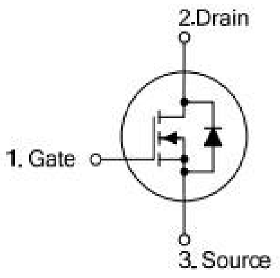
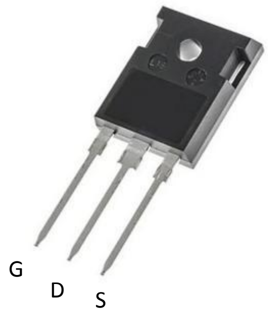
Description

MLS60R150W, the silicon N-channel Enhanced MOSFETs, is obtained by advanced Super Junction technology which reduce the conduction loss, improve switching performance. The transistor is suitable device for SMPS, high speed switching and general purpose applications.





TO-247

KEY CHARACTERISTICS

① V_{DS}=600V, R_{dson}<150mΩ @V_{GS}=10V, I_D=26A (Typ:126mΩ)
① Fast Switching
② 100% avalanche tested
③ Improved dv/dt capability
④ RoHS product

APPLICATIONS

①High frequency switching mode power supply

ORDERING INFORMATION

Ordering Codes	Package	Product Code	Packing
MLS60R150-W	TO-247	M60R150W	Tube

ABSOLUTE RATINGS at T_C = 25°C, unless otherwise specified

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	600	V
I_D	Continuous Drain Current	26	A
	Continuous Drain Current T_C = 100 °C	16	A
I_{DM}	Pulsed Drain Current(Note1)	75.9	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy(Note2)	600	mJ
dv/dt	Peak Diode Recovery dv/dt(Note3)	15	V/ns
P_D	Power Dissipation TO-220 TO-262 TO-263 TO-3PN	220	W
	Derating Factor above 25°C	1.75	W/℃
P_D	Power Dissipation TO-220F	42	W
	Derating Factor above 25°C	0.33	W/℃

T_J， T_{stg}	Operating Junction and Storage Temperature Range	150，–55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

Thermal characteristics

Symbol	Parameter	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	0.57	℃/W
$R_{\theta JA}$	Junction-to-Ambient	62.5	℃/W

Electrical Characteristics at T_C = 25°C, unless otherwise specified

OFF Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	600	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	ID=250uA, Reference25℃	--	0.63	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS}=600V, V_{GS}= 0V, Tj = 25℃	--	--	1	μA
		V_{DS}=480V, V_{GS}= 0V, Tj = 125℃	--	--	100	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS}=+30V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS}=-30V	--	--	-100	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On- Resistance	V_{GS}=10V, I_D=9A(Note4)	--	0.126	0.15	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA(Note4)	2.5	--	4.5	V

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
R_g	Gate resistance	f = 1.0MHz	--	3.2	--	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1.0MHz	--	1860	--	PF
C_{oss}	Output Capacitance		--	1060	--	
C_{rss}	Reverse Transfer Capacitance		--	56	--	

Switching Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =8.5A V_{DD} = 300V V_{GS} = 10V R_G =5Ω	--	100.4	--	ns
tr	Rise Time		--	61	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	220.6	--	
t_f	Fall Time		--	54.8	--	
Q_g	Total Gate Charge	I_D =11A V_{DD} =400V V_{GS} = 10V	--	43	--	nC
Q_{gs}	Gate to Source Charge		--	10	--	
Q_{gd}	Gate to Drain ("Miller")Charge		--	16	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)	T_C=25 °C	--	--	26	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	75.9	A
V_{SD}	Diode Forward Voltage	I_S=11A, V_{GS}=0V(Note4)	--	--	1.2	V
T_{rr}	Reverse Recovery Time	I_S=11A, T_j = 25°C d_{IF}/d_t=100A/us	--	267.6	--	ns
Q_{rr}	Reverse Recovery Charge		--	4069	--	nC
I_{rrm}	Reverse Recovery Current		--	26.8	--	A

