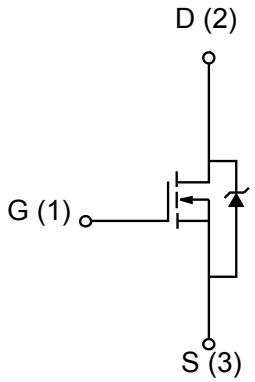
Description

The MOSFET provide the best combination of fast switching, low on-resistance and cost-effectiveness.

MOSFET Product Summary		
V_{DS}(V)	$R_{DS(on)}$(Ω)	I_D(A)
650	0.7@V_{GS}=10V	13



Absolute maximum rating@25℃

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Curren(T_J=150℃)	T_A=25℃	I_D	13	A
	T_A=100℃		Figure 3	
Pulsed Drain Current,V_{GS}@10V		I_{DM}	Figure 6	A
Power Dissipation		P_D	125	W
Derating Factor above 25℃			1.0	w/℃
Peak Diode Recovery dv/dt		dv/dt	5.0	V/ns
Single Pulse Avalanche Engergy L=11.9mH, I_D=5.2Amps		E_{AS}	1000	mJ
Pulsed Avalanche Rating		I_{AS}	Figure 8	
Maximum Temperature for Soldering Leads at 0.063in(1.6mm) from case for 10 seconds Package Body for 10 seconds		 T_L T_{PKG}	 300 260	℃
Operating Junction and Storage Temperature Range		T_J	-55 to 150	℃

Thermal Characteristics

Parameter	Symbol	Conditions	Maximum	Units
Junction to Ambient	$R_{\theta JA}$	1 cubic foot chamber, free air	62	℃/W
Junction to Case	$R_{\theta JC}$	Water cooled heat sink, P_D adjusted for a peak junction temperature of +150℃	1.0	

Electrical characteristics per line@25℃(unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV_{DSS}	I_D =250μA,V_{GS}=0V	650		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =650V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{DS} =0V,V_{GS}=±30V	-	-	±100	nA
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 =6.5A	-	0.55	0.70	Ω
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=13A		-	1.5	V
Forward Transonductance	gfs	V_{DS}=30V,I_D=13A		19		S
Total Gate Charge	Qg	V_{GS}=10V, V_{DD}=325V, I_D =13A		46		nC
Gate-Source Charge	Qgs			10		
Gate-Drain Charge	Qgd			19		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} =325V, V_{GS} =10V, R_G=9.1Ω, I_D =13A	-	16		ns
Turn-Off Delay Time	$t_{d(off)}$		-	29		ns
Turn-On Rise Time	t_r		-	56		ns
Turn-On Fall Time	t_f		-	39		ns
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS} =25V, f=1MHz		2130		pF
Output Capacitance	C_{OSS}			180		pF
Reverse Transfer Capacitance	C_{RSS}			21		pF
Continuous Source Current(Body Diode)	I_S				13	A
Maximum Pulsed Current(Body Diode)	I_{SM}				52	A
Reverse Recovery Time	trr	V_{GS} =0V, I_F =13A, di/dt=100A/μs		675		ns
Reverse Recovery Charge	Qrr			5.1		μC

