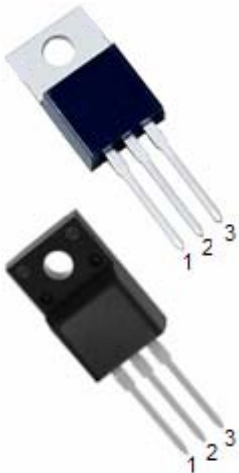
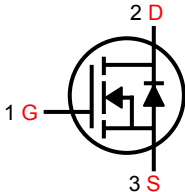


Industrial model	Package identification	Packing method	Quantity per tube	Quantity per box	Quantity per carton
SPT15N60 SPF15N60	T: TO-220AB F: TO-220F-3L	TUBE	50/tube	1Kpcs/box	5Kpcs

Features	$I_D=15A$ $BV_{DSS}=600V$ $R_{DS(on)}=0.52\Omega$	SPF/T15N60 Series Pin Assignment	
Originative New Design Superior Avalanche Rugged Technology Robust Gate Oxide Technology Very Low Intrinsic Capacitances Excellent Switching Characteristics Unrivalled Gate Charge: 48.5nC(Typ.) Extended Safe Operating Area Lower $R_{DS(on)}$: 0.49Ω(Typ.) @ $V_{GS}=10V$ 100% Avalanche Tested Package: TO-220AB & TO-220F-3L		3-Lead Plastic TO-220AB Package Code: T Pin 1: Gate Pin 2 & Tab: Drain Pin 3: Source	3-Lead Plastic TO-220F-3L Package Code: F Pin 1: Gate Pin 2: Drain Pin 3: Source
Series Symbol:			

■ Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Drain to Source Voltage		V_{DSS}	600	V
Gate to Source Voltage		V_{GSS}	±30	V
Avalanche Current (Note 2)		I_{AR}	15	A
Continuous Drain Current	Continuous	I_D	15	A
	Pulsed (Note 2)	I_{DM}	60	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	637	mJ
	Repetitive (Note 2)	E_{AR}	25.0	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220F-3L	P_D	38.5	W
	TO-220AB		312	
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Notes: 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. Repetitive Rating : Pulse width limited by maximum junction temperature

3. $L=5.23mH$, $I_{AS}=15A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^{\circ}C$

4. $I_{SD} \leq 15A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^{\circ}C$

■ Thermal Data

Parameter		Symbol	Ratings	Unit
Junction to Ambient	TO-220F-3L	θ_{JA}	62.5	°C/W
	TO-220AB		40	
Junction to Case	TO-220F-3L	θ_{JC}	3.3	°C/W
	TO-220AB		0.4	

■ Electrical Characteristics (T_C=25°C unless otherwise specified)

