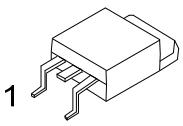
100V P-CHANNEL MOSFET



TO-252

Lead-free: 12P10L
Halogen-free: 12P10G

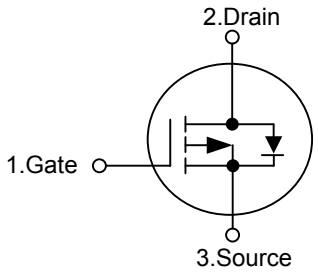
■ DESCRIPTION

The **12P10** uses advanced proprietary, planar stripe, DMOS technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable to be used in low voltage applications such as audio amplifier, high efficiency switching DC/DC converters, and DC motor control.

■ FEATURES

* $R_{DS(ON)}$ = 0.29Ω @V_{GS} = -10 V
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number			Package	Pin Assignment			Packing
Normal	Lead Free	Halogen Free		1	2	3	
12P10-TN3-R	12P10L-TN3-R	12P10G-TN3-R	TO-252	G	D	S	Tape Reel
12P10-TN3-T	12P10L-TN3-T	12P10G-TN3-T	TO-252	G	D	S	Tube

12P10L-TN3-R (1)Packing Type (2)Package Type (3)Lead Plating	(1) R: Tape Reel, T: Tube (2) TN3: TO-252 (3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn

■ ABSOLUTE MAXIMUM RATINGS (T_c=25℃, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-100	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current		I_D	-9.4	A
Pulsed Drain Current (Note 2)		I_{DM}	-37.6	A
Avalanche Current (Note 2)		I_{AR}	-9.4	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	370	mJ
Repetitive Avalanche Energy (Note 2)		E_{AR}	5.0	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	-6.0	V/ns
Power Dissipation	T_a= 25°C	P_D	50	W
Derate above 25°C			0.4	W/°C
Junction Temperature		T_J	+150	℃
Storage Temperature		T_{STG}	-55 ~ +150	℃

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Pulse width limited by $T_{J(MAX)}$
3. L=6.3mH, I_{AS}=-9.4A, V_{DD}=-25V, R_G=25Ω, Starting T_J=25°C
4. I_{SD}≤-11.5A, di/dt≤300μA/ s, V_{DD}≤BV_{DSS}, Starting T_J=25°C

■ THERMAL DATA

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction-to-Ambient	θ_{JA}			110	℃/W
Junction-to-Case	θ_{JC}			2.5	℃/W

■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0 V, I_D=-250μA	-100			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=-250μA, Referenced to 25°C		-0.1		V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-100V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0		-4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.7A		0.24	0.29	Ω
Forward Transconductance	g_{FS}	V_{DS} =-40V, I_D=-4.7A (Note 1)		6.3		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1.0MHz		620	800	pF
Output Capacitance	C_{OSS}			220	290	pF
Reverse Transfer Capacitance	C_{RSS}			65	85	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=-80V, I_D=-11.5A, V_{GS}=-10V(Note 1, 2)		21	27	nC
Gate Source Charge	Q_{GS}			4.6		nC
Gate Drain Charge	Q_{GD}			11.5		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=-50V, I_D=-11.5A, R_G=25Ω(Note 1, 2)		15	40	ns
Turn-ON Rise Time	t_R			160	330	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			35	80	ns
Turn-OFF Fall-Time	t_F			60	130	ns

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-9.4A			-4.0	V
Maximum Body-Diode Continuous Current	I_S				-9.4	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				-37.6	A
Body Diode Reverse Recovery Time	t_{RR}	V_{GS}=0V, I_S=-11.5A, dI_F/dt=100A/s(Note 4)		110		ns
Body Diode Reverse Recovery Charge	Q_{RR}			0.47		nC