Typical Characteristics

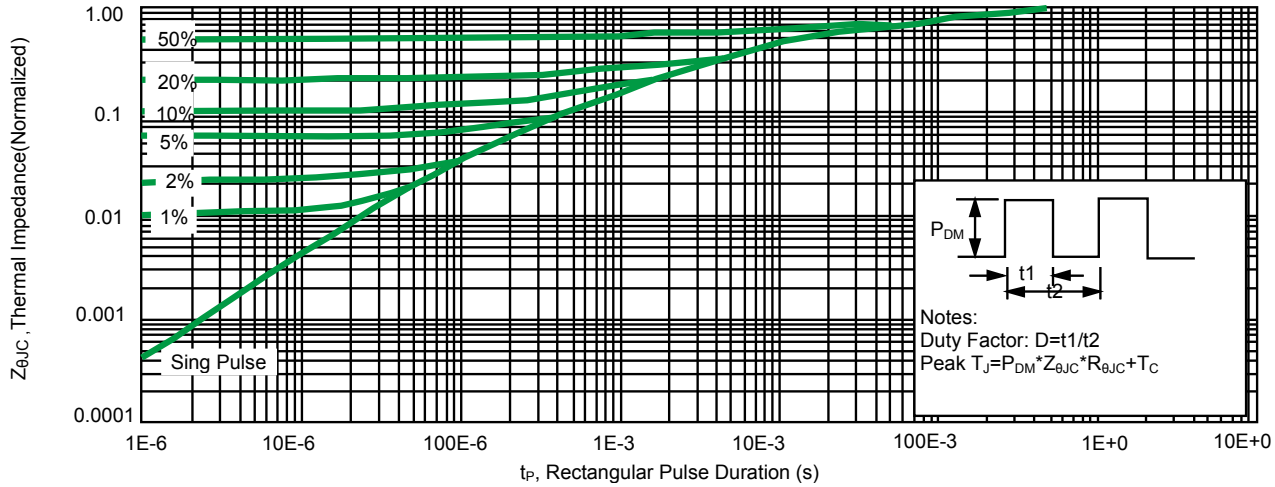


Fig 1.Maximum Effective Thermal Impedance, Junction-to-Case

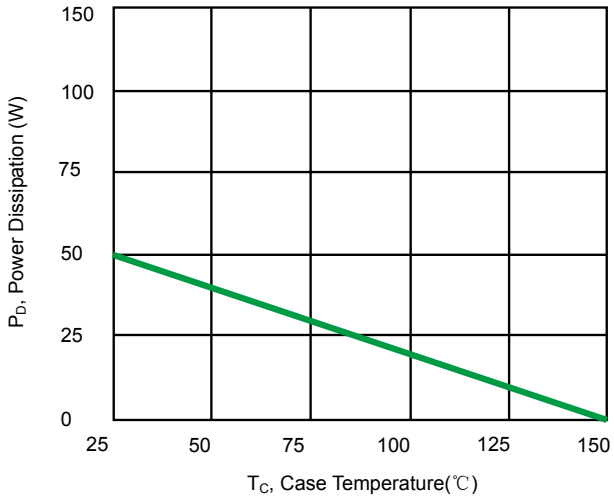


Fig 2. . Maximum Power Dissipation vs. Case Temperature

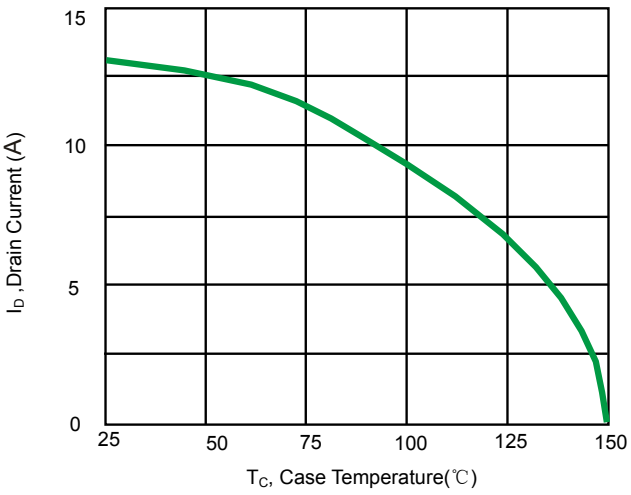


Fig 3. Maximum Continuous Drain Current vs. Case Temperature

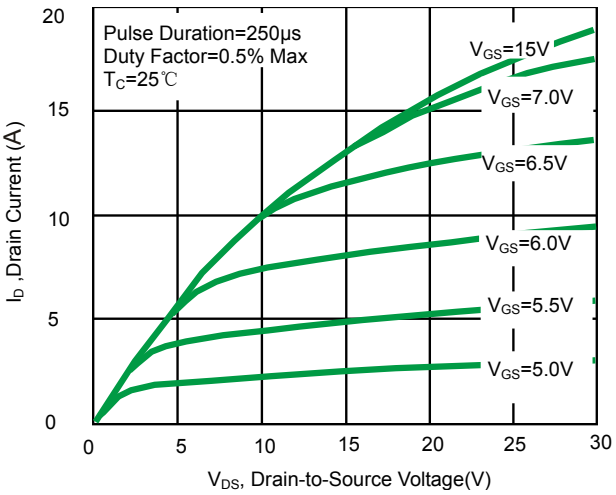


Fig 4. Typical Output Characteristics