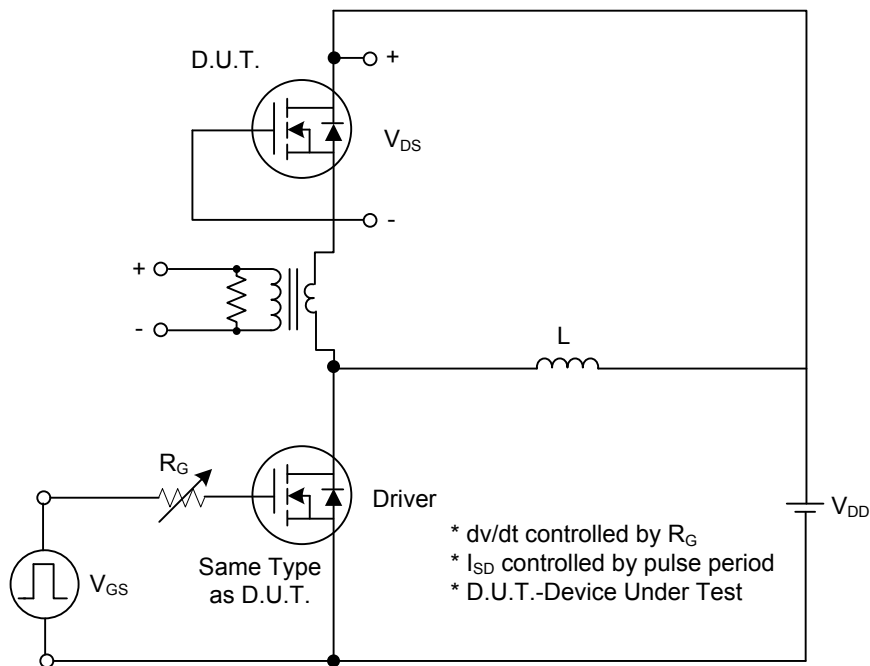
Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA, T _J =25°C	600			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.65		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =600V, V _{GS} =0V			1	μA
			V _{DS} =520V, T _C =125°C			10	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =7.5A		0.49	0.52	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2380	3095	pF
Output Capacitance		C _{OSS}			295	385	pF
Reverse Transfer Capacitance		C _{RSS}			23.6	35.5	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =520V, V _{GS} =10V, I _D =15A (Note 1, 2)		48.5	63.0	nC
Gate-Source Charge		Q _{GS}			14.0		nC
Gate-Drain Charge		Q _{GD}			21.2		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =325V, I _D =15A, R _G =21.7Ω (Note 1, 2)		65	140	ns
Turn-ON Rise Time		t _R			125	260	ns
Turn-OFF Delay Time		t _{D(OFF)}			105	220	ns
Turn-OFF Fall Time		t _F			65	140	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				15	A
Maximum Body-Diode Pulsed Current		I _{SM}				60	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =15A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	V _{GS} =0V, I _S =15A,		496		ns
Body Diode Reverse Recovery Charge		Q _{RR}	dl _F /dt=100A/μs (Note 1)		5.69		μC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

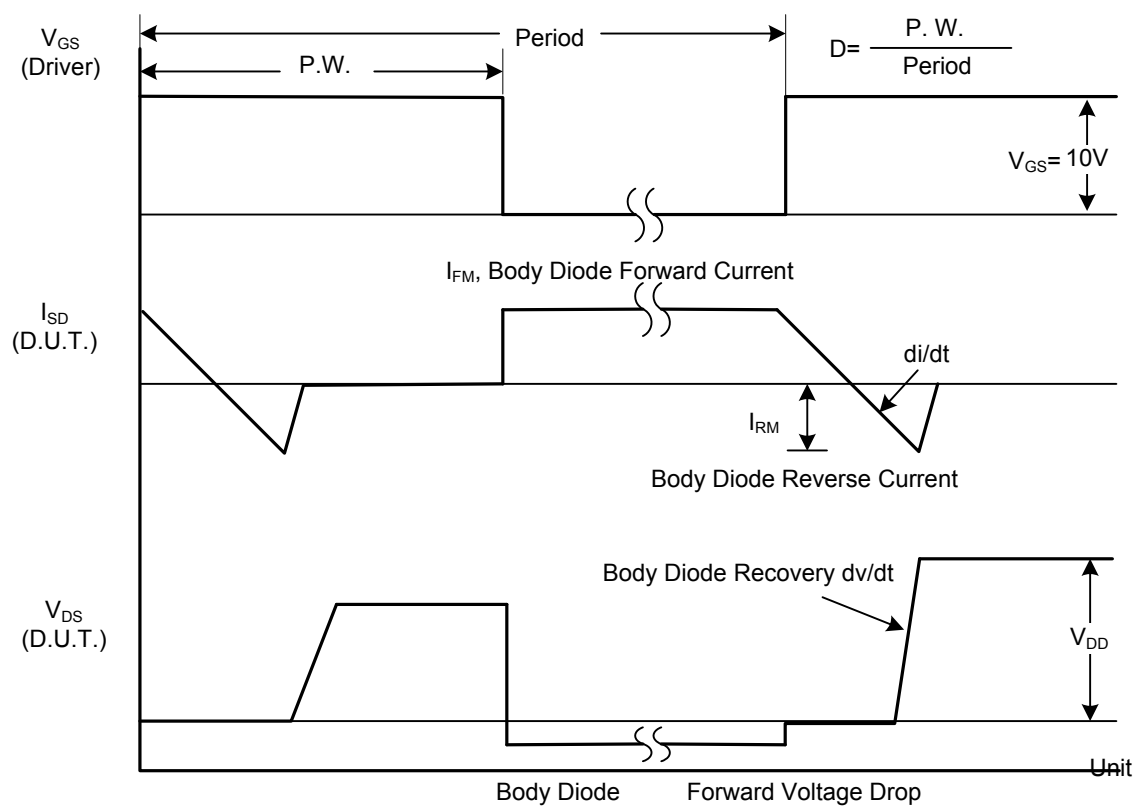
2. Essentially independent of operating temperature

