

## VOLTAGE REGULATOR WITH ON/OFF SWITCH

### FEATURES

- Low Dropout Voltage
- Electronic ON/OFF Switch
- Very Low Standby Current (ON, No Load)
- Internal Thermal Shutdown
- Short Circuit Protection
- Very Low (<100 nA) Current in OFF Mode
- Customized Versions Are Available

### DESCRIPTION

The TK114xx is a low power, linear regulator with a built-in electronic switch. The internal electronic switch can be controlled by an external pull-up resistor and an open drain or open collector transistor. The device is in the OFF state when the control pin is biased from  $V_{IN}$  through the pull-up resistor.

An internal PNP pass-transistor is used in order to achieve low dropout voltage (typically 200 mV at 50 mA load current). The device has very low quiescent current (500  $\mu$ A) in the ON mode with no load and 2 mA with 30 mA load. The quiescent current is typically 4 mA at 60 mA load. An internal thermal shutdown circuit limits the junction temperature to below 150 °C. The load current is internally monitored and the device will shut down (no load current) in the presence of a short circuit at the output. The device is available in a small SOT-23L surface mount package.

### APPLICATIONS

- Battery Powered Systems
- Cellular Telephones
- Pagers
- Personal Communications Equipment
- Portable Instrumentation
- Portable Consumer Equipment
- Radio Control Systems
- Toys
- Low Voltage Systems

### ORDERING INFORMATION

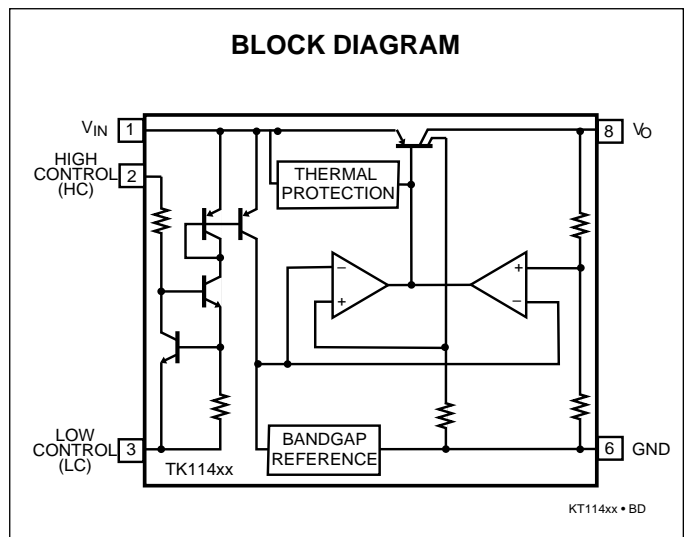
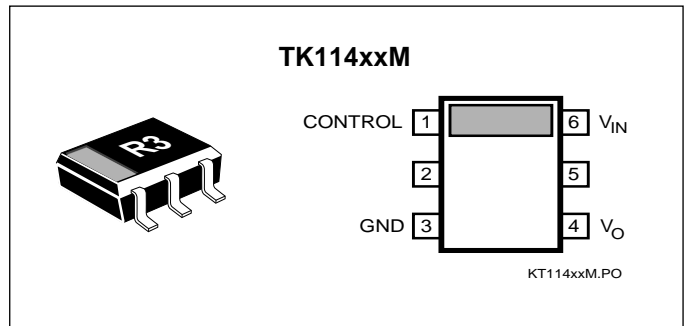
**TK114** □□ □□

└─ Tape/Reel Code

└─ Voltage Code

VOLTAGE CODE	
30 = 3.0 V	47 = 4.75 V
32 = 3.25 V	50 = 5.0 V
35 = 3.5 V	55 = 5.5 V
37 = 3.75 V	57 = 5.75 V
40 = 4.0 V	60 = 6.0 V
45 = 4.5 V	80 = 8.0 V

**TAPE/REEL CODE**  
 BX : Bulk/Bag  
 TL : Tape Left



# TK114xx

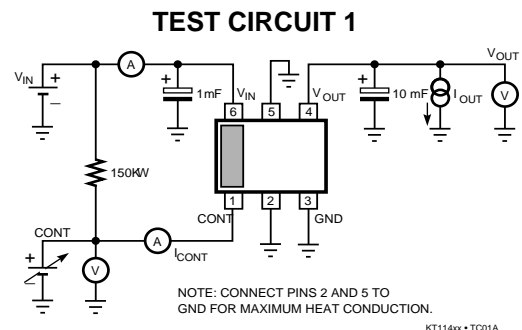
## ABSOLUTE MAXIMUM RATINGS

Supply Voltage .....	16 V	Operating Temperature Range .....	-30 to +80 °C
Load Current .....	180 mA	Lead Soldering Temp. (10 sec.) .....	240 °C
Power Dissipation (Note 1) .....	400 mW	Junction Temperature .....	150 °C
Storage Temperature Range .....	-55 to +150 °C		

## TK11430 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 4\text{ V}, I_O = 0\text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 2.5\text{ V}, I_O = 0\text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10\text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 4\text{ V}, I_O = 30\text{ mA}$	2.9	3.0	3.1	%
$V_{DROPO}$	Dropout Voltage	$I_O = 30\text{ mA}$		0.12	0.3	V
$I_O$	Output Current		70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 4\text{ V} \rightarrow 9\text{ V}$		5	30	mV
LoaReg	Load Regulation	$I_O = 0\text{ mA to } 30\text{ mA}$		18	50	mV
		$I_O = 0\text{ mA to } 60\text{ mA}$		36	80	mV
RR	Ripple Rejection	100 mV(rms), $f = 400\text{ Hz}$ $V_{IN} = 4.5\text{ V}, I_O = 10\text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 4.5\text{ V}, I_O = 10\text{ mA}$ $-20\text{ }^\circ\text{C} \leq T_A \leq 75\text{ }^\circ\text{C}$		$\pm 0.3$		mV/°C
$V_N$	Output Noise Voltage	$V_{IN} = 4.5\text{ V}, I_O = 10\text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 1: Power dissipation must be derated at the rate of 1.6 mW/ °C for operation above  $T_A = 25\text{ }^\circ\text{C}$ .



## TK11432 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 4.2\text{ V}, I_O = 0\text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 2.5\text{ V}, I_O = 0\text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10\text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 4.2\text{ V}, I_O = 30\text{ mA}$	3.13	3.25	3.37	%
$V_{DROP}$	Dropout Voltage	$I_O = 30\text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 4.2\text{ V} \rightarrow 9.2\text{ V}$		6	30	mV
LoaReg	Load Regulation	$V_{IN} = 4.2\text{ V}, I_O = 0\text{ mA to }30\text{ mA}$		20	50	mV
		$V_{IN} = 4.2\text{ V}, I_O = 0\text{ mA to }60\text{ mA}$		40	80	mV
RR	Ripple Rejection	100 mV(rms), $f = 400\text{ Hz}$ $V_{IN} = 4.7\text{ V}, I_O = 10\text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 4.7\text{ V}, I_O = 10\text{ mA}$ $-20\text{ }^\circ\text{C} \leq T_A \leq 75\text{ }^\circ\text{C}$		$\pm 0.3$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$10\text{ Hz} \leq f \leq 100\text{ KHz}, I_O = 10\text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30\text{ mA}$ .

## TK11435 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 4.5\text{ V}, I_O = 0\text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 2.5\text{ V}, I_O = 0\text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10\text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 4.5\text{ V}, I_O = 30\text{ mA}$	3.38	3.5	3.62	%
$V_{DROP}$	Dropout Voltage	$I_O = 30\text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 4.5\text{ V} \rightarrow 9.5\text{ V}$		7	35	mV
LoaReg	Load Regulation	$I_O = 0\text{ mA to }30\text{ mA}$		20	55	mV
		$I_O = 0\text{ mA to }60\text{ mA}$		40	95	<b>mV</b>
RR	Ripple Rejection	100 mV(rms), $f = 400\text{ Hz}$ $V_{IN} = 4.5\text{ V}, I_O = 10\text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 4.5\text{ V}, I_O = 10\text{ mA}$ $-20\text{ }^\circ\text{C} \leq T_A \leq 75\text{ }^\circ\text{C}$		$\pm 0.3$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 4.5\text{ V}, I_O = 10\text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30\text{ mA}$ .

## TK11437 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 4.7\text{ V}, I_O = 0\text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 2.7\text{ V}, I_O = 0\text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10\text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 4.7\text{ V}, I_O = 30\text{ mA}$	3.62	3.75	3.88	%
$V_{DROP}$	Dropout Voltage	$I_O = 30\text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 4.7\text{ V} \rightarrow 9.7\text{ V}$		7	35	mV
LoaReg	Load Regulation	$I_O = 0\text{ mA to }30\text{ mA}$		20	110	mV
		$I_O = 0\text{ mA to }60\text{ mA}$		40	100	mV
RR	Ripple Rejection	100 mV(rms), $f = 400\text{ Hz}$ $V_{IN} = 5.2\text{ V}, I_O = 10\text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 5.2\text{ V}, I_O = 10\text{ mA}$ $-20\text{ }^\circ\text{C} \leq T_A \leq 75\text{ }^\circ\text{C}$		$\pm 0.4$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 4.5\text{ V}, I_O = 10\text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30\text{ mA}$ .

## TK11440 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 5\text{ V}, I_O = 0\text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 3.0\text{ V}, I_O = 0\text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10\text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 5\text{ V}, I_O = 30\text{ mA}$	3.86	4.0	3.1	%
$V_{DROP}$	Dropout Voltage	$I_O = 30\text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 5\text{ V} \rightarrow 10\text{ V}$		8	40	mV
LoaReg	Load Regulation	$I_O = 0\text{ mA to } 30\text{ mA}$		24	60	mV
		$I_O = 0\text{ mA to } 60\text{ mA}$		48	100	mV
RR	Ripple Rejection	100 mV(rms), $f = 400\text{ Hz}$ $V_{IN} = 5.5\text{ V}, I_O = 10\text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 5.5\text{ V}, I_O = 10\text{ mA}$ $-20\text{ }^\circ\text{C} \leq T_A \leq 75\text{ }^\circ\text{C}$		$\pm 0.4$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 5.5\text{ V}, I_O = 10\text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30\text{ mA}$ .

## TK11445 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 5\text{ V}, I_O = 0\text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 3.5\text{ V}, I_O = 0\text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10\text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 5.5\text{ V}, I_O = 30\text{ mA}$	4.34	4.5	4.66	%
$V_{DROP}$	Dropout Voltage	$I_O = 30\text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 5.5\text{ V} \rightarrow 10.5\text{ V}$		8	40	mV
LoaReg	Load Regulation	$I_O = 0\text{ mA to }30\text{ mA}$		25	65	mV
		$I_O = 0\text{ mA to }60\text{ mA}$		55	110	mV
RR	Ripple Rejection	100 mV(rms), $f = 400\text{ Hz}$ $V_{IN} = 6\text{ V}, I_O = 10\text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 6\text{ V}, I_O = 10\text{ mA}$ $-20\text{ }^\circ\text{C} \leq T_A \leq 75\text{ }^\circ\text{C}$		$\pm 0.5$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 6\text{ V}, I_O = 10\text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30\text{ mA}$ .