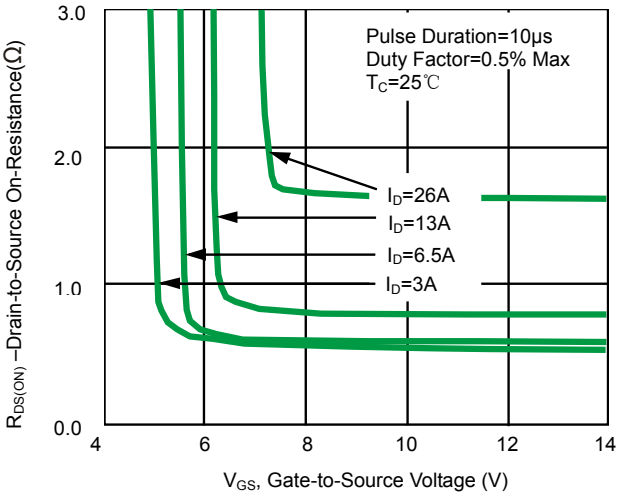


Fig 5. Typical Darin-to-Source ON Resistance vs. Gate Voltage and Drain Current

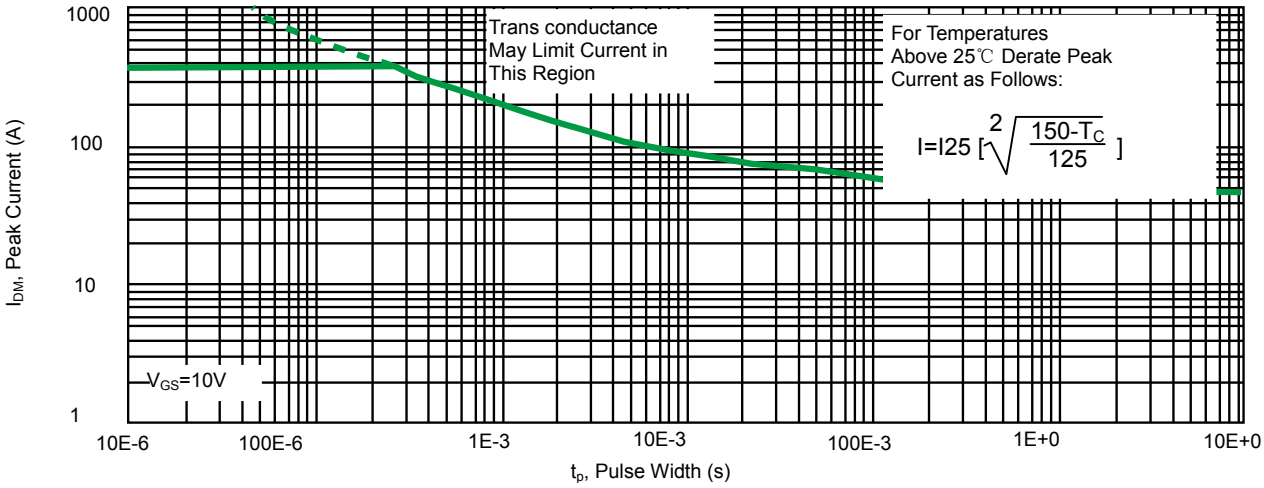


Fig 6. Maximum Peak Current Capability

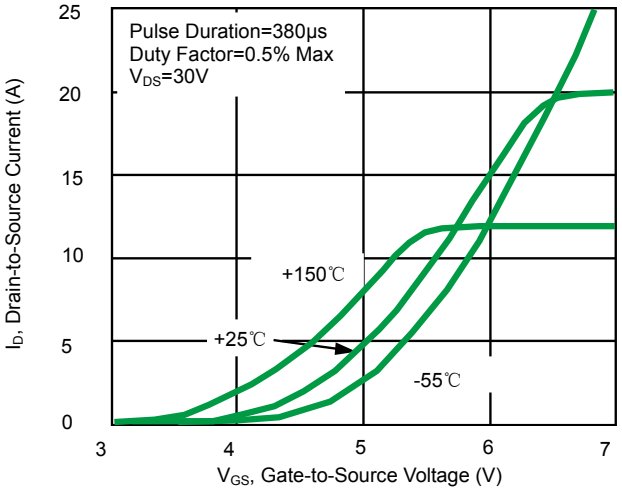


Fig 7. Typical Transfer Characteristics

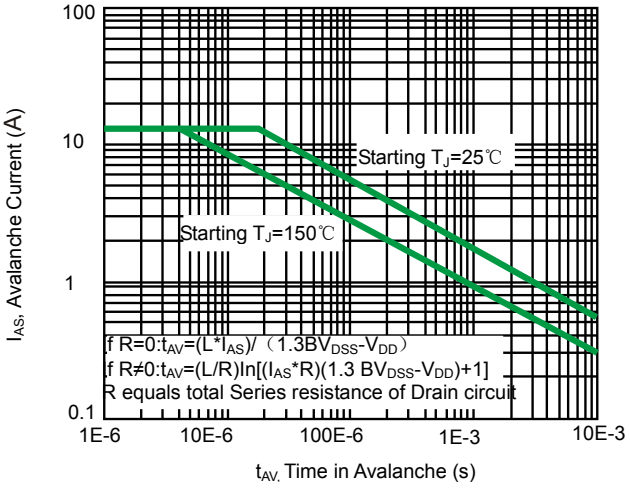


Fig 8. Unclamped Inductive Switching Capability

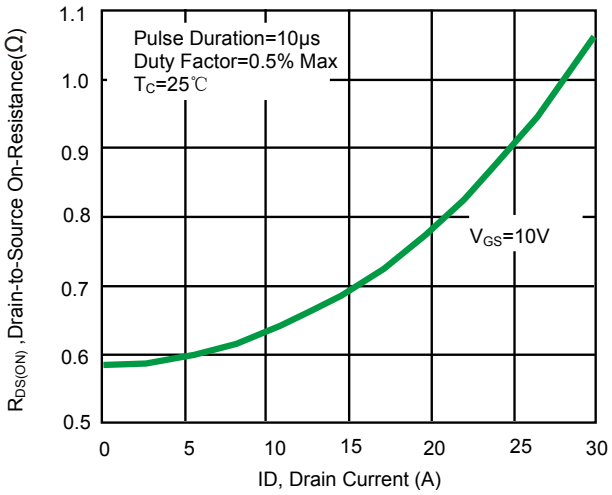