3. Drain current limited by maximum junction temperature

■ Test circuits and waveforms

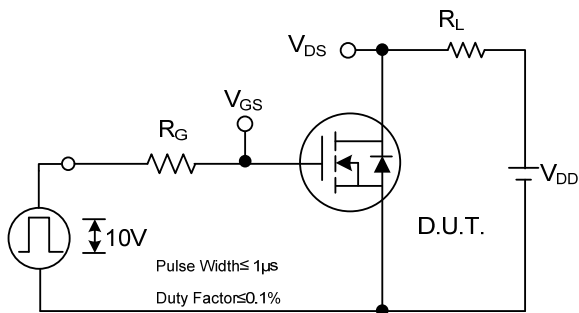


Peak Diode Recovery dv/dt Test Circuit

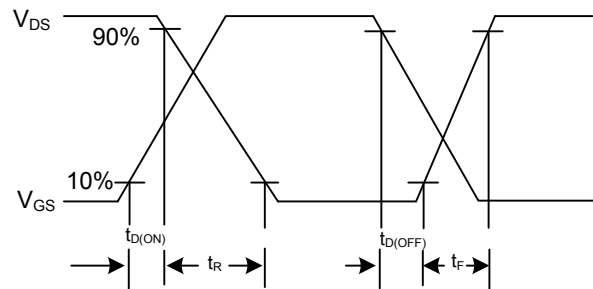


Peak Diode Recovery dv/dt Waveforms

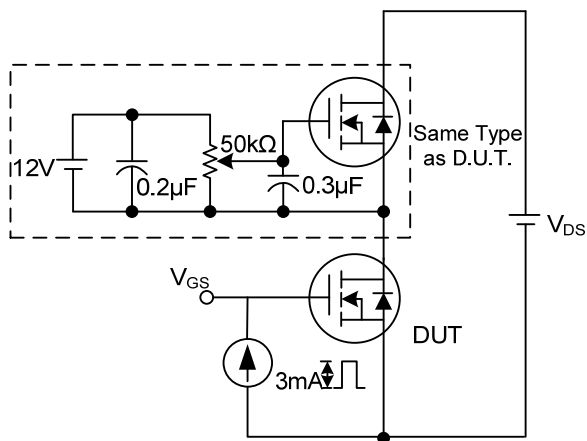
■ Test circuits and waveforms(Cont.)