## TK11447 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 5.7 \text{ V}, I_O = 0 \text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 3.7 \text{ V}, I_O = 0 \text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10 \text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 5.7 \text{ V}, I_O = 30 \text{ mA}$	4.58	4.75	4.92	%
$V_{DROP}$	Dropout Voltage	$I_O = 30 \text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 5.7 \text{ V} \rightarrow 10.7 \text{ V}$		8	40	mV
LoaReg	Load Regulation	$I_O = 0 \text{ mA to } 30 \text{ mA}$		25	70	mV
		$I_O = 0 \text{ mA to } 60 \text{ mA}$		50	120	mV
RR	Ripple Rejection	100 mV(rms), $f = 400 \text{ Hz}$ $V_{IN} = 6.2 \text{ V}, I_O = 10 \text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 6.2 \text{ V}, I_O = 10 \text{ mA}$ $-20 \text{ }^\circ\text{C} \leq T_A \leq 75 \text{ }^\circ\text{C}$		$\pm 0.6$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 6.2 \text{ V}, I_O = 10 \text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30 \text{ mA}$ .



## TK11450 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 6.0 \text{ V}, I_O = 0 \text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 4.0 \text{ V}, I_O = 0 \text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10 \text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 6.0 \text{ V}, I_O = 30 \text{ mA}$	4.83	5.0	5.17	%
$V_{DROP}$	Dropout Voltage	$I_O = 30 \text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 6 \text{ V} \rightarrow 11 \text{ V}$		8	40	mV
LoaReg	Load Regulation	$I_O = 0 \text{ mA to } 30 \text{ mA}$		25	70	mV
		$I_O = 0 \text{ mA to } 60 \text{ mA}$		60	120	mV
RR	Ripple Rejection	100 mV(rms), $f = 400 \text{ Hz}$ $V_{IN} = 6.5 \text{ V}, I_O = 10 \text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 6.5 \text{ V}, I_O = 10 \text{ mA}$ $-20 \text{ }^\circ\text{C} \leq T_A \leq 75 \text{ }^\circ\text{C}$		$\pm 0.6$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 6.5 \text{ V}, I_O = 10 \text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30 \text{ mA}$ .

## TK11455 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 6.5 \text{ V}, I_O = 0 \text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 4.5 \text{ V}, I_O = 0 \text{ mA}$		1	2.5	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10 \text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 6.5 \text{ V}, I_O = 30 \text{ mA}$	5.31	5.5	5.69	%
$V_{DROP}$	Dropout Voltage	$I_O = 30 \text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 6.5 \text{ V} \rightarrow 11.5 \text{ V}$		8	40	mV
LoaReg	Load Regulation	$I_O = 0 \text{ mA to } 30 \text{ mA}$		30	75	mV
		$I_O = 0 \text{ mA to } 60 \text{ mA}$		65	130	mV
RR	Ripple Rejection	100 mV(rms), $f = 400 \text{ Hz}$ $V_{IN} = 7.0 \text{ V}, I_O = 10 \text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 7.0 \text{ V}, I_O = 10 \text{ mA}$ $-20 \text{ }^\circ\text{C} \leq T_A \leq 75 \text{ }^\circ\text{C}$		$\pm 0.7$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 7.0 \text{ V}, I_O = 10 \text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30 \text{ mA}$ .

## TK11460 ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 7.0 \text{ V}, I_O = 0 \text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 5.0 \text{ V}, I_O = 0 \text{ mA}$		1	3.0	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10 \text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 7.0 \text{ V}, I_O = 30 \text{ mA}$	5.79	6.0	6.21	%
$V_{DROP}$	Dropout Voltage	$I_O = 30 \text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 7.0 \text{ V} \rightarrow 12 \text{ V}$		8	40	mV
LoaReg	Load Regulation	$I_O = 0 \text{ mA to } 30 \text{ mA}$		30	80	mV
		$I_O = 0 \text{ mA to } 60 \text{ mA}$		65	140	mV
RR	Ripple Rejection	100 mV(rms), $f = 400 \text{ Hz}$ $V_{IN} = 7.5 \text{ V}, I_O = 10 \text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 7.5 \text{ V}, I_O = 10 \text{ mA}$ $-20 \text{ }^\circ\text{C} \leq T_A \leq 75 \text{ }^\circ\text{C}$		$\pm 0.7$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 7.5 \text{ V}, I_O = 10 \text{ mA}$		180		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30 \text{ mA}$ .

## TK11480 ELECTRICAL CHARACTERISTICS

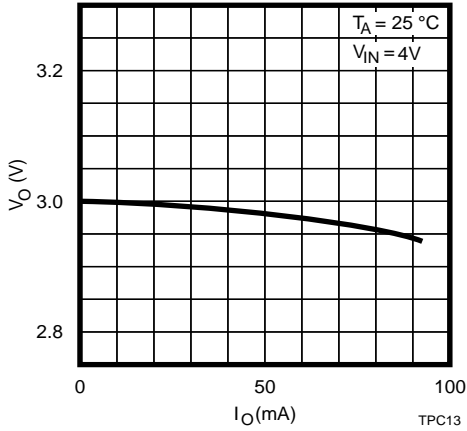
SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNITS
$I_{IN1}$	Supply Current 1	$V_{IN} = 9.0 \text{ V}, I_O = 0 \text{ mA}$		500	900	$\mu\text{A}$
$I_{IN2}$	Supply Current 2	$V_{IN} = 7.0 \text{ V}, I_O = 0 \text{ mA}$		1	3.0	$\mu\text{A}$
$I_{INS}$	Standby Current	$V_{IN} = 10 \text{ V}, \text{Output Off}$			0.1	$\mu\text{A}$
$V_O$	Output Voltage Regulation	$V_{IN} = 9.0 \text{ V}, I_O = 30 \text{ mA}$	7.72	8.0	8.28	%
$V_{DROP}$	Dropout Voltage	$I_O = 30 \text{ mA}$		0.12	0.3	V
$I_O$	Output Current	(Note 2)	70	110		mA
$I_{OR}$	Recommended Output Current				70	mA
LinReg	Line Regulation	$V_{IN} = 9 \text{ V} \rightarrow 13 \text{ V}$		8	40	mV
LoaReg	Load Regulation	$I_O = 0 \text{ mA to } 30 \text{ mA}$		30	100	mV
		$I_O = 0 \text{ mA to } 60 \text{ mA}$		65	180	mV
RR	Ripple Rejection	100 mV(rms), $f = 400 \text{ Hz}$ $V_{IN} = 9.5 \text{ V}, I_O = 10 \text{ mA}$		55		dB
$\Delta V/\Delta T$	$V_O$ Temperature Coefficient	$V_{IN} = 9.5 \text{ V}, I_O = 10 \text{ mA}$ $-20 \text{ }^\circ\text{C} \leq T_A \leq 75 \text{ }^\circ\text{C}$		$\pm 0.7$		mV/ $^\circ\text{C}$
$V_N$	Output Noise Voltage	$V_{IN} = 9.5 \text{ V}, I_O = 10 \text{ mA}$		220		$\mu\text{V(rms)}$
<b>Control Pin</b>						
$I_{CONT}$	Control Pin Current	On Mode		35	120	$\mu\text{A}$
$V_{Coff}$	Control Pin Voltage	Off Mode	$V_{IN}-0.2$		$V_{IN}$	V
$V_{Con}$	Control Pin Voltage	On Mode	0		0.6	V

Note 2:  $I_O$  (Load Current) is current when  $V_O$  drop down 0.3V from  $V_O$  at  $I_O = 30 \text{ mA}$ .