Fig 9. Typical Drain-to-Source ON Resistance vs. Drain Current

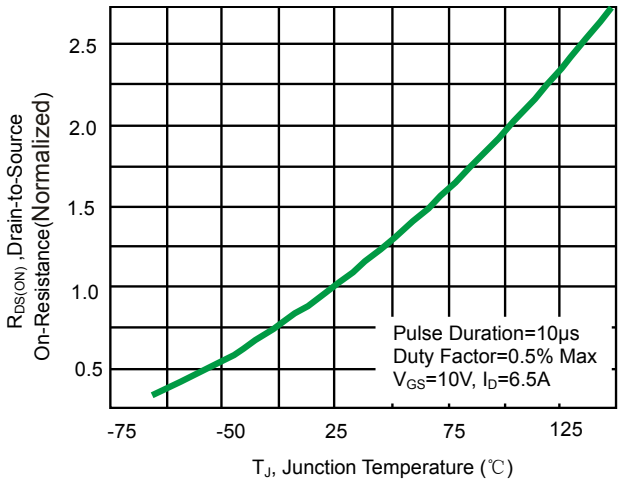


Fig 10. Typical Drain-to-Source ON Resistance vs. Junction Temperature

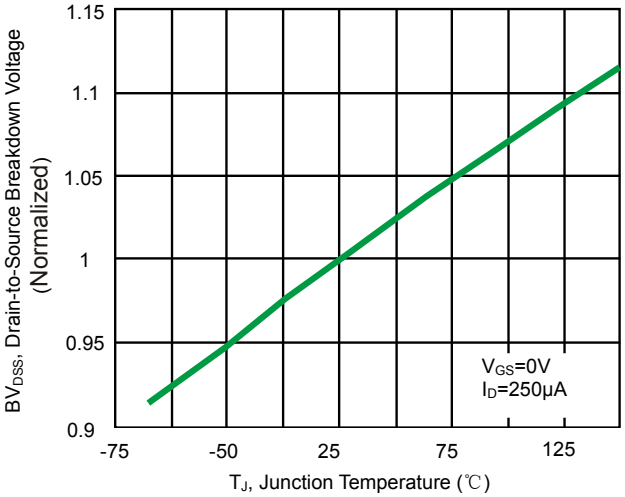


Fig 11. Typical Breakdown Voltage vs. Junction Temperature

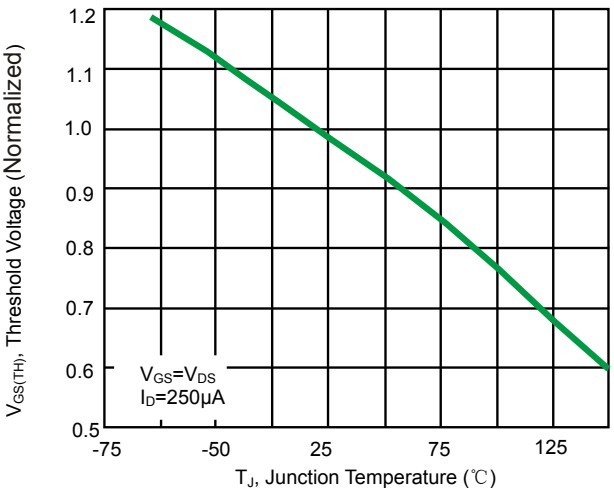


Fig 12. Typical Threshold Voltage vs. Junction Temperature

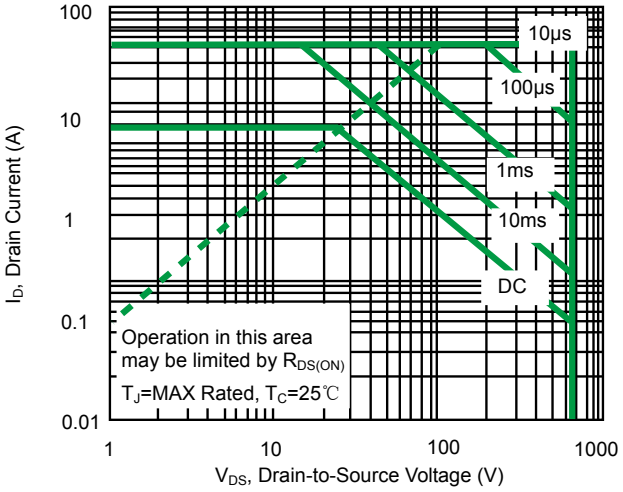