Note1: Pulse width limited by maximum junction temperature
Note2: L=20mH, VDs=50V, Start TJ=25℃

Note3: I_{SD} =11A,d_i/d_t ≤100A/us,V_{DD}≤B_{VDS}, Start T_J=25℃

Note4: Pulse width tp≤300μs, δ≤2%

Characteristics Curves

Figure 1a Safe Operating Area (No FullPAK)

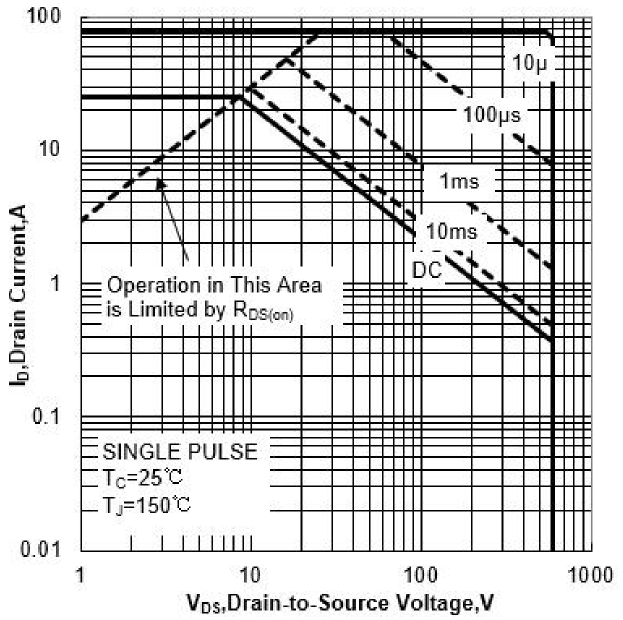


Figure 1b Safe Operating Area (FullPAK)

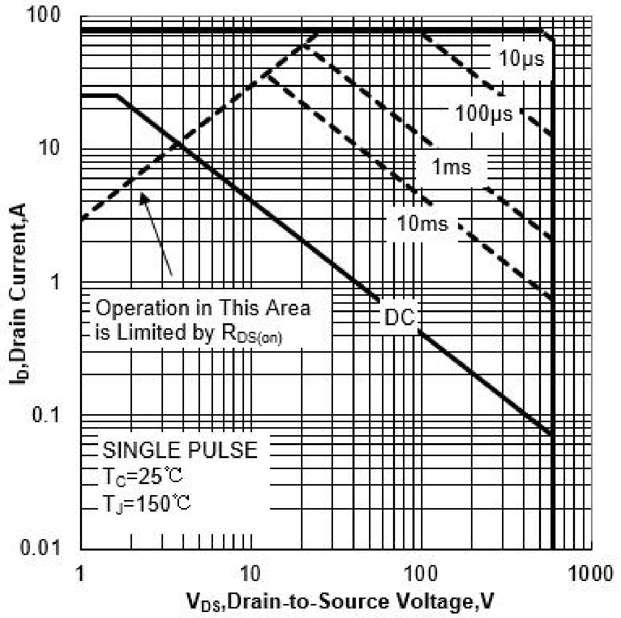


Figure 2a Power Dissipation (No FullPAK)