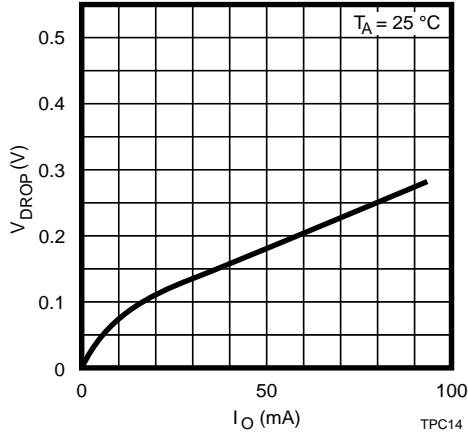
TYPICAL PERFORMANCE CHARACTERISTICS

TK11430

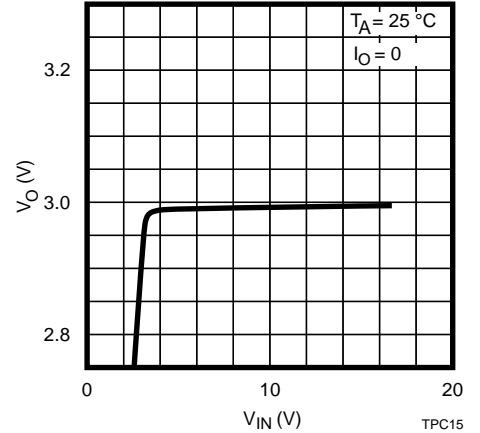
OUTPUT VOLTAGE vs OUTPUT CURRENT



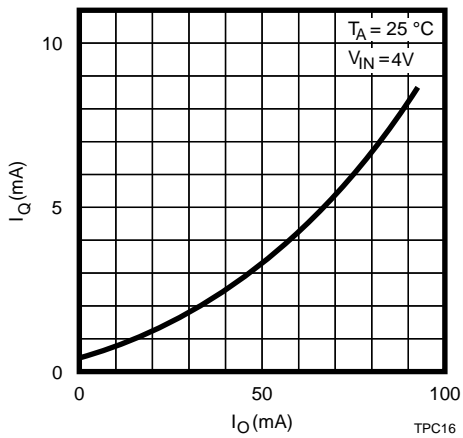
DROPOUT VOLTAGE vs LOAD CURRENT



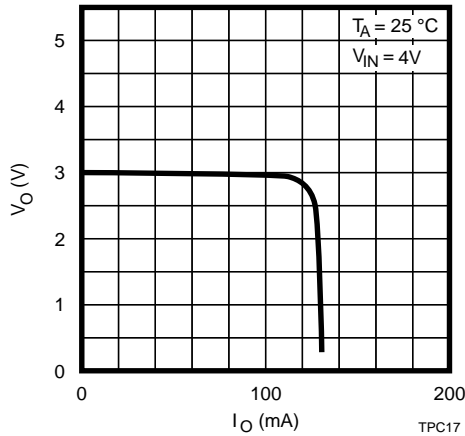
OUTPUT VOLTAGE vs INPUT VOLTAGE



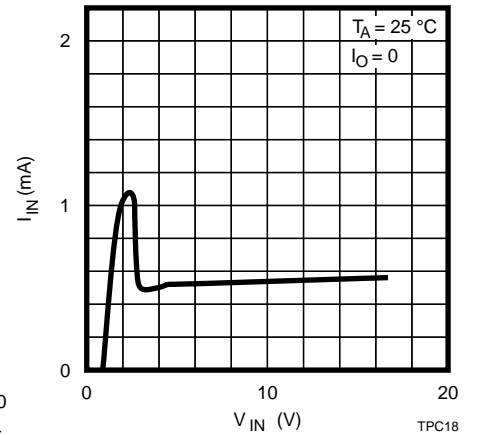
QUIESCENT CURRENT vs LOAD CURRENT



SHORT CIRCUIT PROTECTION

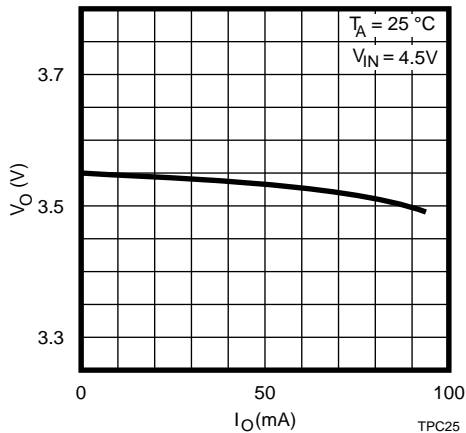


INPUT CURRENT vs INPUT VOLTAGE

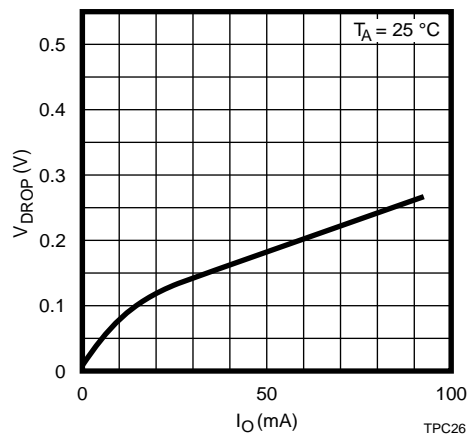


TK11435

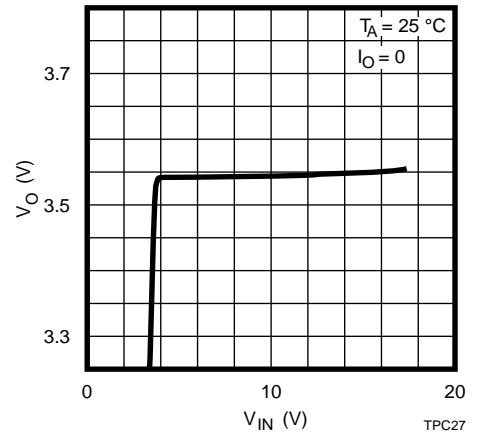
OUTPUT VOLTAGE vs OUTPUT CURRENT



DROPOUT VOLTAGE vs LOAD CURRENT



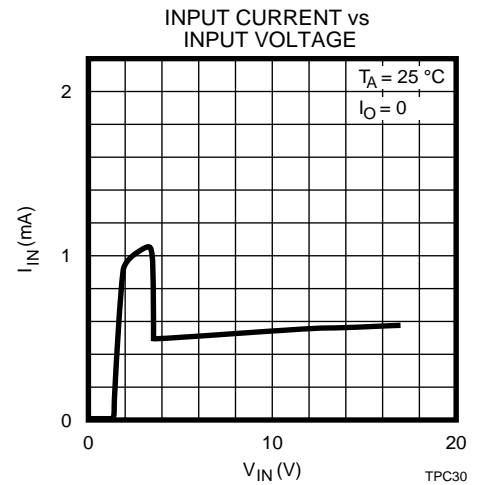
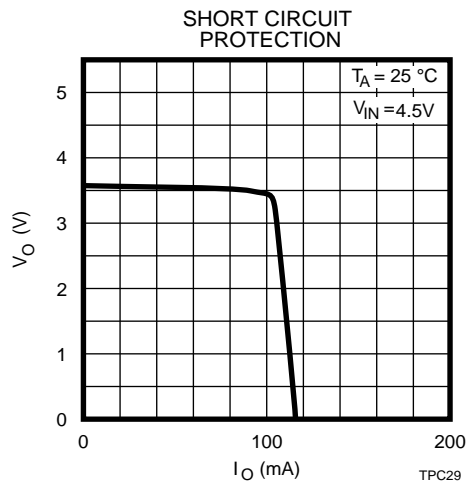
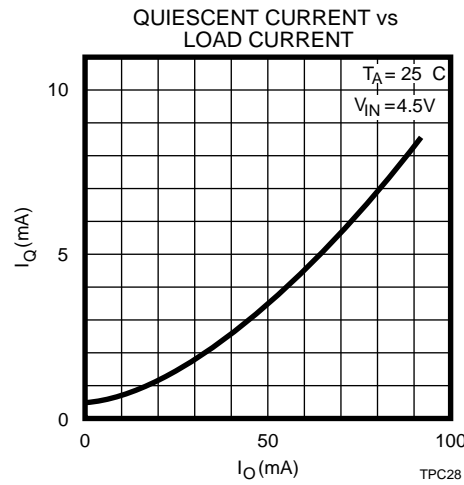
OUTPUT VOLTAGE vs INPUT VOLTAGE



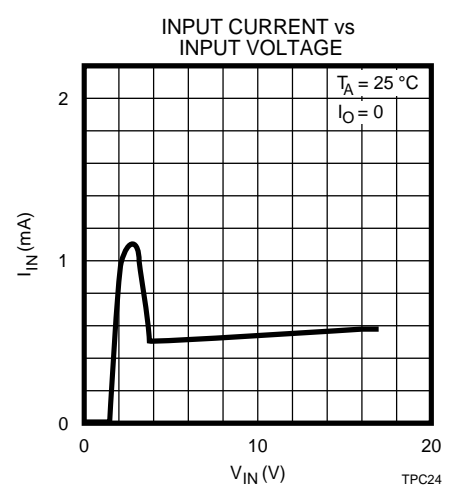
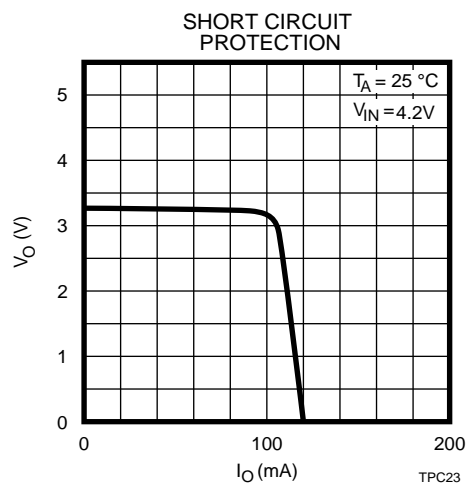
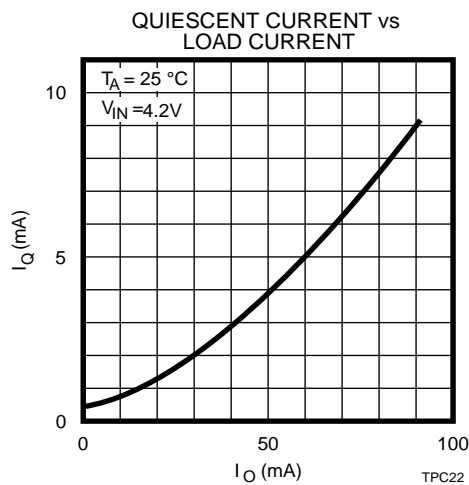
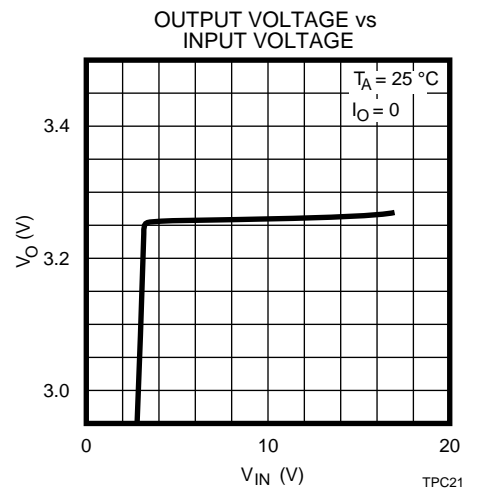
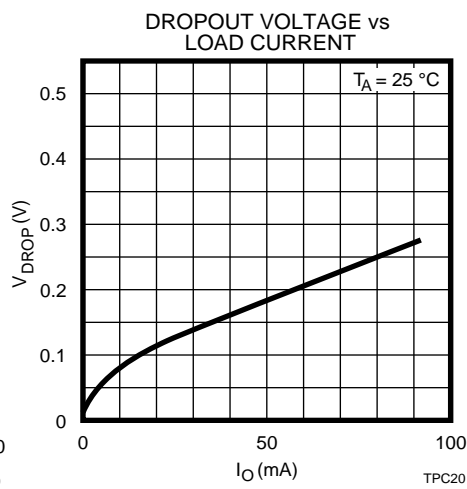
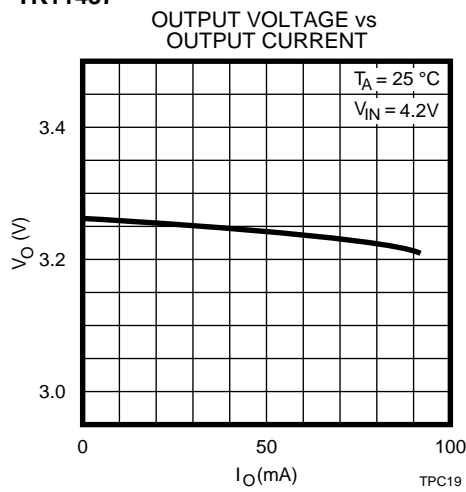
# TK114xx

## TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

### TK11435 (CONT.)

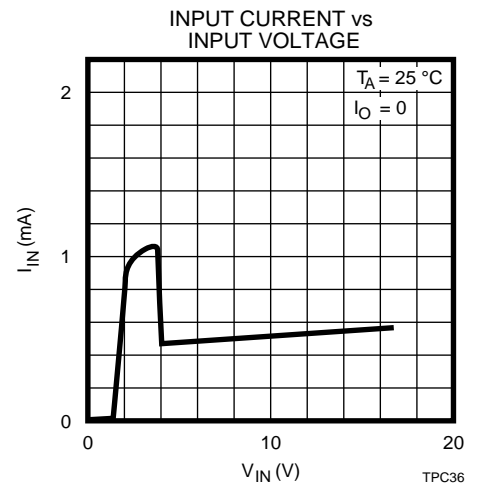
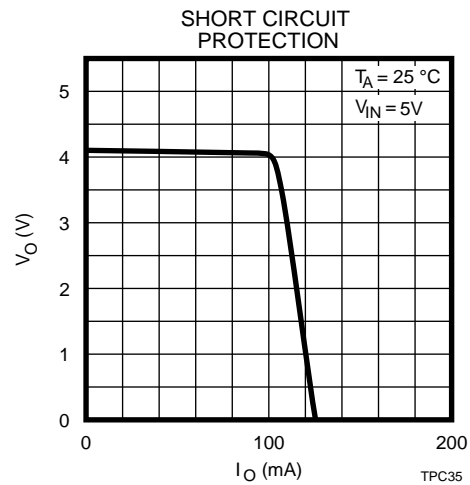
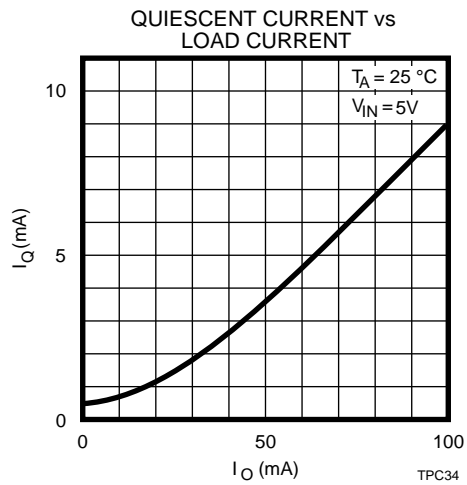
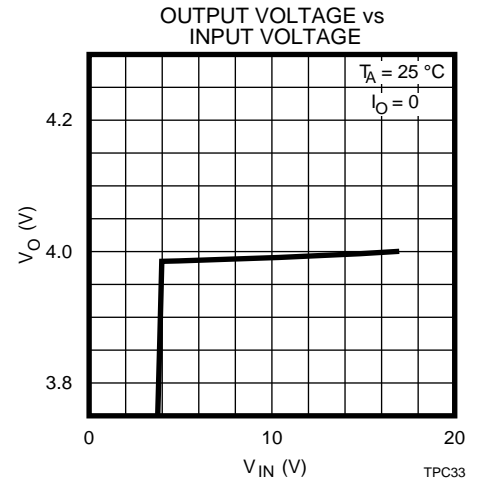
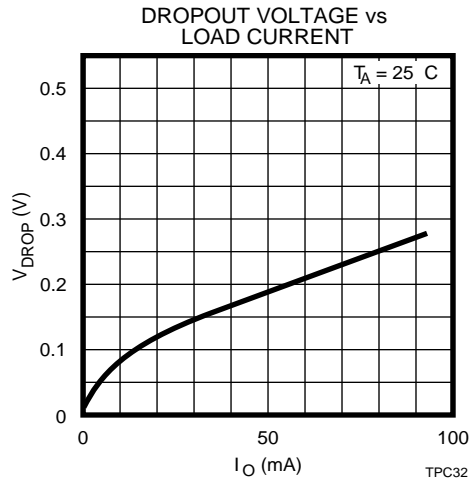
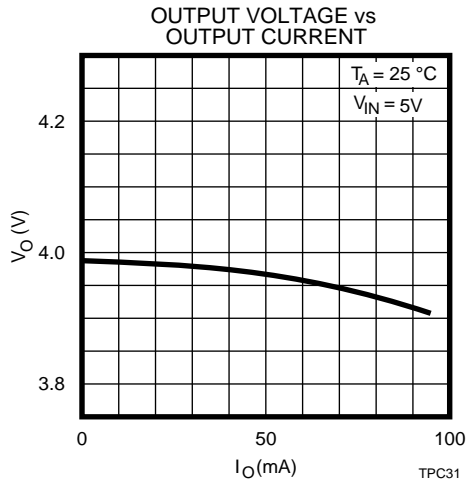


### TK11437

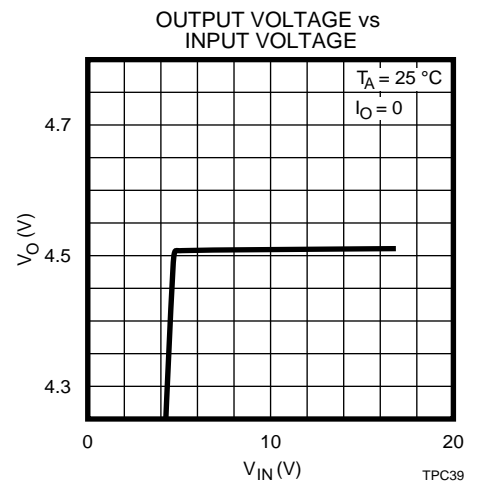
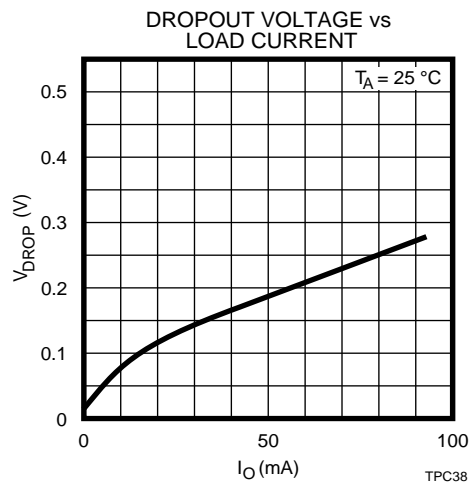
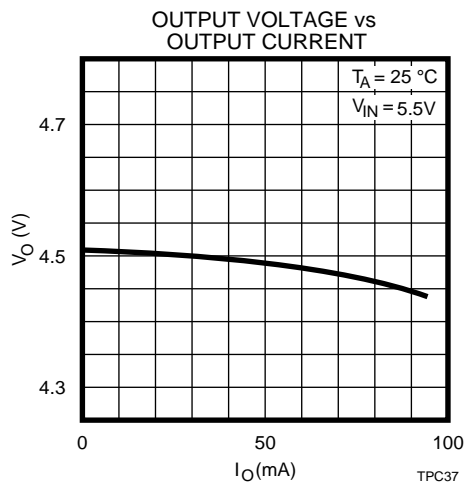


TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TK11440

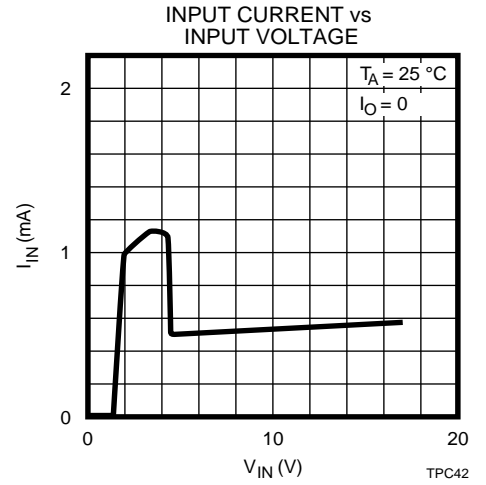
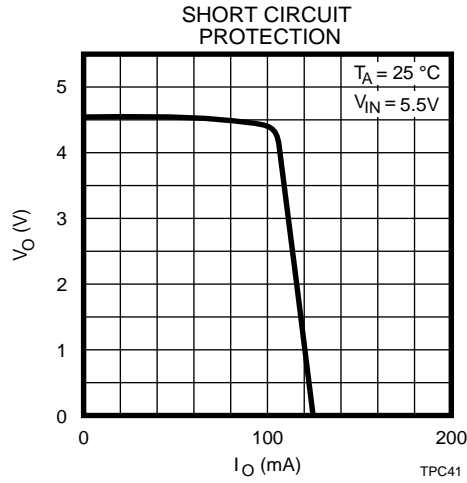
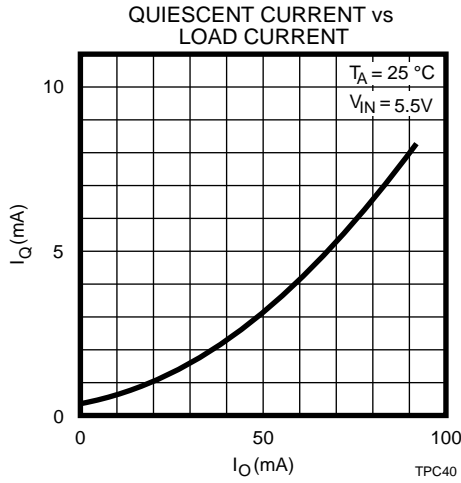


TK11445

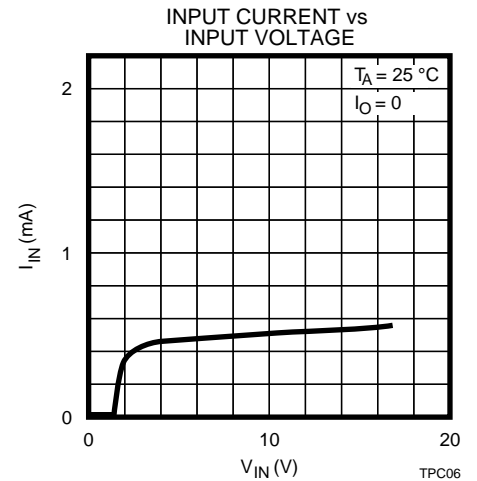
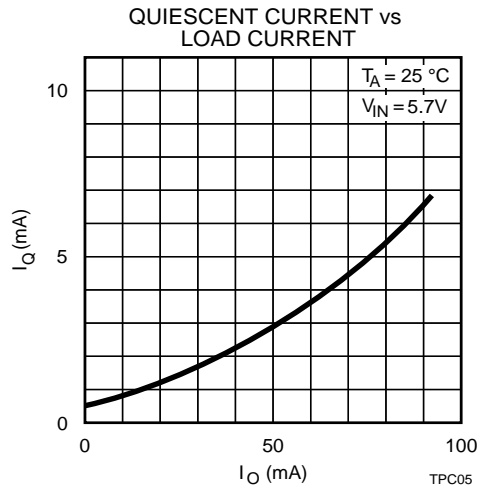
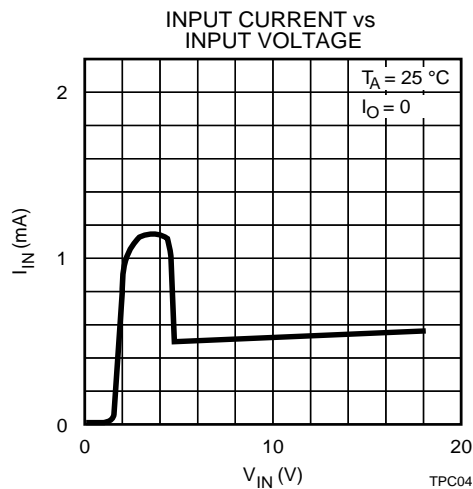
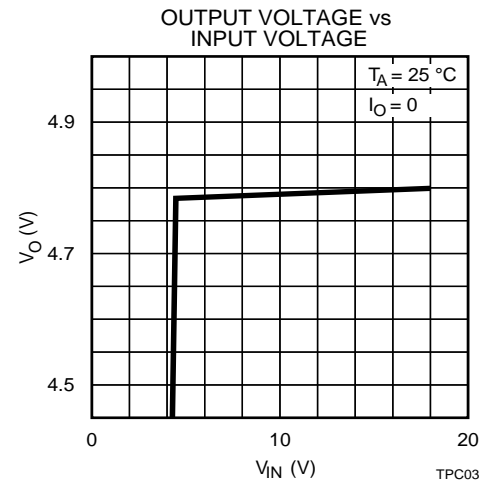
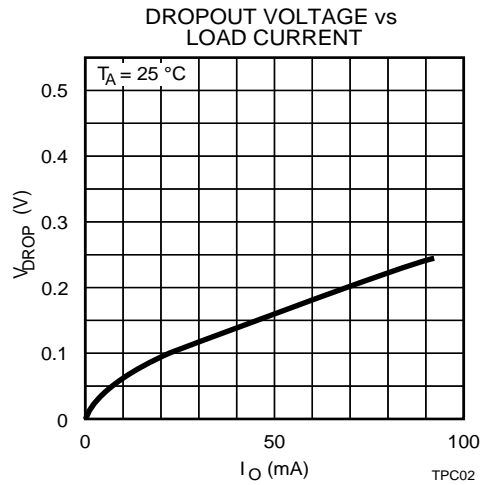
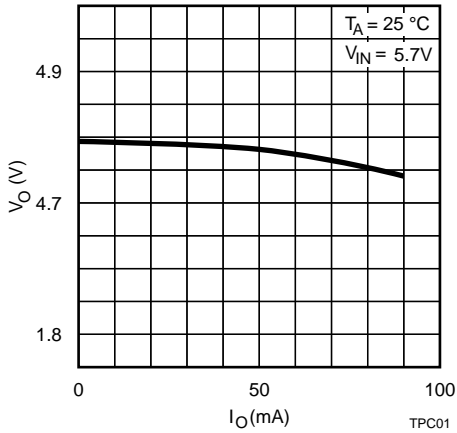


## TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

### TK11445 (CONT.)



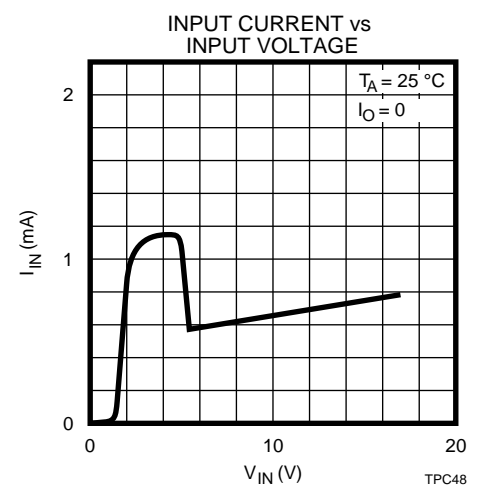
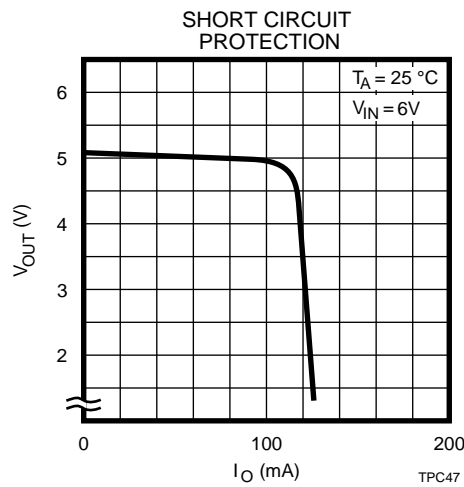
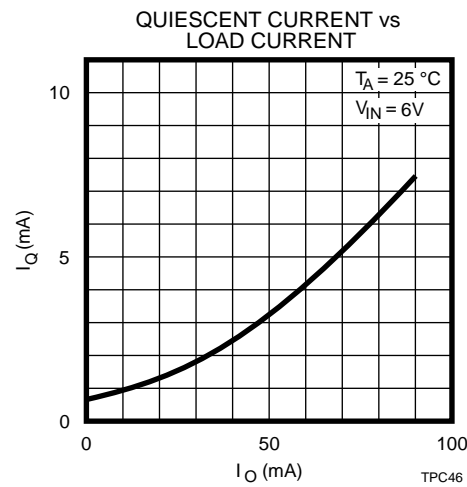
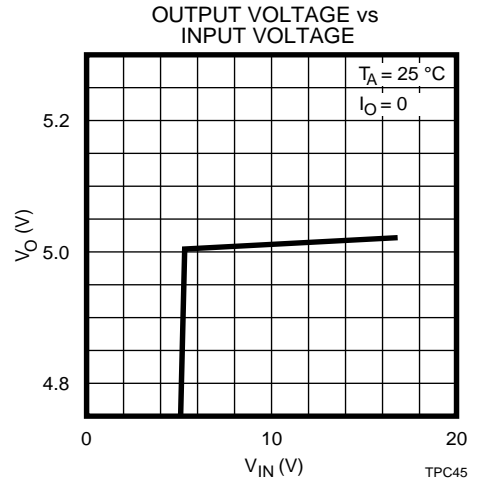
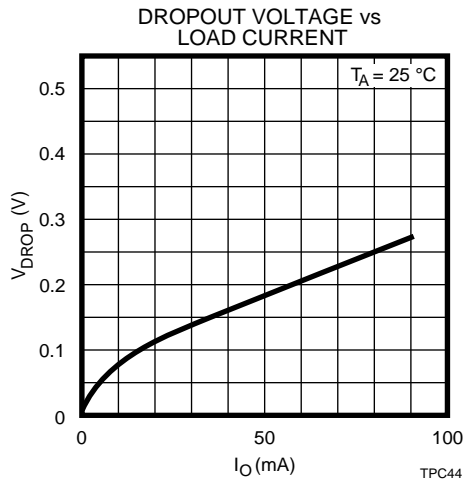
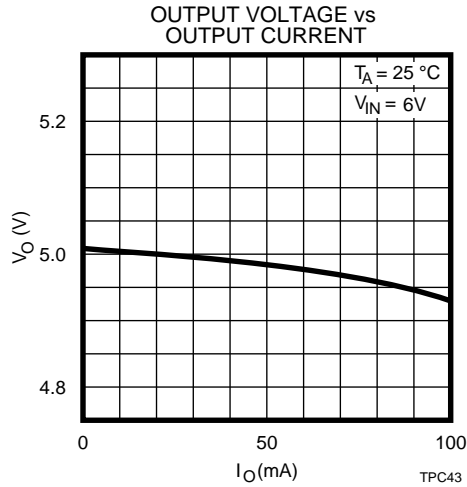
### TK11447 OUTPUT VOLTAGE vs OUTPUT CURRENT



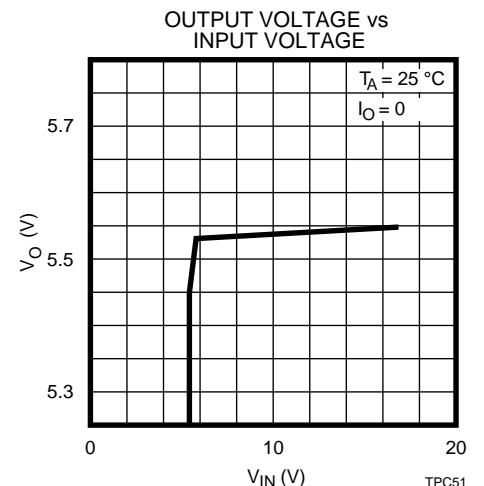
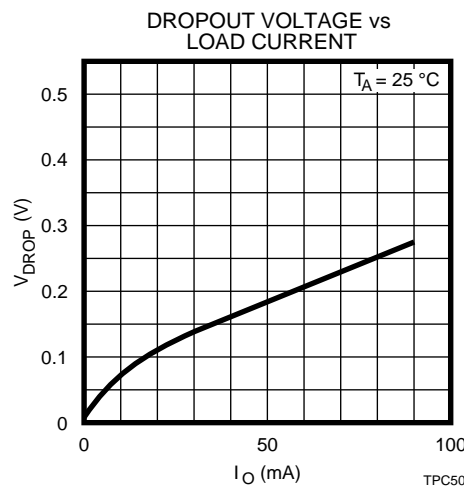
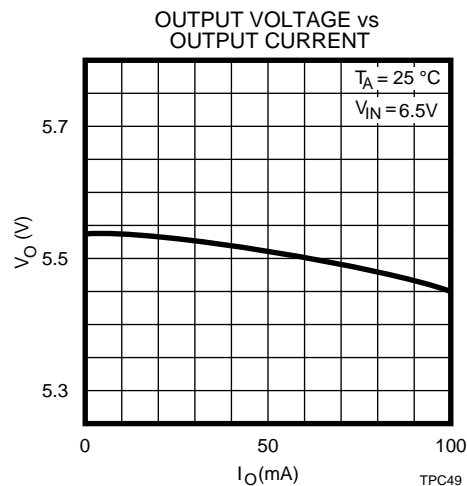


TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

TK11450



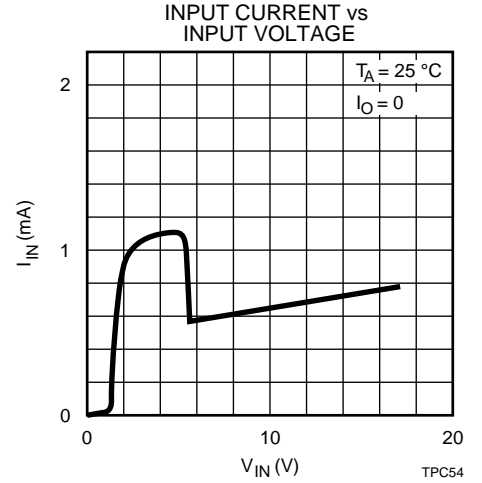
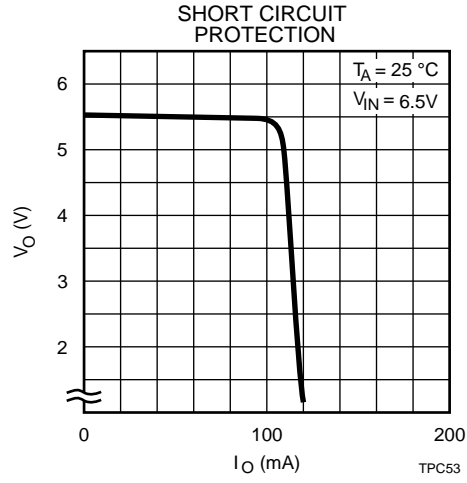
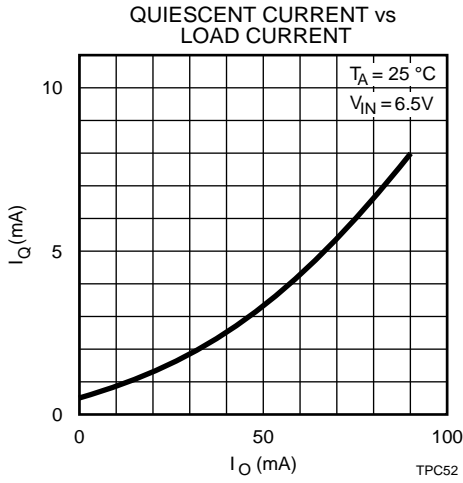
TK11455