Fig 13. Maximum Forward Bias Safe Operating Area

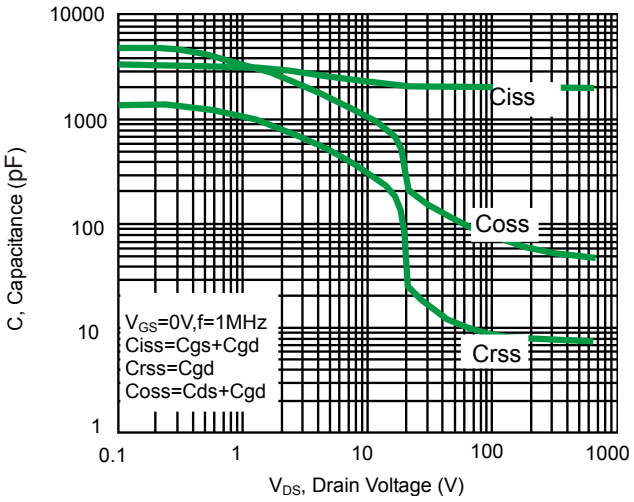


Fig 14. Typical Capacitance vs. Drain Voltage

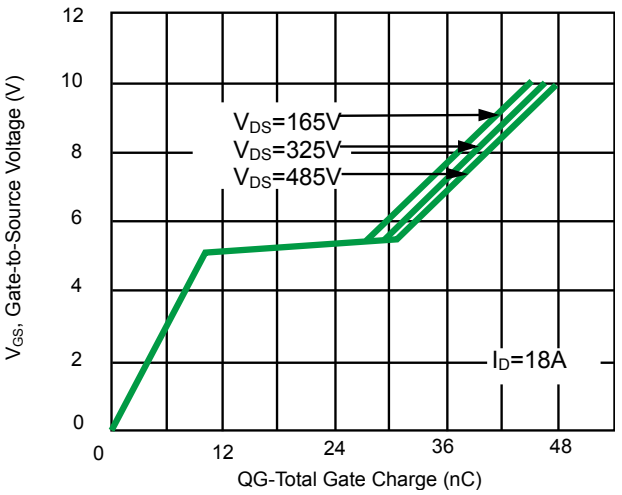


Fig 15. Typical Gate Charge vs. Gate-to-Source Voltage

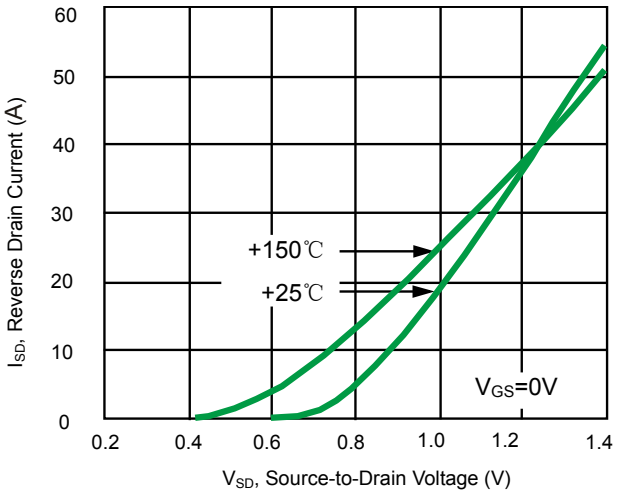


Fig 16. Typical Body Diode Transfer Characteristics

Test Circuits and Waveforms

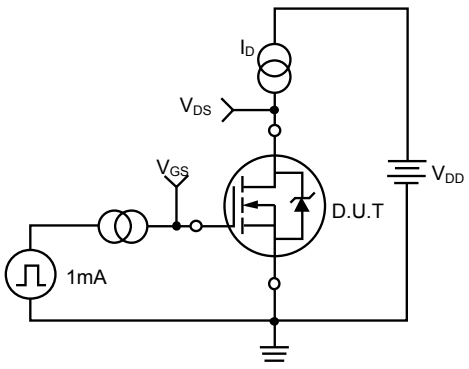


Fig.17 Gate Charge Test Circuit