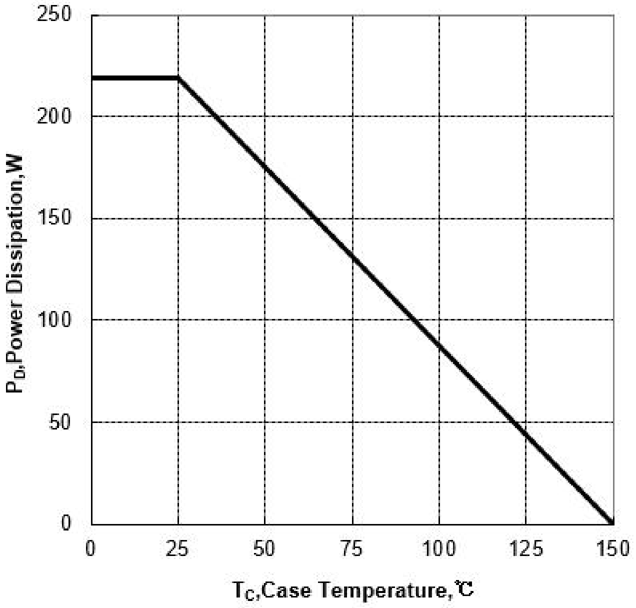


Figure 2b Power Dissipation (FullPAK)

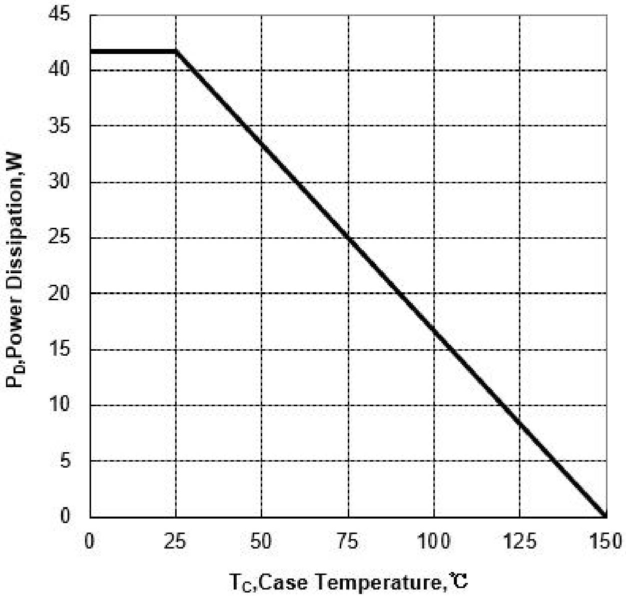


Figure 3a Max Thermal Impendance (No FullPAK)

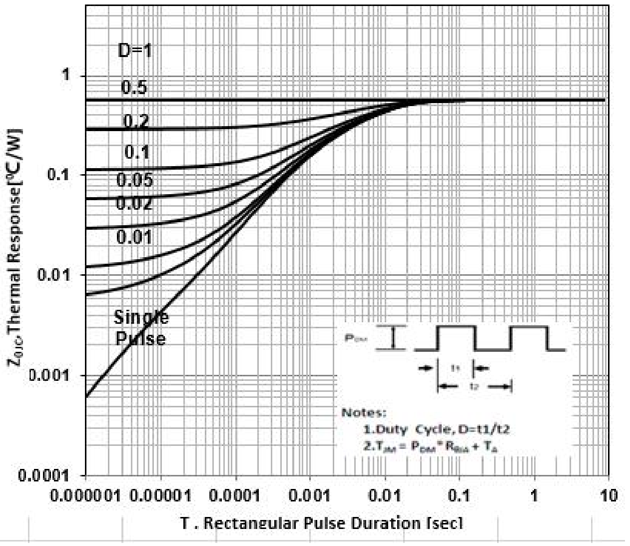


Figure 3b Max Thermal Impendance (FullPAK)