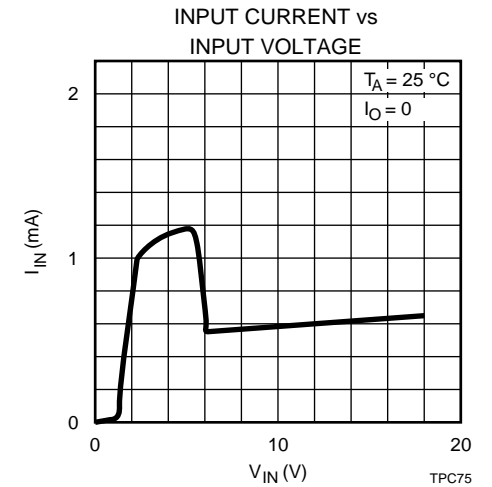
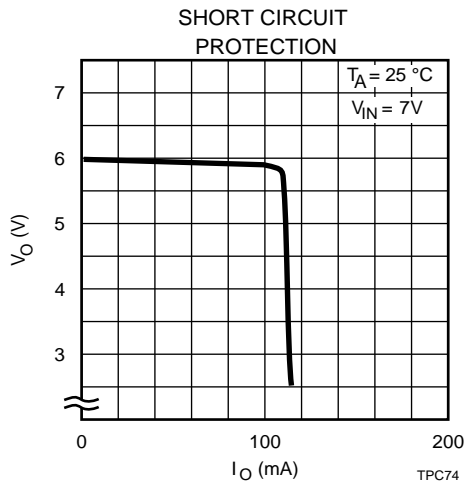
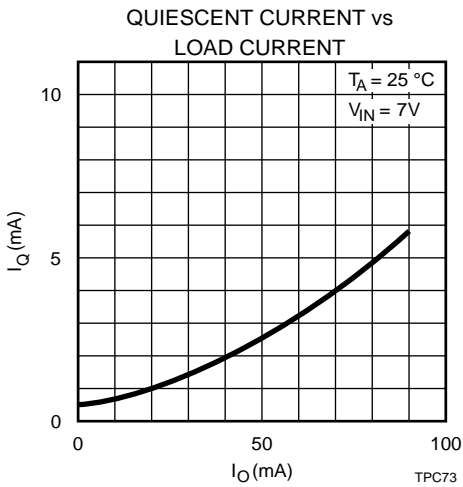
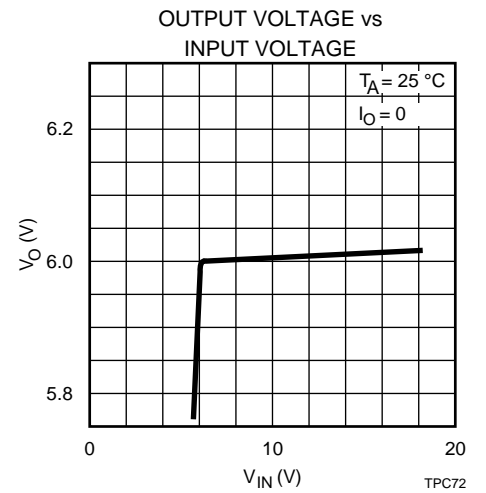
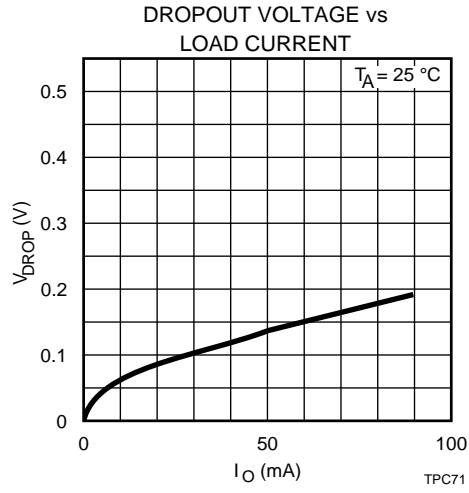
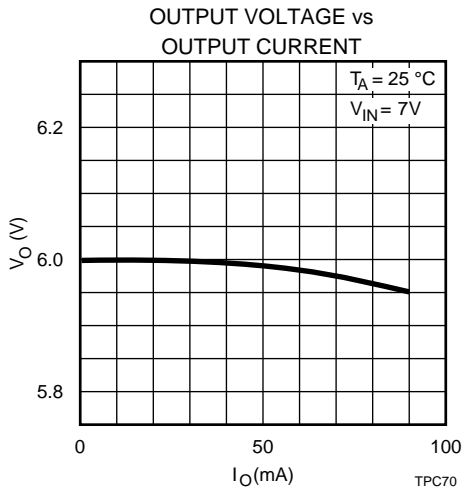
# TK114xx

## TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

### TK11455 (CONT.)

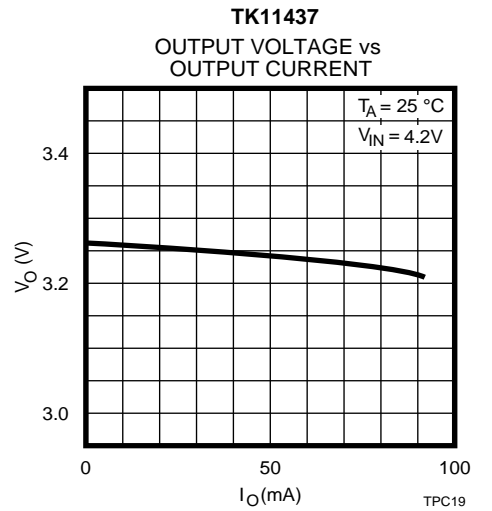
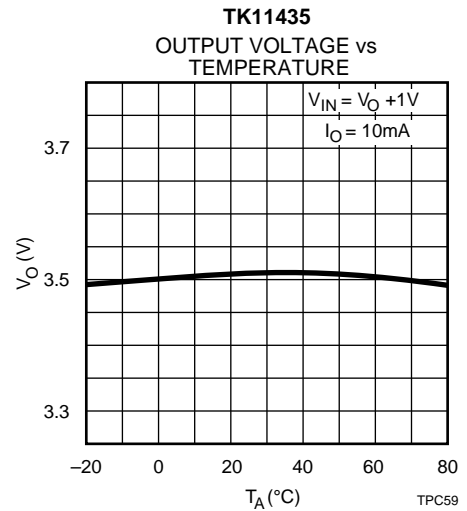
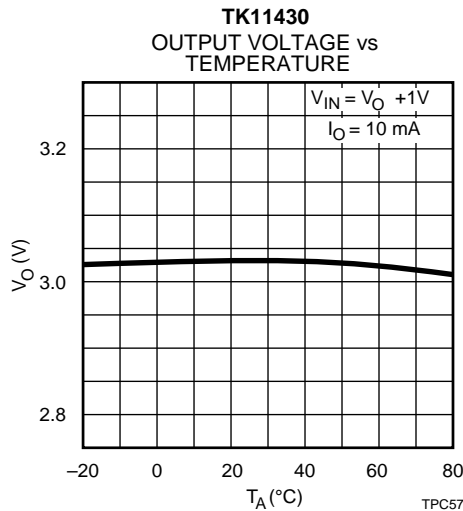
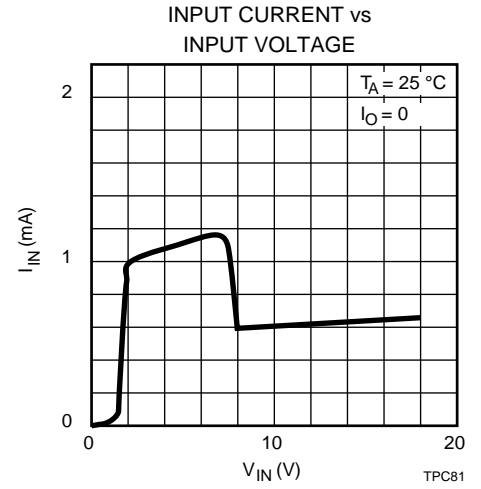
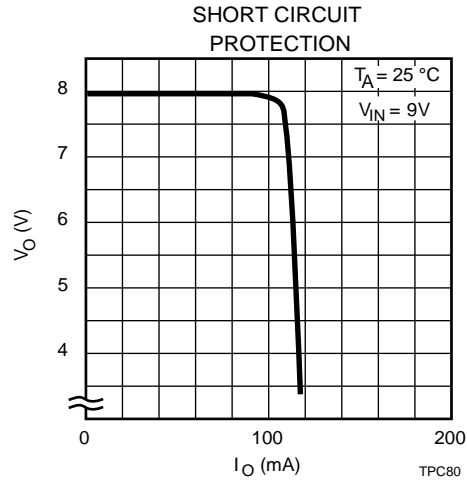
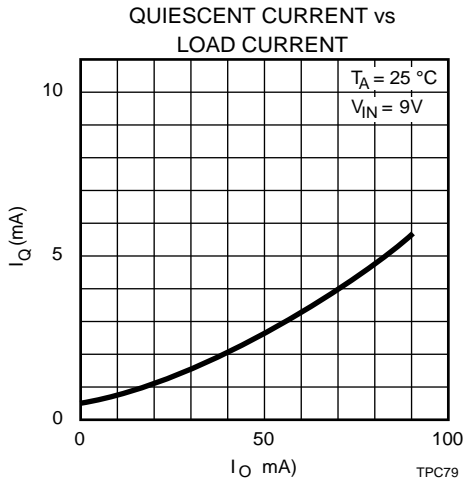
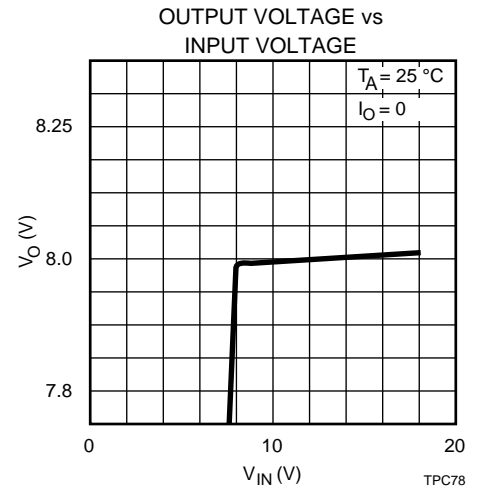
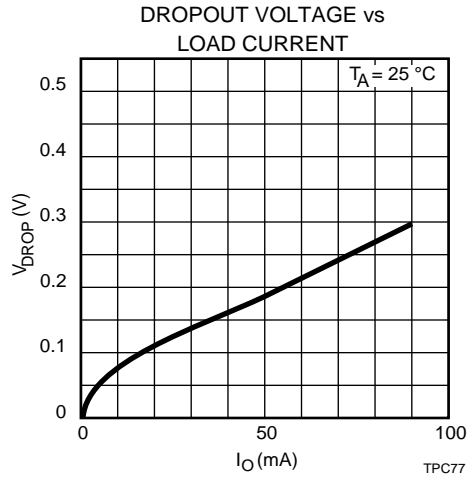
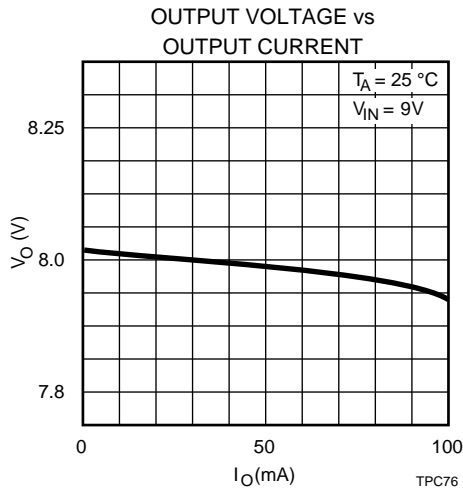