Note: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

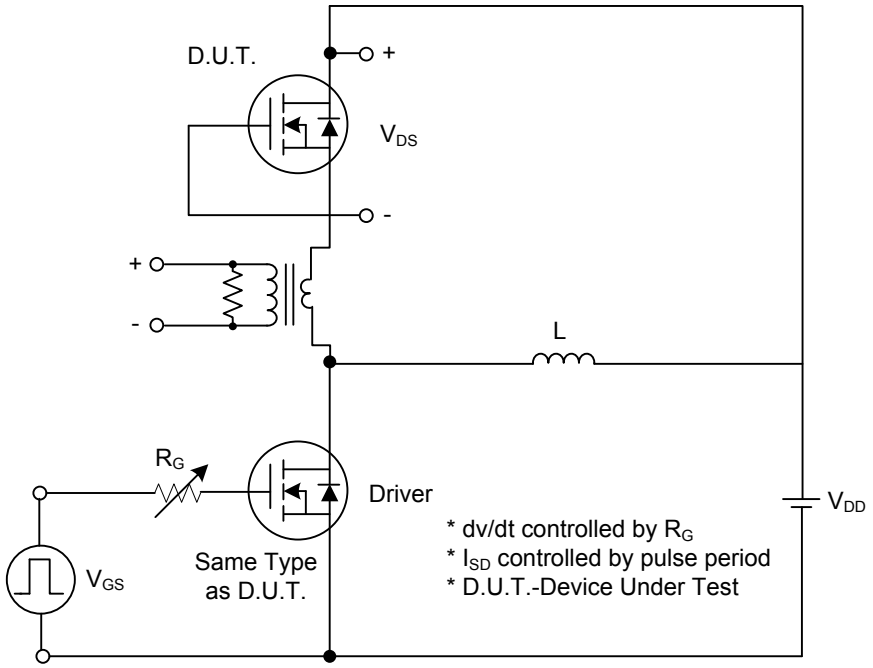


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

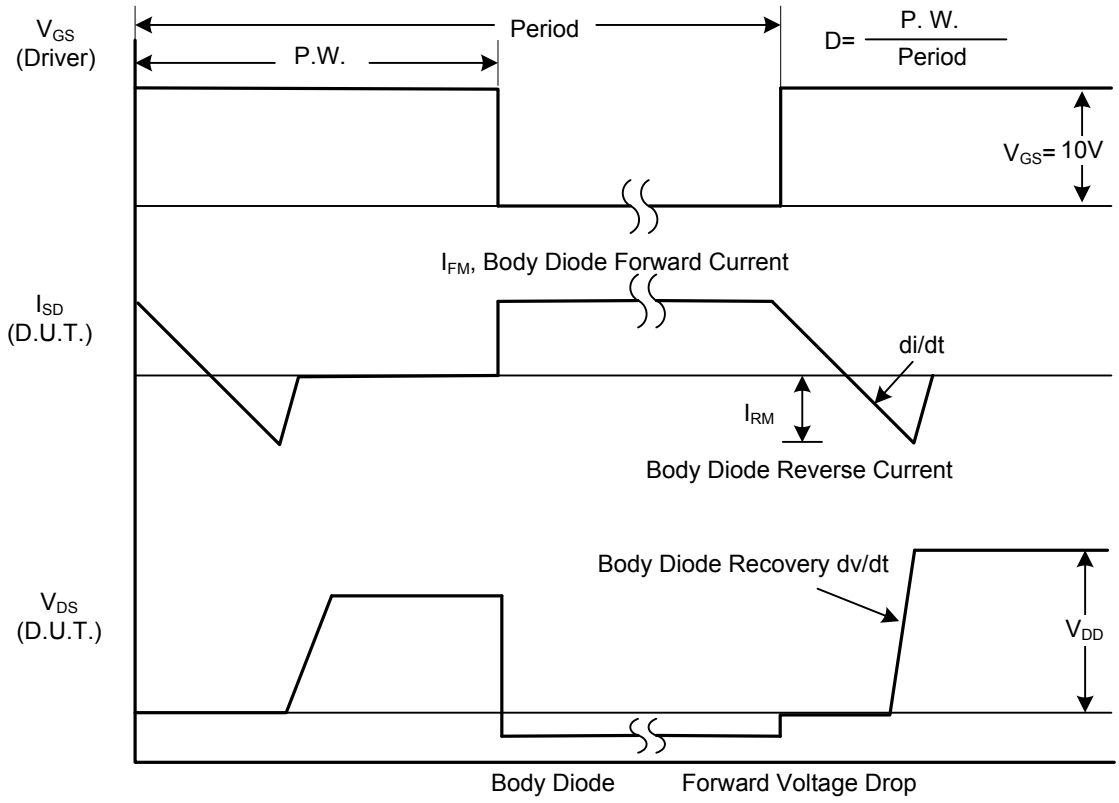


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

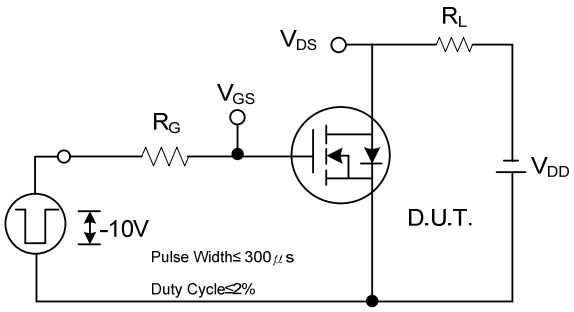


Fig. 2A Switching Test Circuit

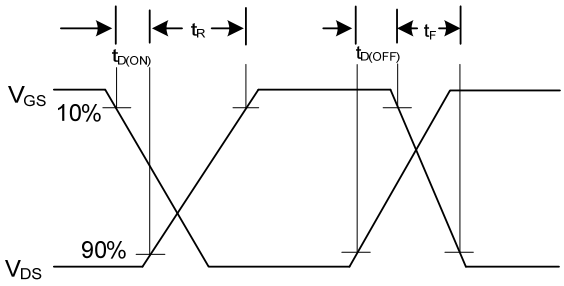