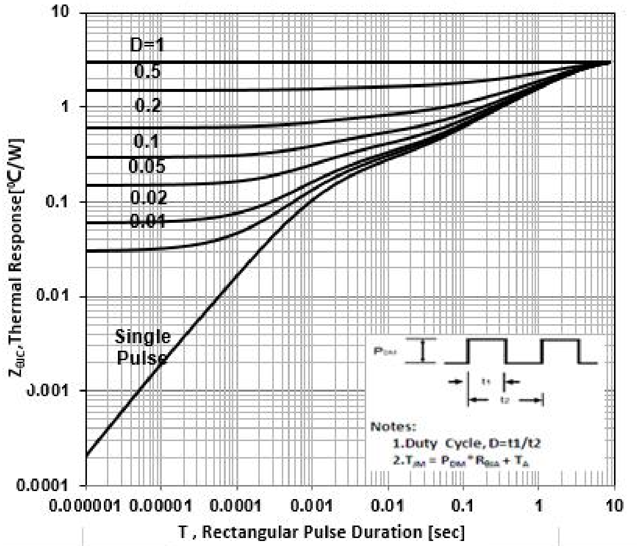


Figure 4 Typical Output Characteristics

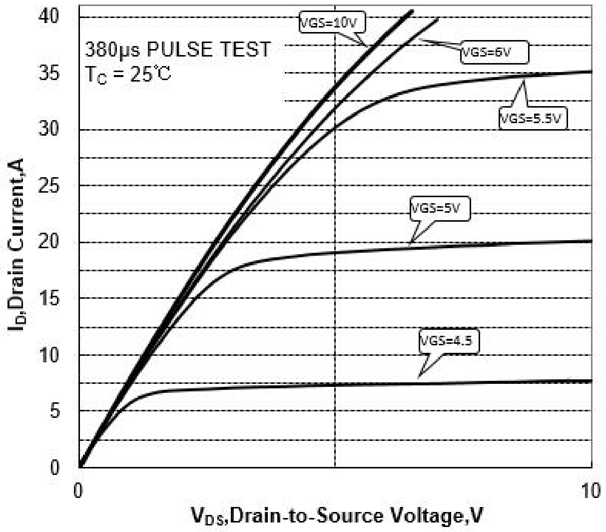


Figure 5 Typical Transfer Characteristics

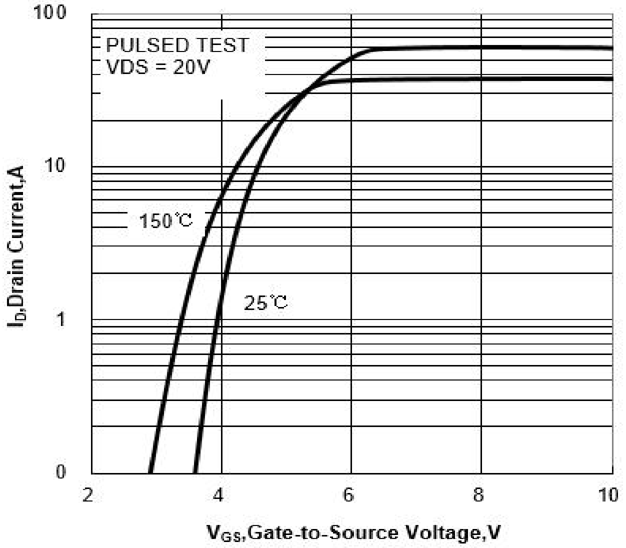


Figure 6 Typical Drain to Source ON Resistance vs Drain Current

