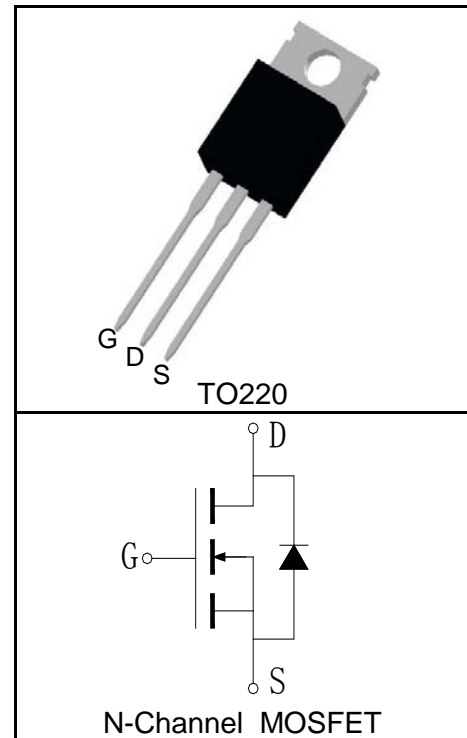


Features

- 500V/13A,
 $R_{DS(ON)} = 420m\Omega(Typ.)@V_{GS}=10V$
- Super High Dense Cell Design
- Fast Switching
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description

Applications

- High efficiency switch mode power supplies
- Lighting

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_C=25^\circ C$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	500	V
V_{GSS}	Gate-Source Voltage	± 30	
T_J	Maximum Junction Temperature	150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
I_S	Diode Continuous Forward Current	$T_C=25^\circ C$ 13	A
Mounted on Large Heat Sink			
$I_{DP}^{①}$	300 μs Pulse Drain Current Tested	$T_C=25^\circ C$ 52	A
$I_D^{②}$	Continuous Drain Current($V_{GS}=10V$)	$T_C=25^\circ C$ 13	A
		$T_C=100^\circ C$ 8.2	
P_D	Maximum Power Dissipation	$T_C=25^\circ C$ 208	W
		$T_C=100^\circ C$ 83	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.6	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	$^\circ C/W$
Drain-Source Avalanche Ratings			
$E_{AS}^{③}$	Avalanche Energy, Single Pulsed	500	mJ

Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

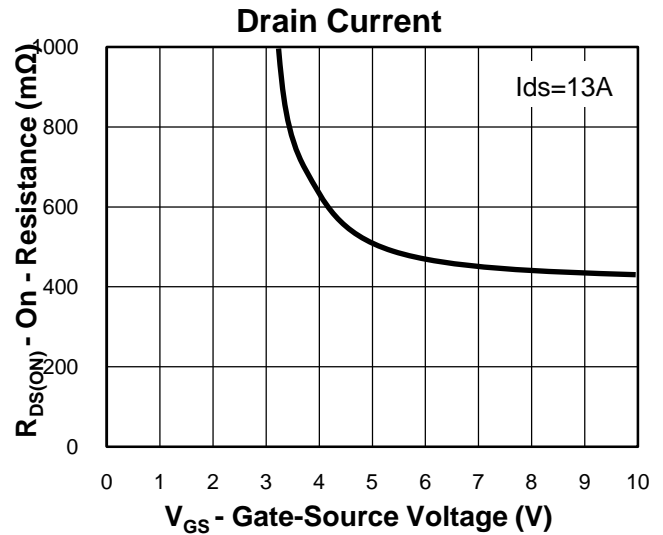
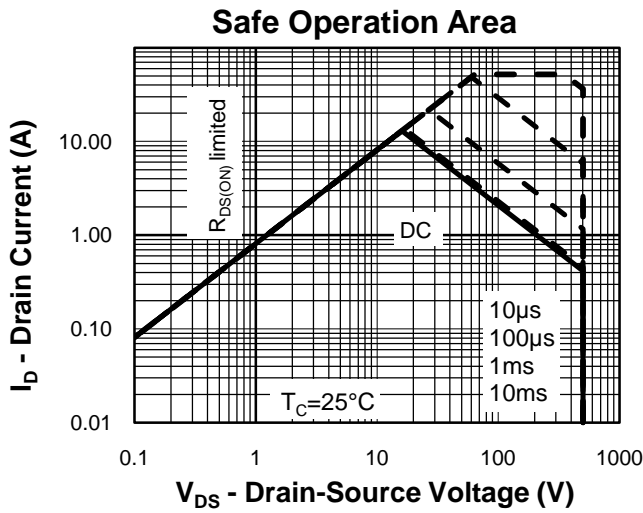
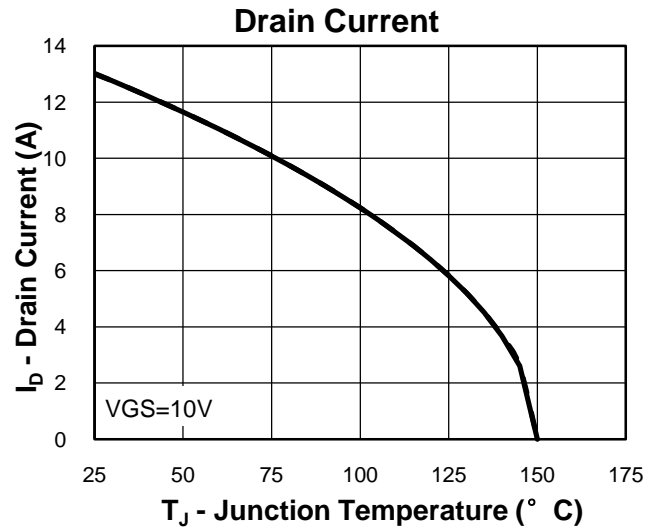
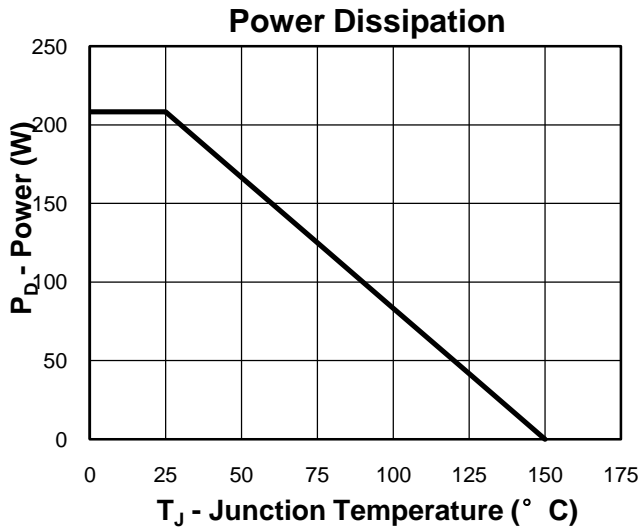
Symbol	Parameter	Test Condition	RU5H13R			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	500			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=500V, V_{GS}=0V$			1	μA
		$T_J=125^\circ C$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2		4	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(4)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=6.5A$		420	480	m Ω
Diode Characteristics						
$V_{SD}^{(4)}$	Diode Forward Voltage	$I_{SD}=13A, V_{GS}=0V$			1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD}=13A, di_{SD}/dt=100A/\mu s$		460		ns
Q_{rr}	Reverse Recovery Charge			4.6		μC
Dynamic Characteristics ⁽⁵⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		5		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=250V,$ Frequency=1.0MHz		1900		pF
C_{oss}	Output Capacitance			220		
C_{riss}	Reverse Transfer Capacitance			25		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=250V, R_L=20\Omega,$ $I_{DS}=13A, V_{GEN}=10V,$ $R_G=25\Omega$		25		ns
t_r	Turn-on Rise Time			45		
$t_{d(OFF)}$	Turn-off Delay Time			35		
t_f	Turn-off Fall Time			65		
Gate Charge Characteristics ⁽⁵⁾						
Q_g	Total Gate Charge	$V_{DS}=400V, V_{GS}=10V,$ $I_{DS}=13A$		45		nC
Q_{gs}	Gate-Source Charge			11		
Q_{gd}	Gate-Drain Charge			18		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - ③ Limited by T_{Jmax} , $I_{AS}=10A$, $V_{DD}=100V$, $R_G=50\Omega$, Starting $T_J=25^\circ C$.
 - ④ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑤ Guaranteed by design, not subject to production testing.