### TK11460



TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

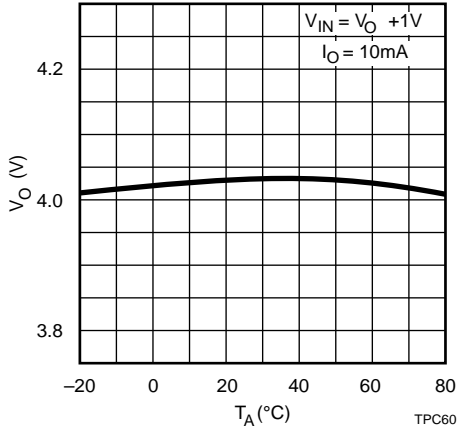
TK11480



## TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

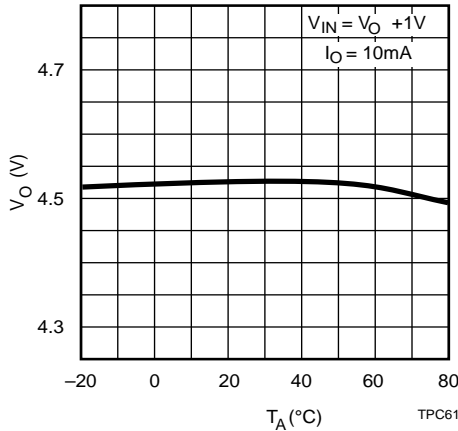
**TK11440**

OUTPUT VOLTAGE vs TEMPERATURE



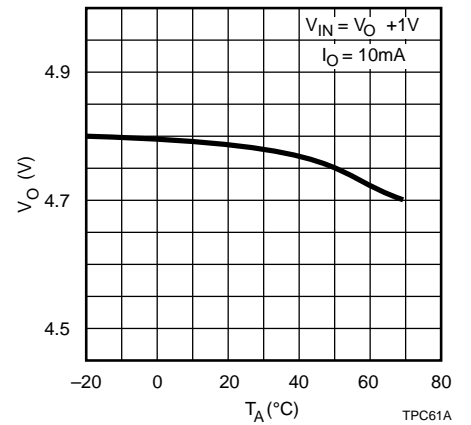
**TK11445**

OUTPUT VOLTAGE vs TEMPERATURE



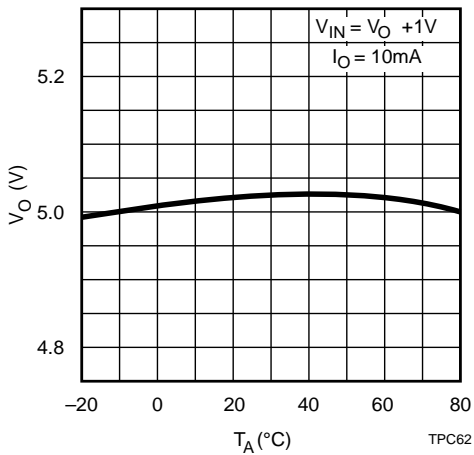
**TK11447**

OUTPUT VOLTAGE vs TEMPERATURE



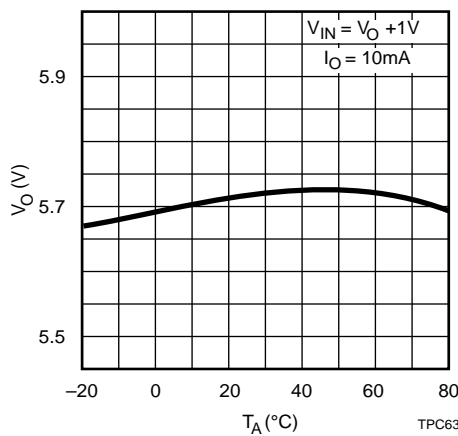
**TK11450**

OUTPUT VOLTAGE vs TEMPERATURE



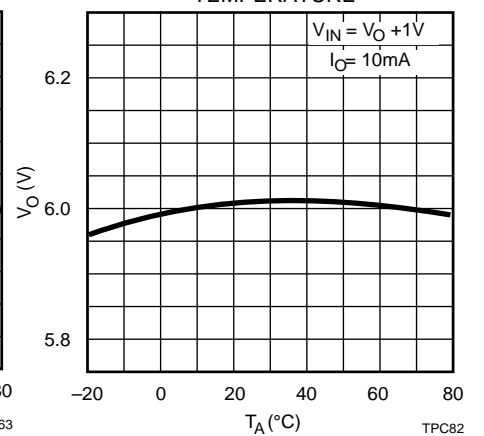
**TK11457**

OUTPUT VOLTAGE vs TEMPERATURE



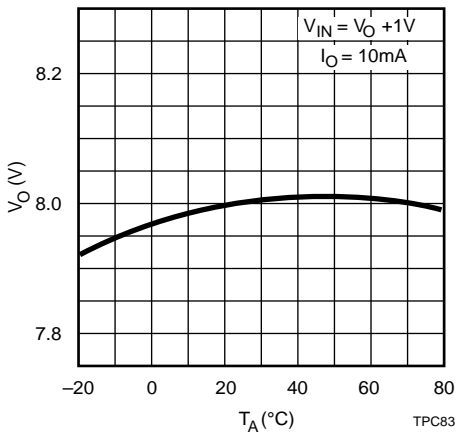
**TK11460**

OUTPUT VOLTAGE vs TEMPERATURE



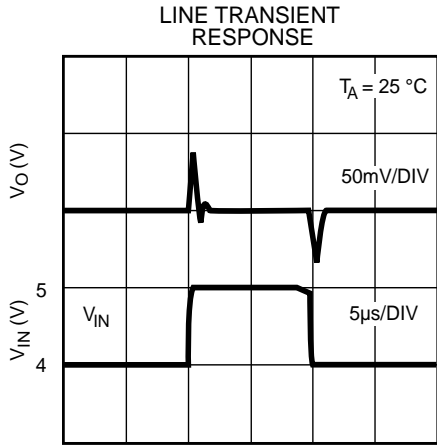
**TK11480**

OUTPUT VOLTAGE vs TEMPERATURE

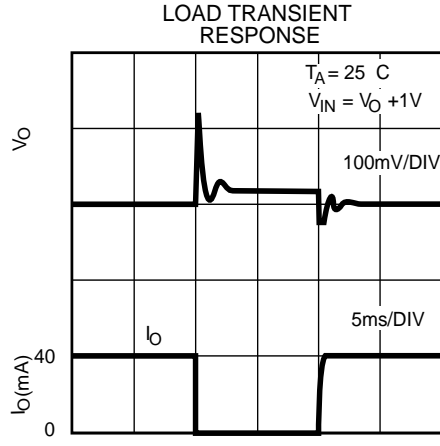


## TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)

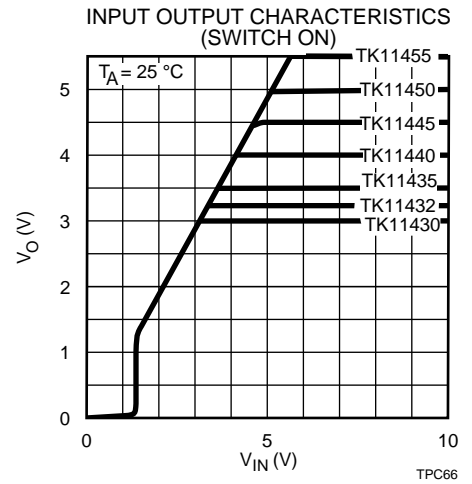
### COMMON CHARACTERISTICS



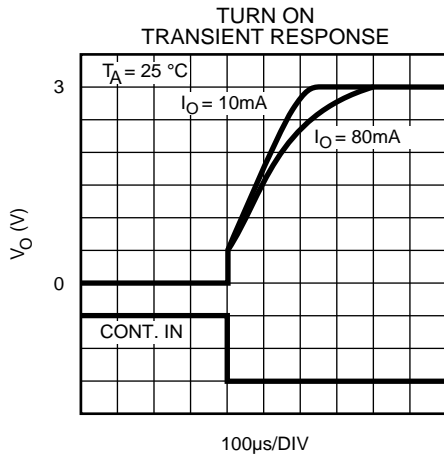
TPC64



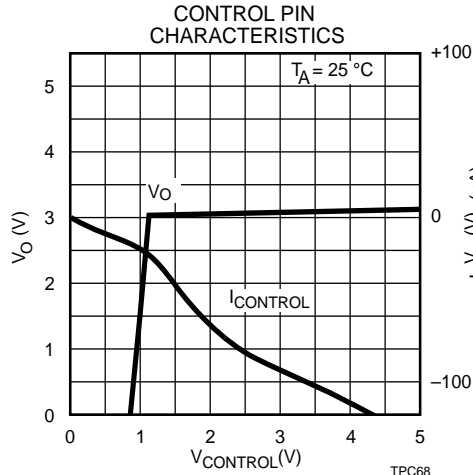
TPC65



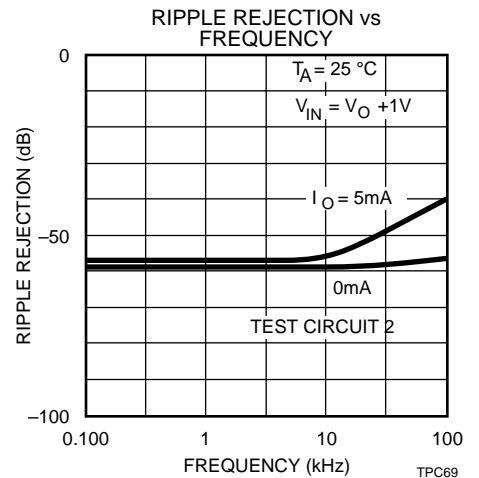
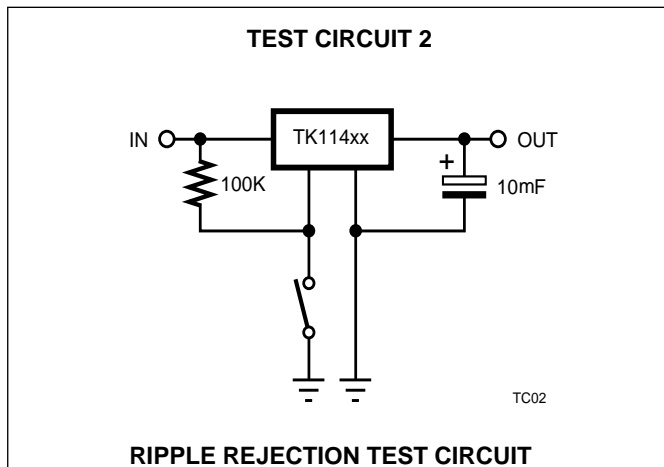
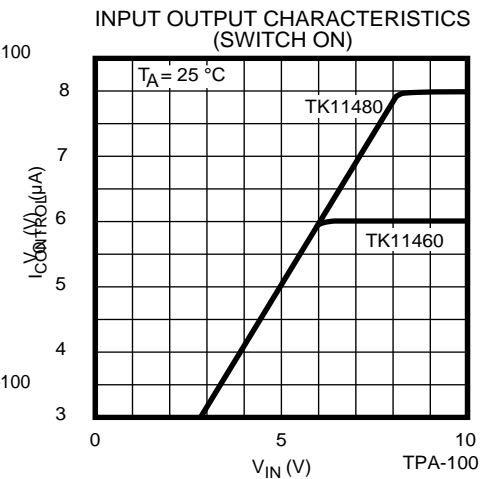
TPC66