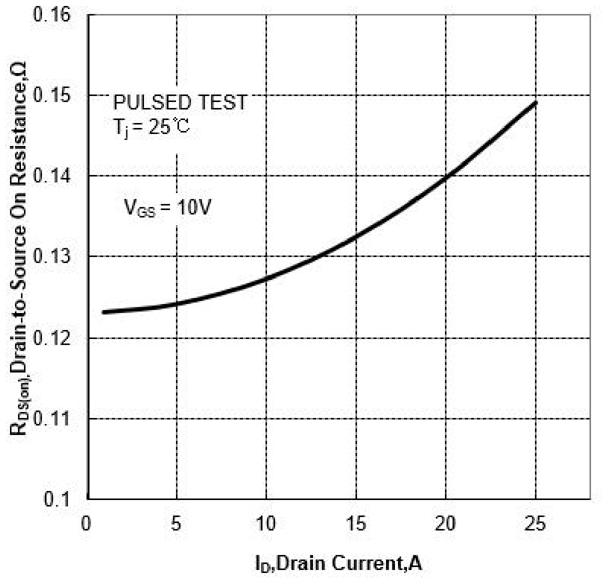


Figure 7 Typical Drian to Source on Resistance vs Junction Temperature

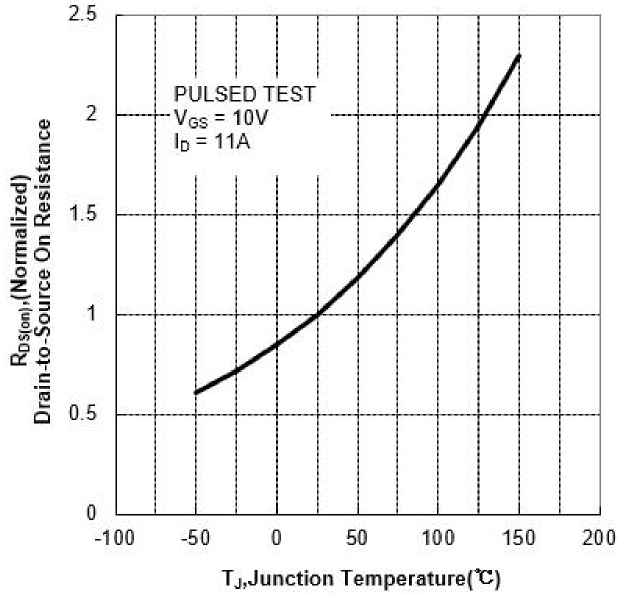


Figure 8 Typical Theshold Voltage vs Junction Temperature

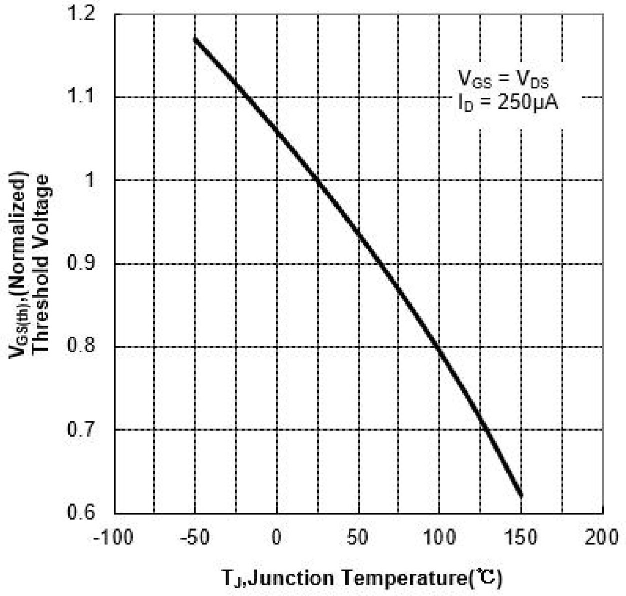