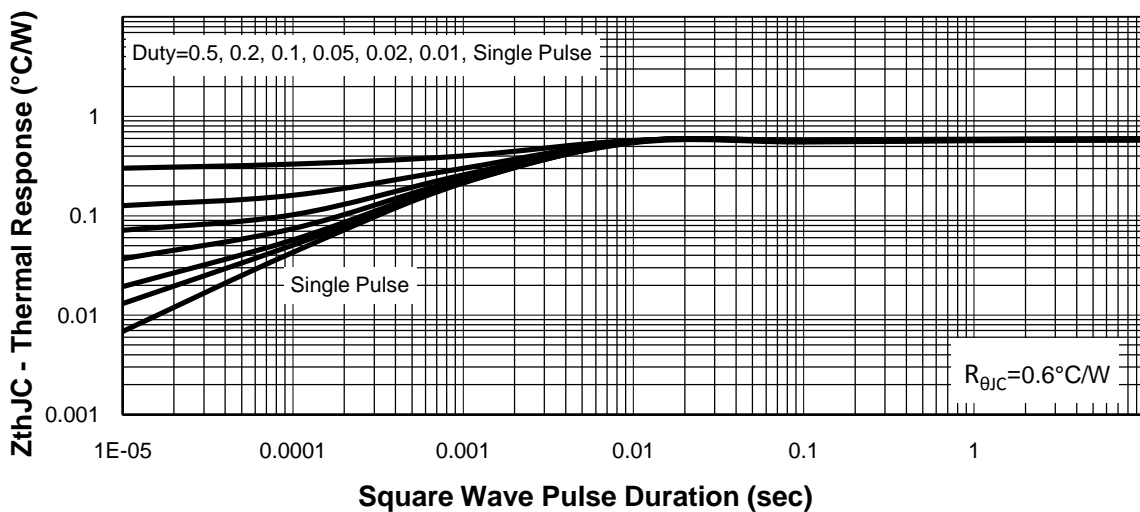
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU5H13R	RU5H13R	TO220	Tube	50	-	-