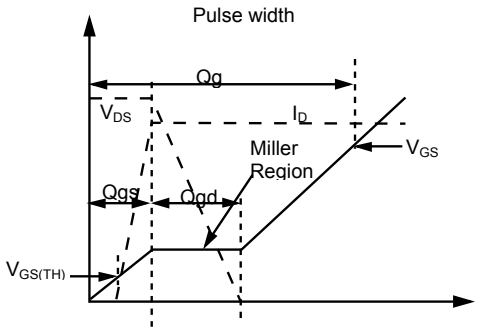


Fig.18 Gate Charge Waveform

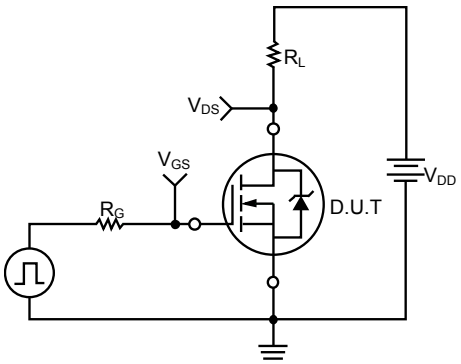


Fig.19 Resistive Switching Test Circuit

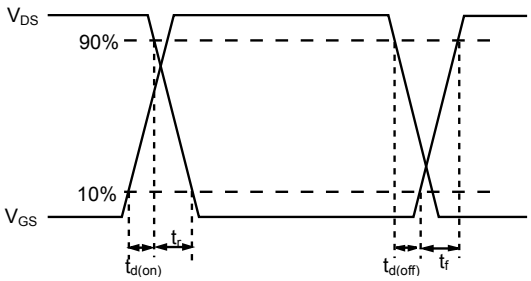


Fig.20 Resistive Switching Waveforms

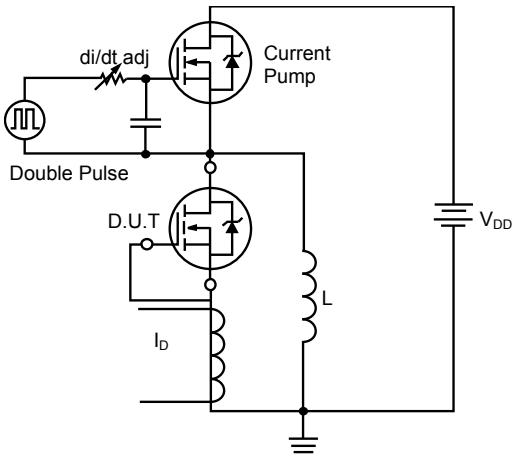


Fig.21 Diode Reverse Recovery Test Circuit

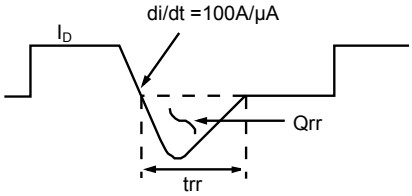


Fig.22 Diode Reverse Recovery Waveform