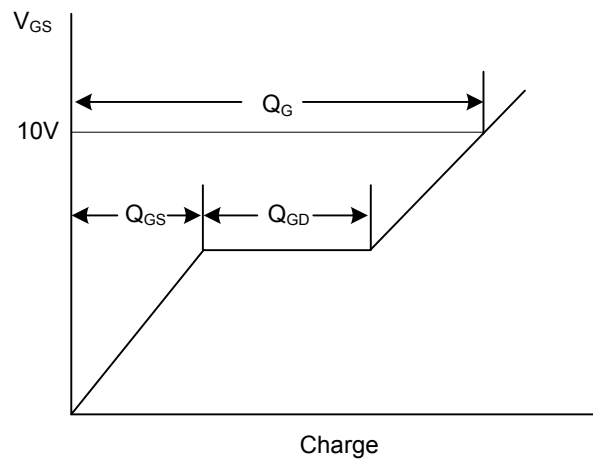
Switching Test Circuit



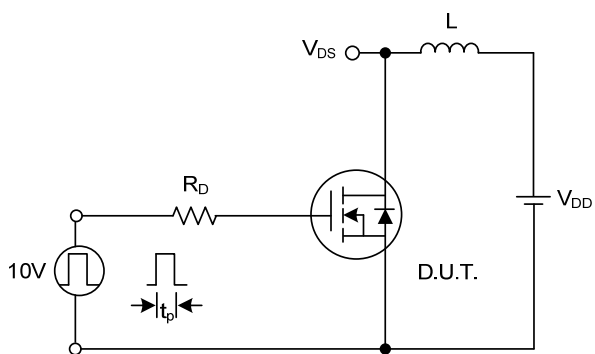
Switching Waveforms



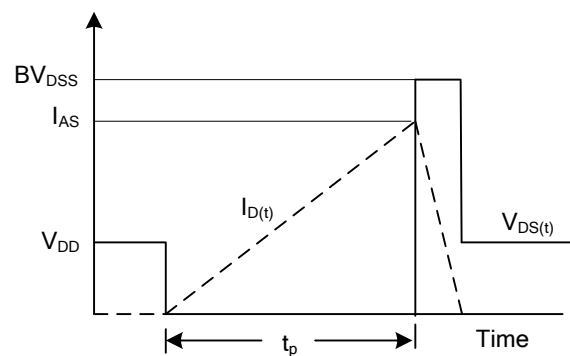
Gate Charge Test Circuit



Gate Charge Waveform

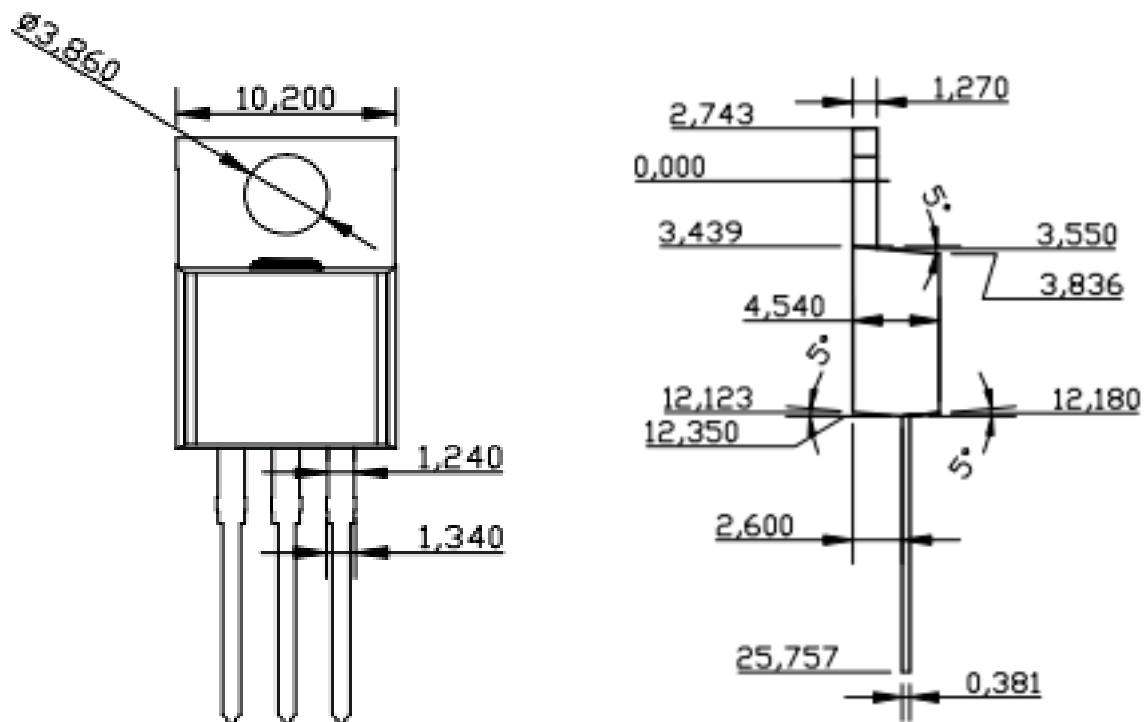


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TO-220-3L Package outline dimensions



■ TO-220F-3L Package outline dimensions