Fig. 2B Switching Waveforms

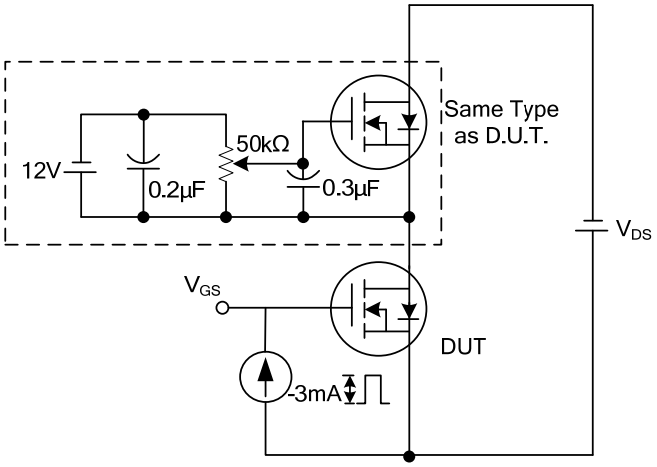


Fig. 3A Gate Charge Test Circuit

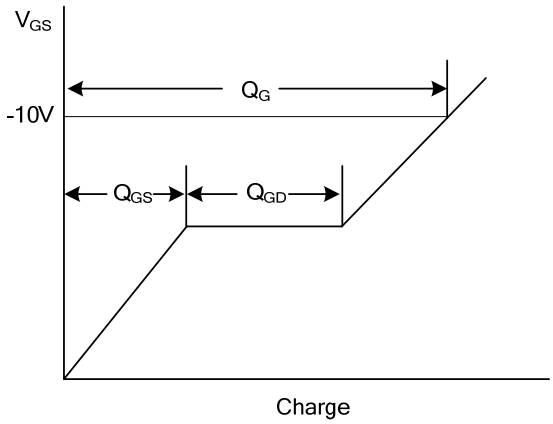


Fig. 3B Gate Charge Waveform

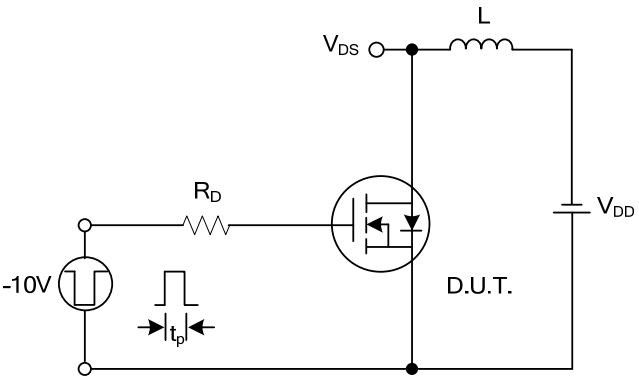


Fig. 4A Unclamped Inductive Switching Test Circuit

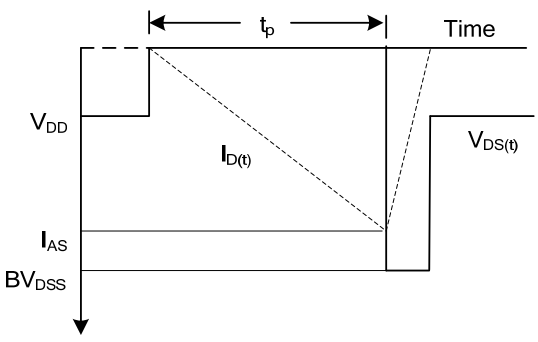
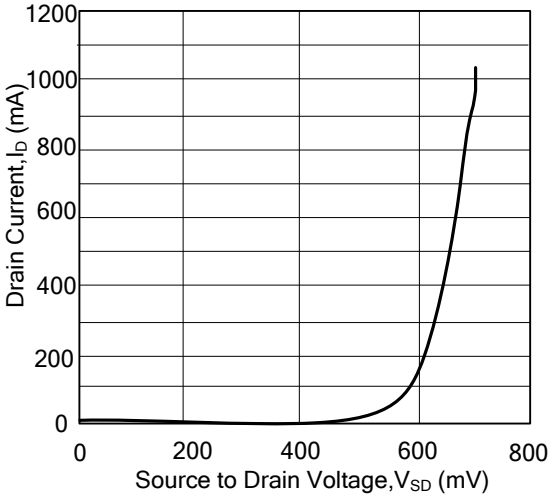


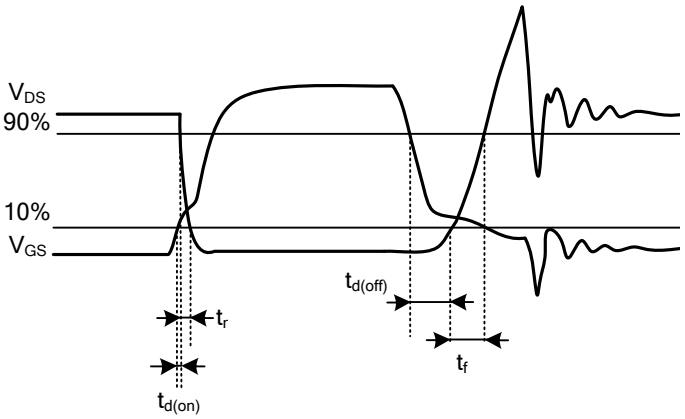