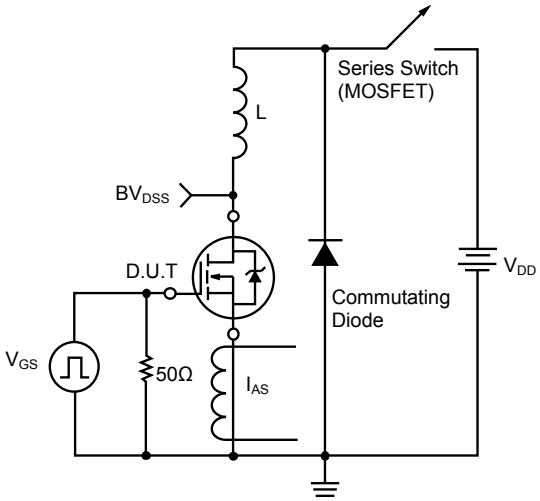
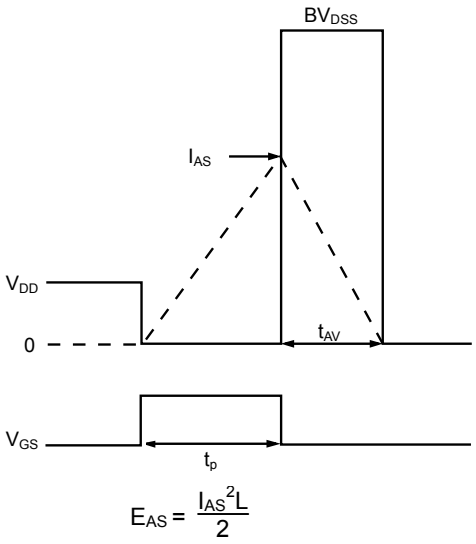


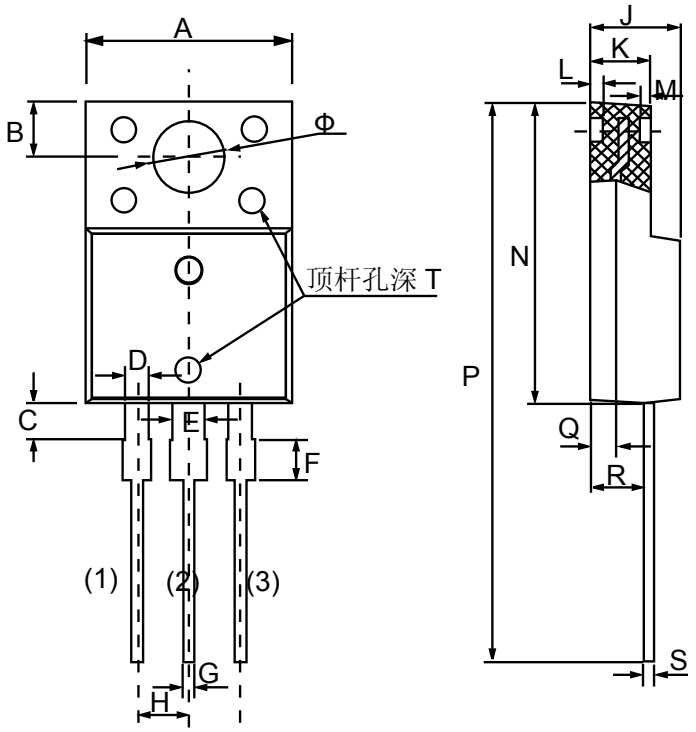
Fig.23 Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Fig.24 Unclamped Inductive Switching Waveforms

Product dimension (TO-220F)



Dim	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	9.960	10.360	0.392	0.408
B	2.700 REF		0.106 REF	
C	1.700	1.900	0.067	0.075
D	1.100	1.350	0.043	0.053
E	1.500	1.750	0.059	0.069
F	1.900	2.100	0.075	0.083
G	0.500	0.750	0.020	0.030
H	2.540 TYP		0.100 TYP	
J	4.300	4.700	0.169	0.185
K	2.800	3.200	0.110	0.126
L	0.800 REF		0.031 REF	
M	0.500 REF		0.020 REF	
N	14.800	15.200	0.583	0.598
P	28.000	28.400	1.102	1.118
Q	1.300 REF		0.051 REF	
R	2.500	2.900	0.098	0.114
S	0.500	0.750	0.020	0.030
T	0.000	0.300	0.000	0.012
Φ	3.500 REF		0.138 REF	

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