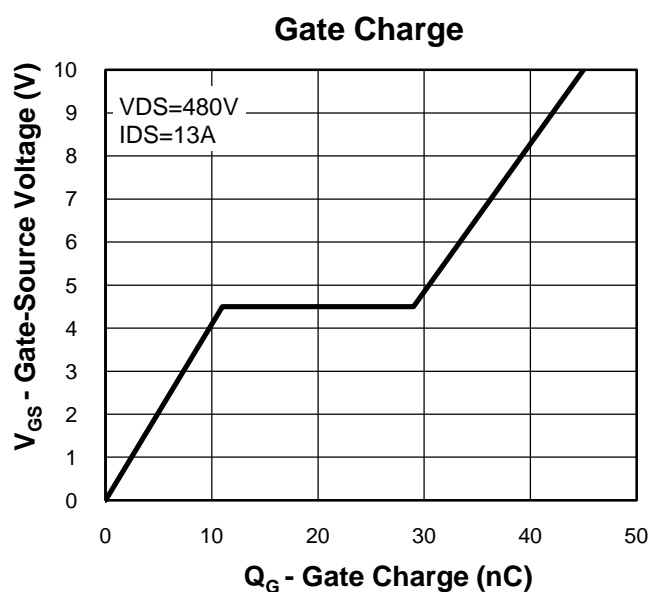
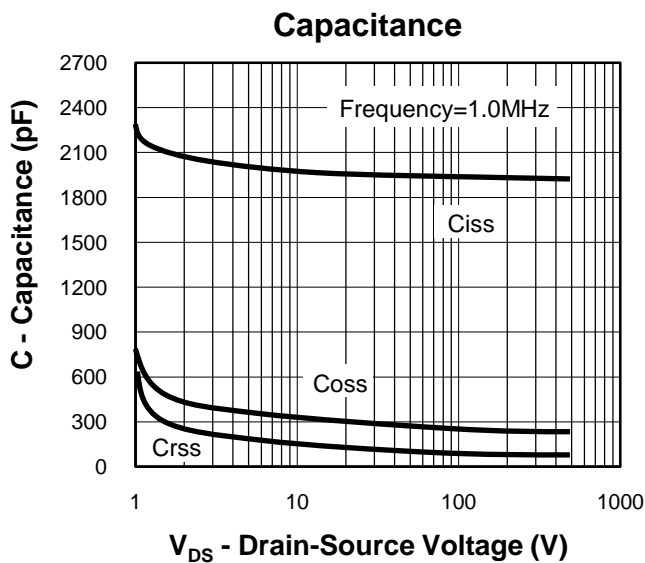
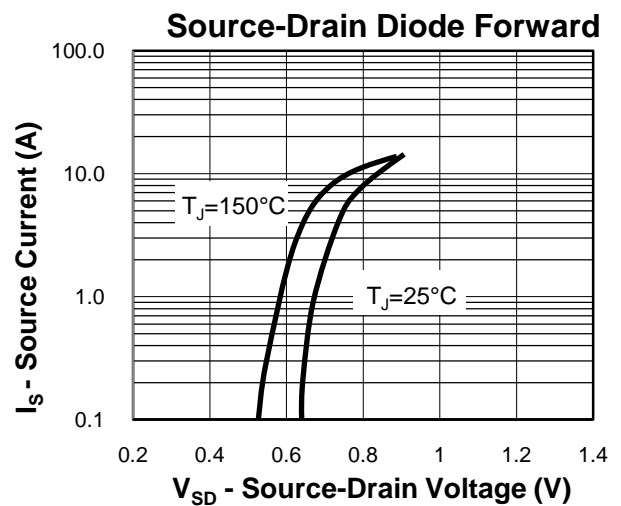
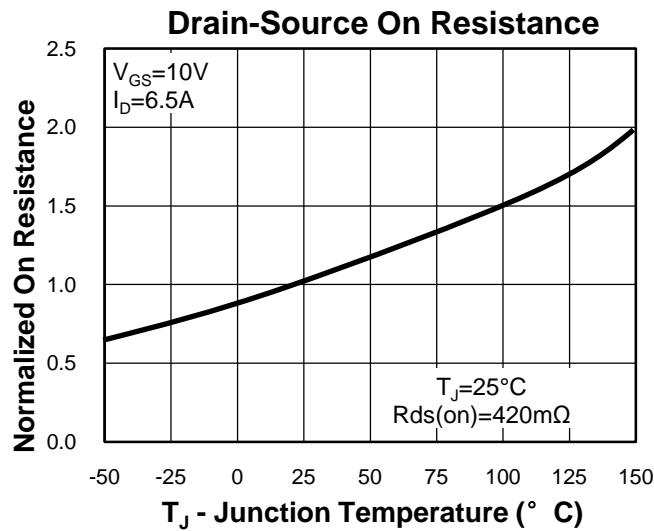
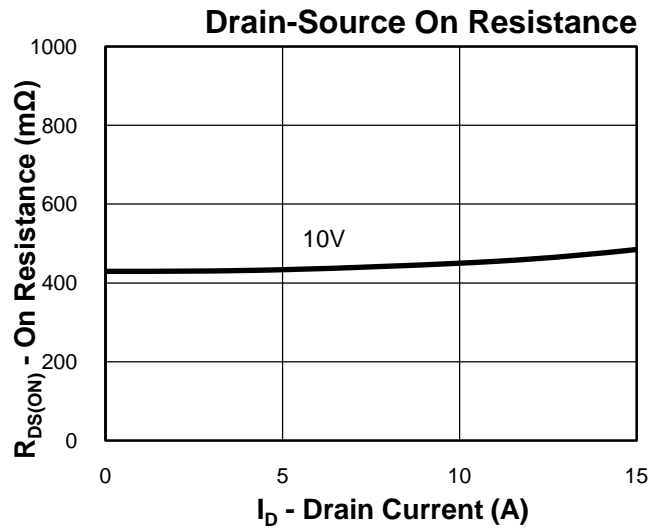
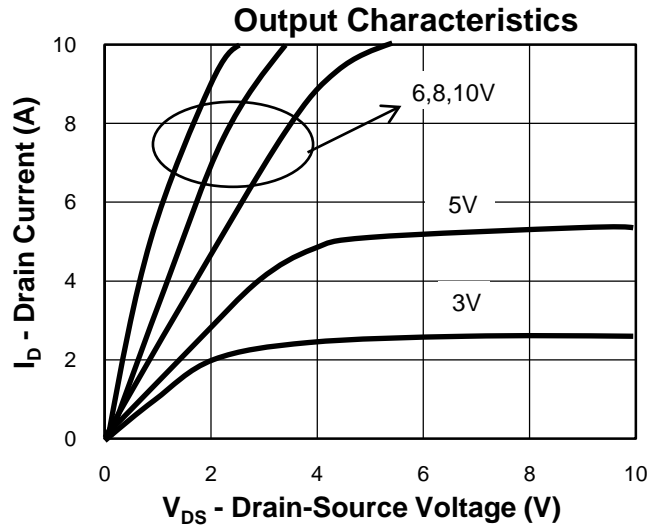
Typical Characteristics