Fig. 4B Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

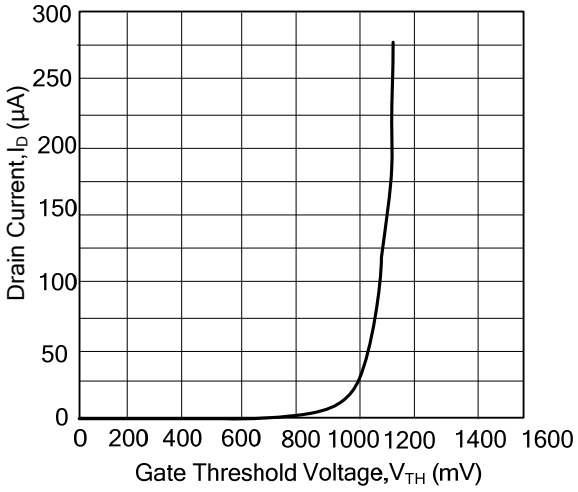
Drain Current vs. Source to Drain Voltage



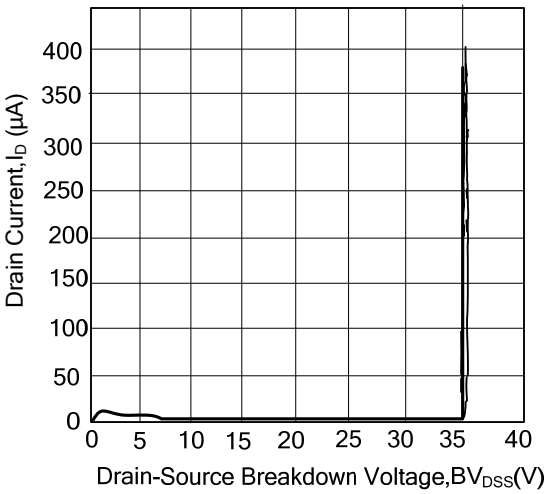
Switching Time Waveforms



Drain Current vs. Gate Threshold Voltage



Drain Current vs. Drain-Source Breakdown Voltage



Drain-Source On-State Resistance Characteristics