Figure 9 Typical Breakdown Voltage vs Junction Temperature

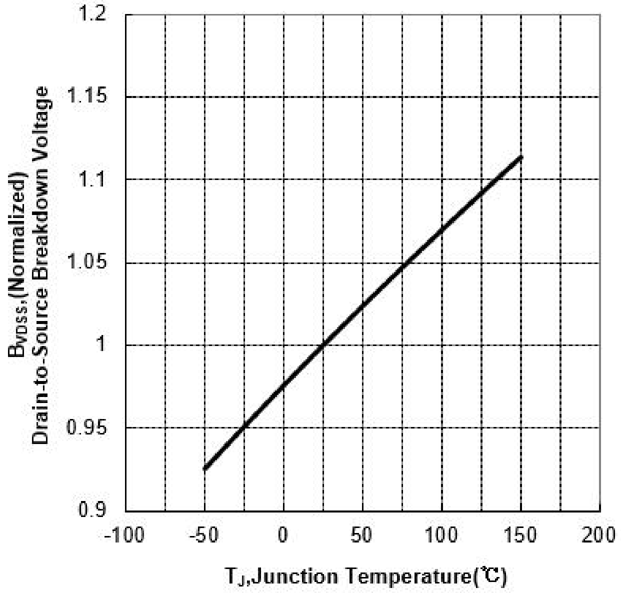


Figure 10 Typical Capacitance vs Drain to Source Voltage

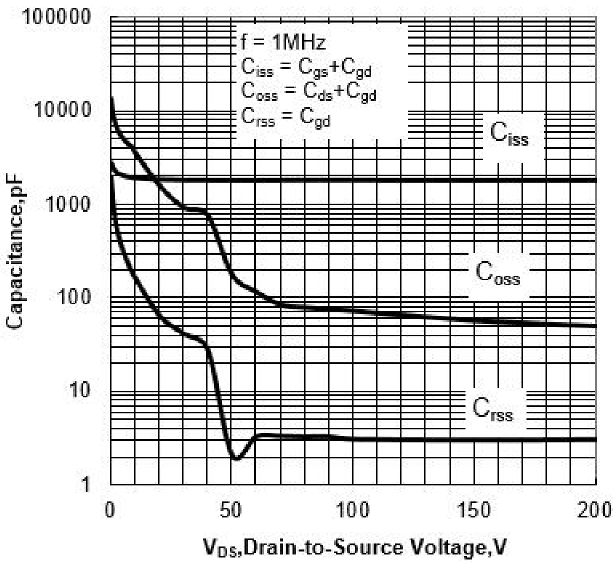
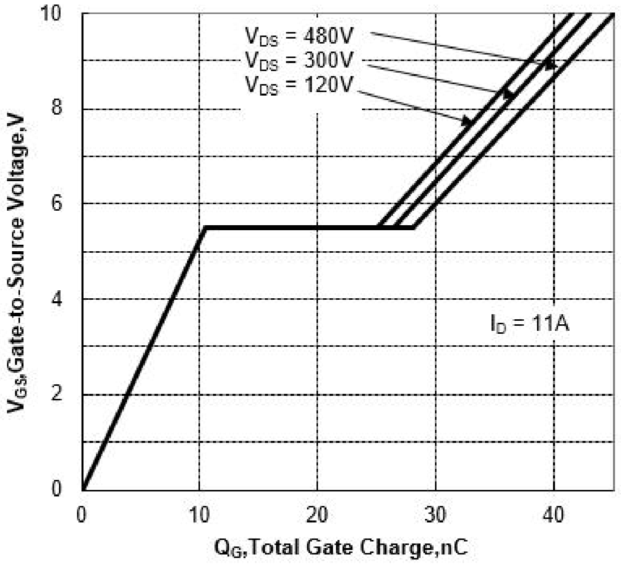