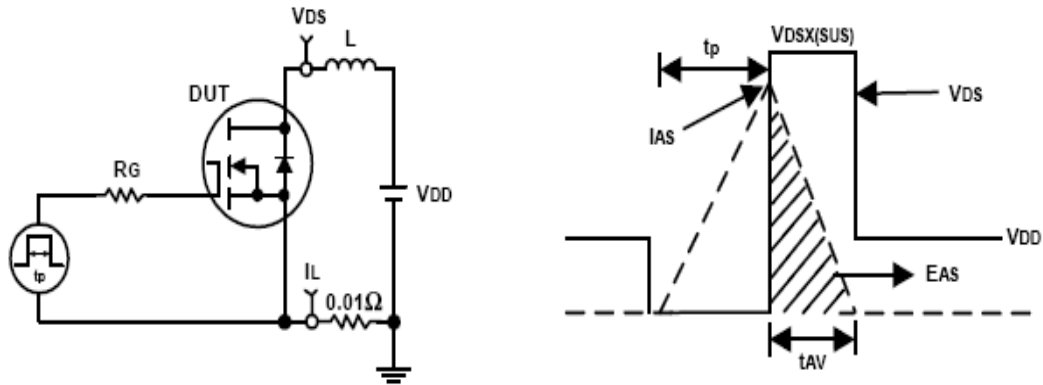
Thermal Transient Impedance



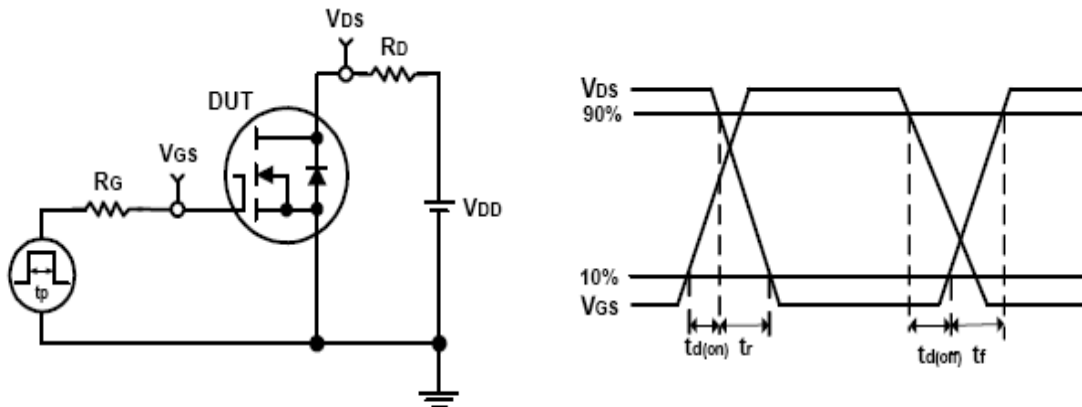
Typical Characteristics



Avalanche Test Circuit and Waveforms

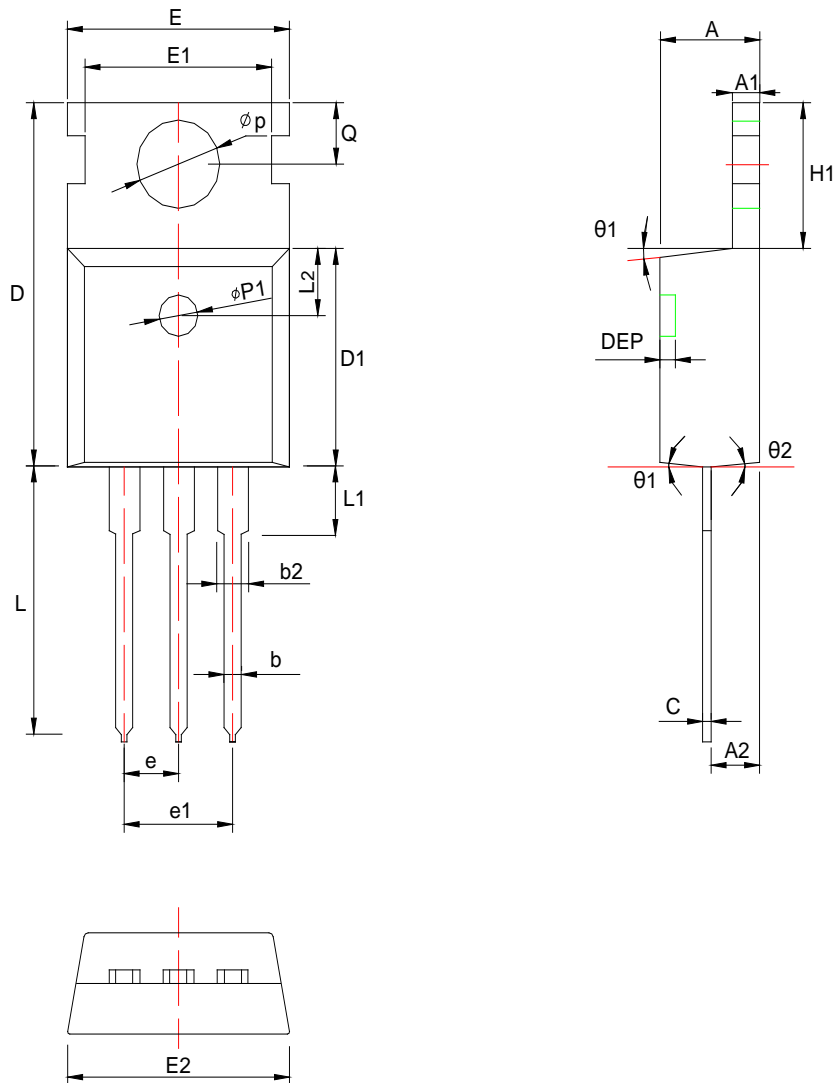


Switching Time Test Circuit and Waveforms



Package Information

TO220



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.55	4.70	0.173	0.179	0.185	$\Phi p1$	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.20	1.30	1.40	0.047	0.051	0.055	e	2.54 BSC			0.10 BSC		
A2	2.23	2.38	2.53	0.088	0.094	0.100	e1	5.08 BSC			0.20 BSC		
b	0.75	0.80	0.85	0.030	0.031	0.033	H1	6.40	6.50	6.60	0.252	0.256	0.260
b2	1.17	1.28	1.39	0.046	0.050	0.055	L	12.70	13.18	13.65	0.500	0.519	0.537
c	0.40	0.50	0.60	0.016	0.020	0.024	L1	*	*	3.95	*	*	0.156
D	15.40	15.60	15.80	0.606	0.614	0.622	L2	2.50 REF			0.098 REF		
D1	8.96	9.21	9.46	0.353	0.363	0.372	Φp	3.50	3.60	3.70	0.138	0.142	0.146
DEP	0.05	0.13	0.20	0.002	0.005	0.008	Q	2.73	2.80	2.87	0.107	0.110	0.113
E	9.66	9.97	10.28	0.380	0.393	0.405	$\theta 1$	5°	7°	9°	5°	7°	9°
E1	*	8.70	*	*	0.343	*	$\theta 2$	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.402							

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