TPC67

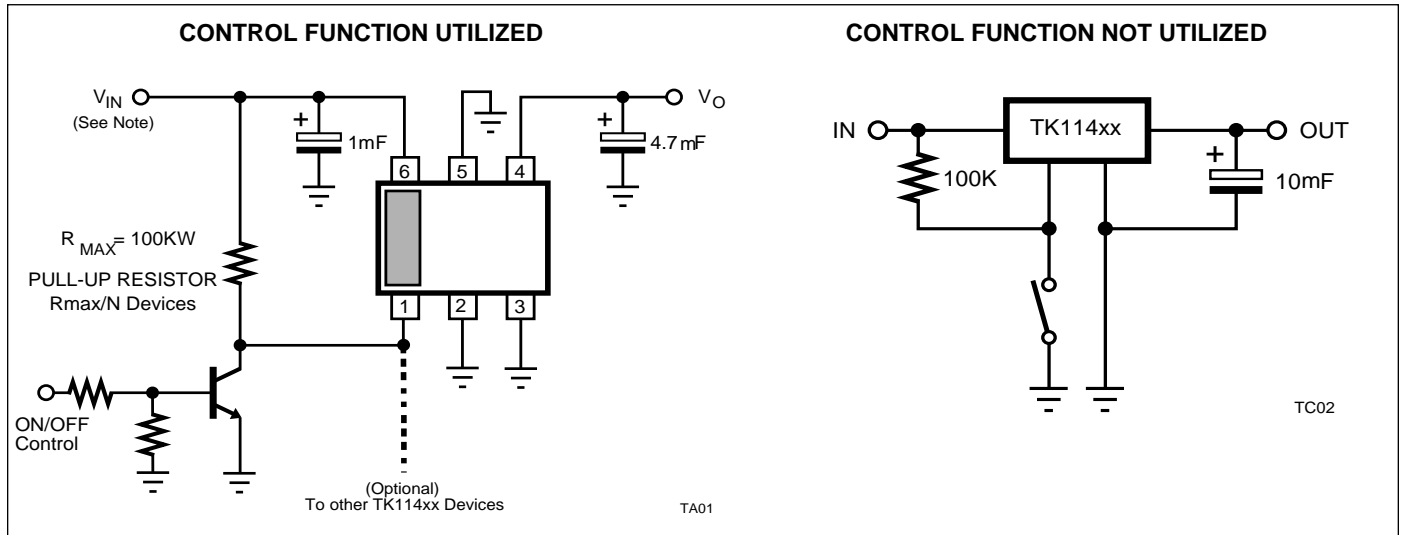


TPC68

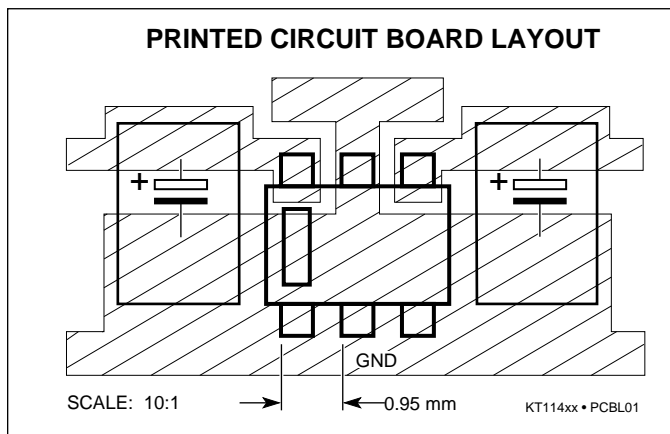


# TK114xx

## TYPICAL APPLICATIONS



Note: Parallel connection of control pins is allowed if all devices use identical input voltage.



### Application Hints

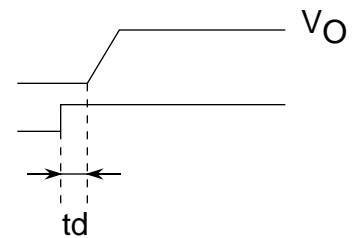
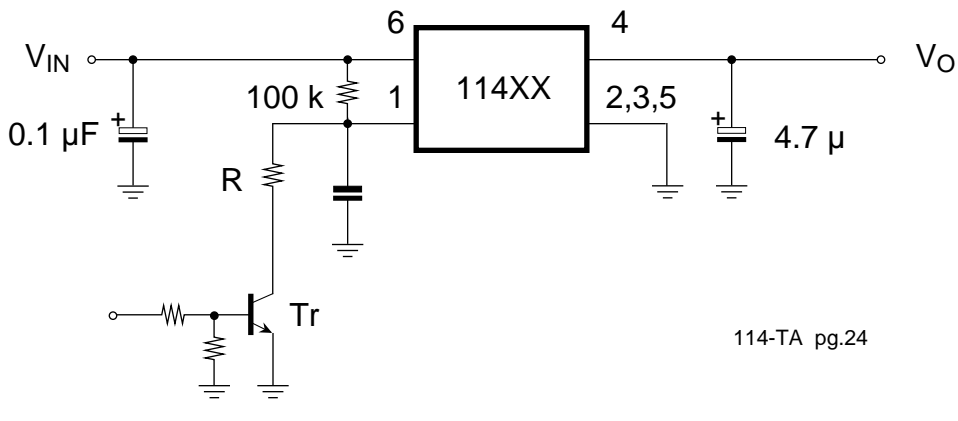
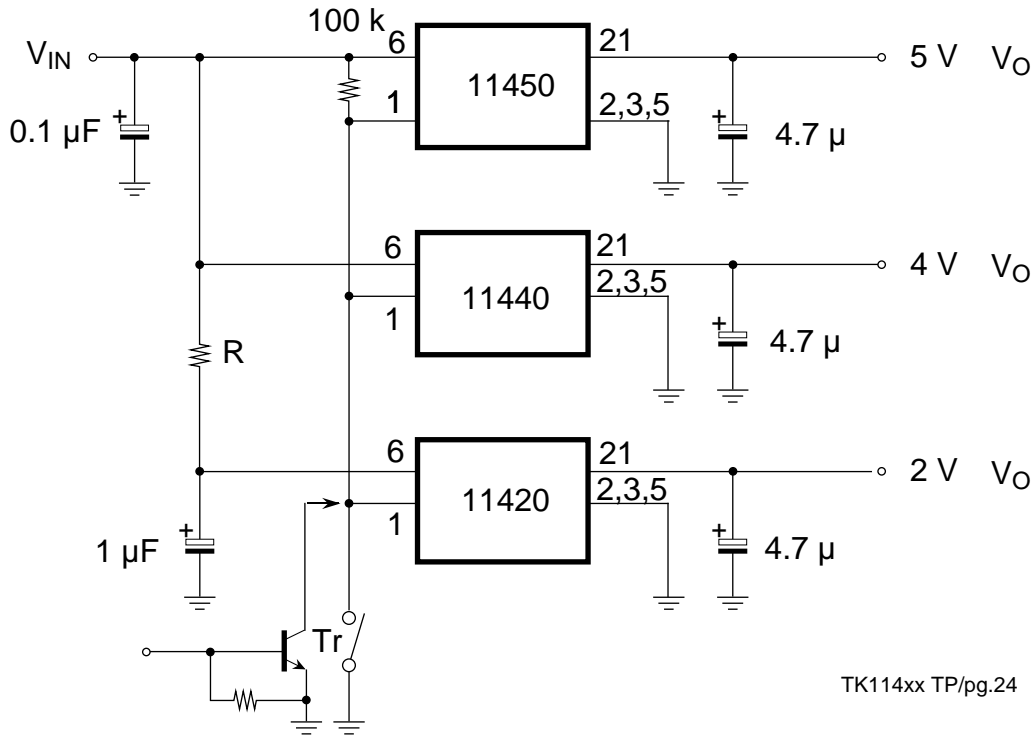
Maximize copper foil area connecting to all IC pins for optimum performance. Place input and output bypass capacitors close to the GND pin. For best transient behavior and lowest output impedance, use as large a capacitor value as possible. The temperature coefficient of the capacitance and Equivalent Series Resistance (ESR) should be taken into account. These parameters can influence power supply noise and ripple rejection. In extreme cases, oscillation may occur. In order to maintain stability, the output bypass capacitor value should be minimum 2.2  $\mu\text{F}$  for a Tantalum electrolytic or 4.7  $\mu\text{F}$  for an Aluminum electrolytic.

### Handling Molded Resin Packages

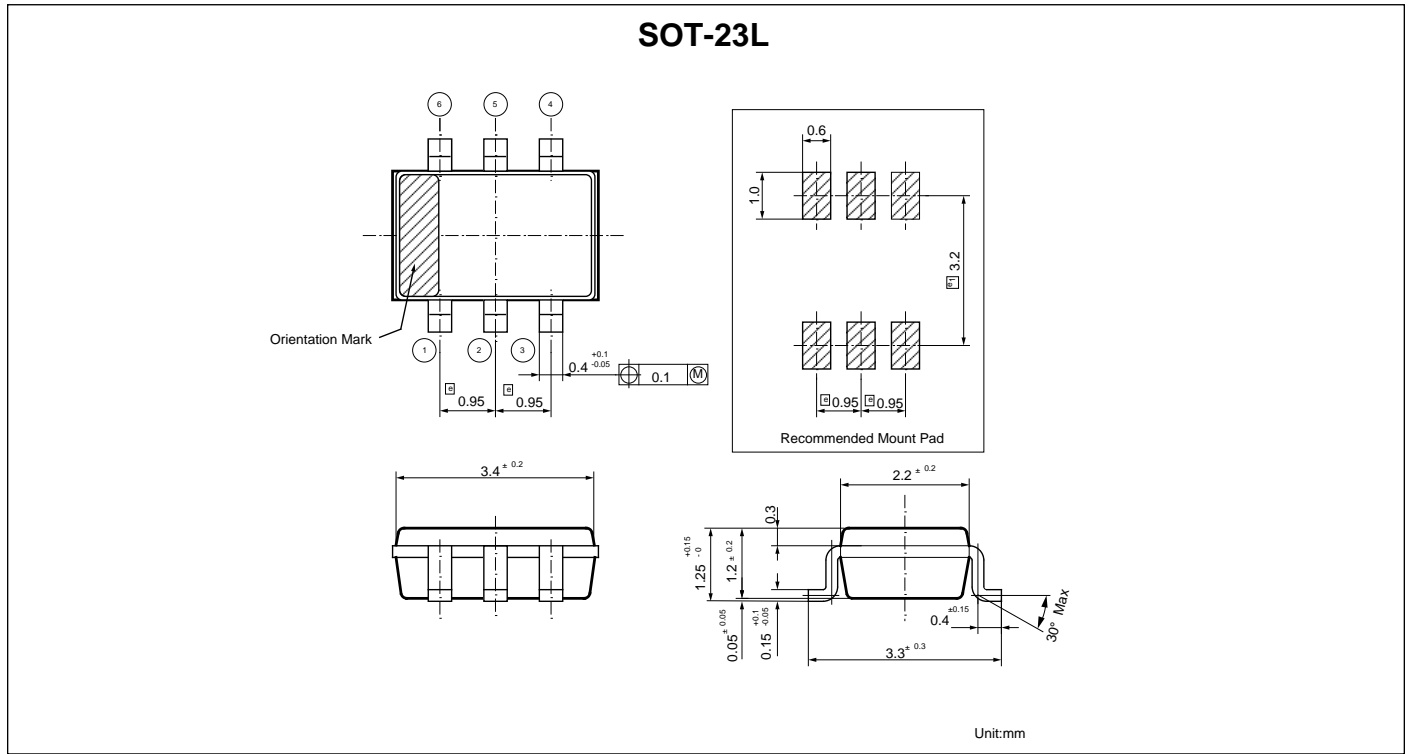
All plastic molded packages absorb some moisture from the air. If moisture absorption occurs prior to soldering the device into the printed circuit board, increased separation of the lead from the plastic molding may occur, degrading the moisture barrier characteristics of the device. This property of plastic molding compounds should not be overlooked, particularly in the case of very small packages, where the plastic is very thin.

In order to preserve the original moisture barrier properties of the package, devices are stored and shipped in moisture proof bags, filled with dry air. The bags should not be opened or damaged prior to the actual use of the devices. If this is unavoidable, the devices should be stored in a low relative humidity environment (40 to 65%) or in an enclosed environment with desiccant.

TYPICAL APPLICATIONS (CONT.)



PACKAGE OUTLINE



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