Figure 11 Typical Gate Charge vs Gate to Source Voltage



Test Circuit and Waveform

Figure 12 Gate Charge Test Circuit

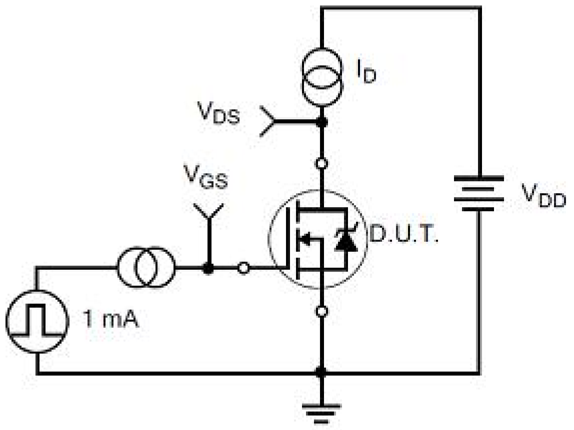


Figure 13 Gate Charge Waveforms

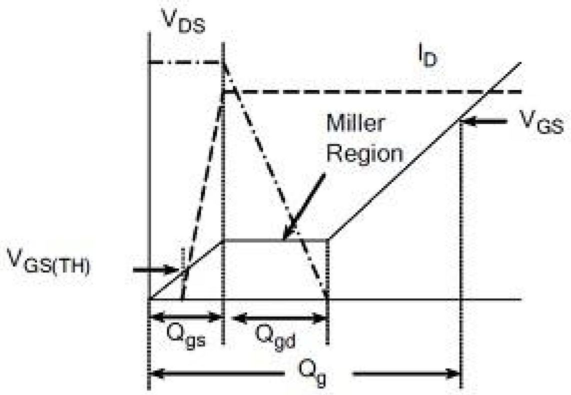


Figure 14 Resistive Switching Test Circuit

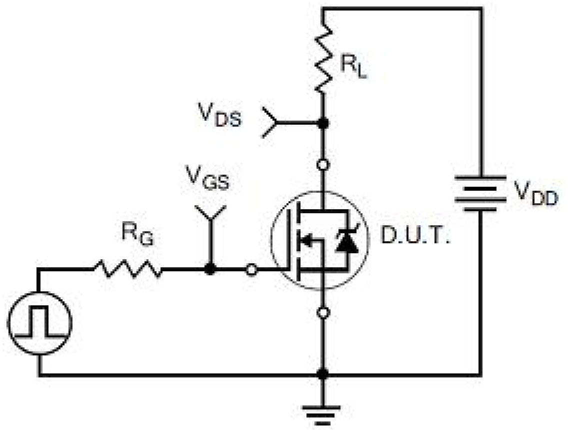


Figure 15 Resistive Switching Waveforms

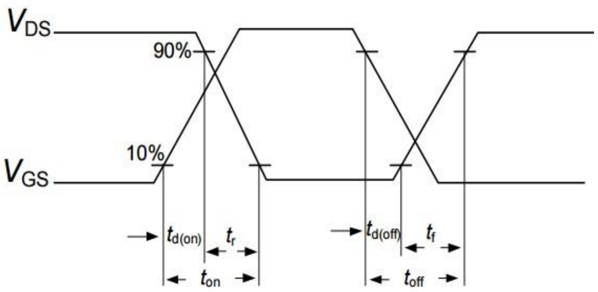


Figure 16 Diode Reverse Recovery Test Circuit

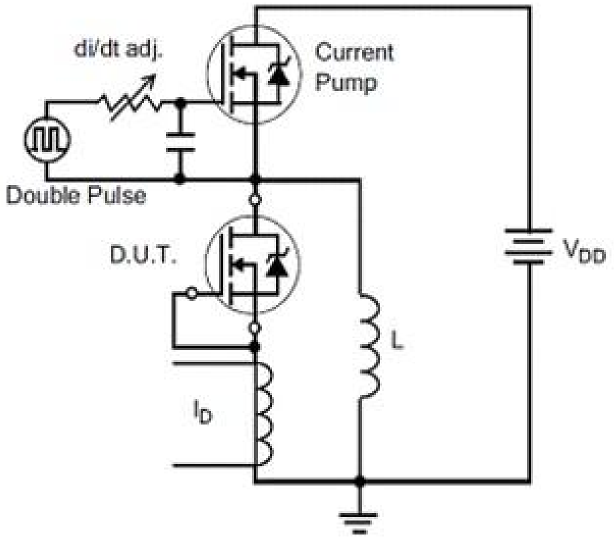


Figure 17 Diode Reverse Recovery Waveform

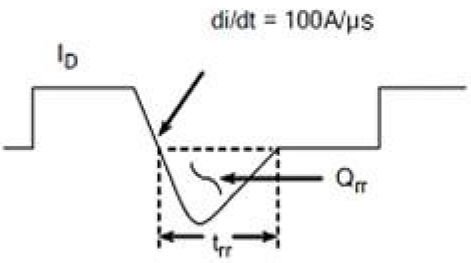


Figure 18 Unclamped Inductive Switching Test Circuit

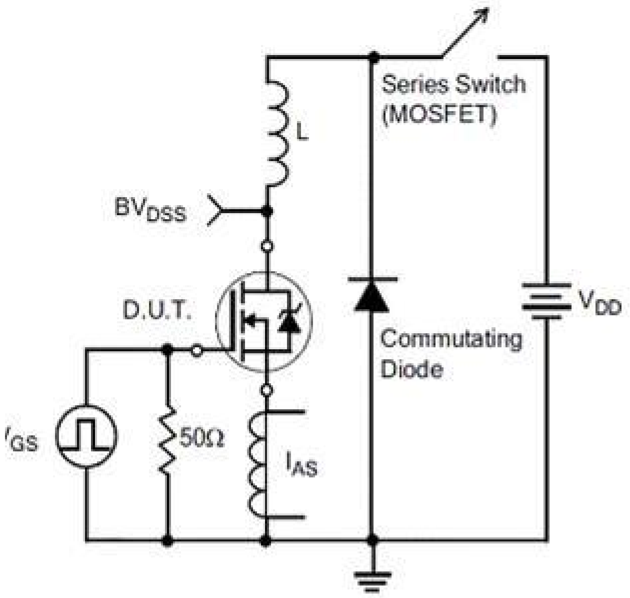
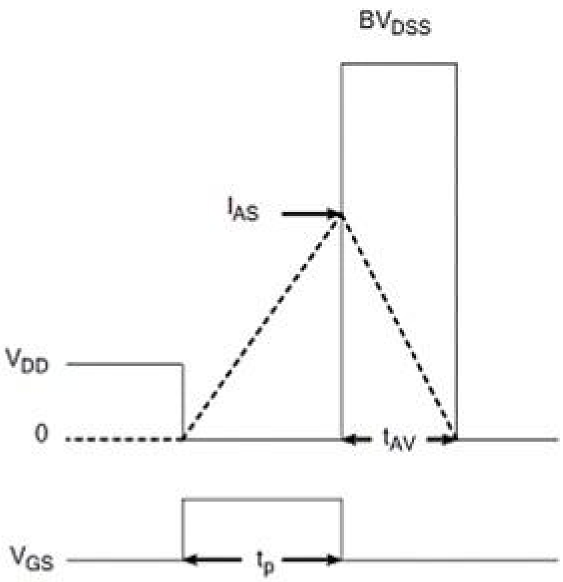
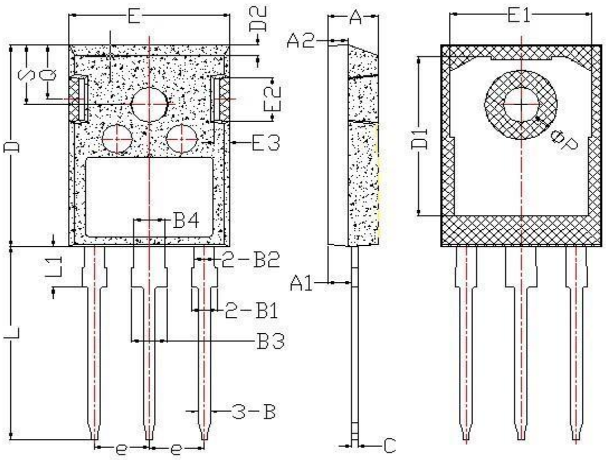


Figure 19 Unclamped Inductive Switching Waveform



Package Description



Items	Values(mm)	
	MIN	MAX
A	4.6	5.2
A1	2,2	2.6
B	0.9	1.4
B1	1.75	2.35
B2	1.75	2.15
B3	2.8	3.35
B4	2.8	3.15
C	0.5	0.7
D	20.60	21.30
D1	16	18
E	15.5	16.10
E1	13	14.7
E2	3.80	5.3
E3	0.8	2.60
e	5.2	5.7
L	19	20.5
L1	3.9	4.6
ΦP	2.5	3.70
Q	5.2	6.00
S	5.8	6.6

TO-247 Package

NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change withoutprior notice.

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