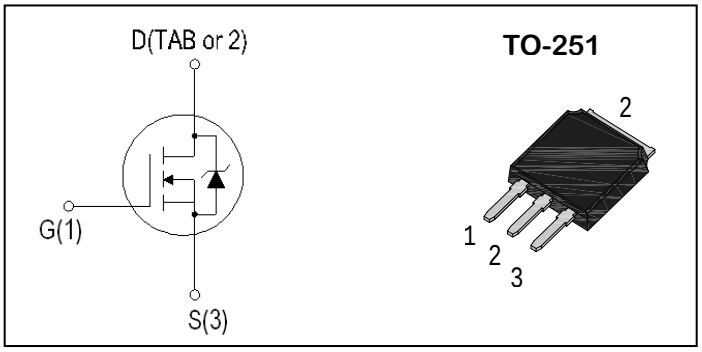
N-Channel Enhancement Mode Field Effect Transistor



PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ)
60V	45A	15mΩ

Absolute Maximum Ratings (T_A = 25°C unless otherwise specifed)

Symbol	Parameter		Ratings	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	TC=25°C	45	A
Mounted on Large Heat Sink				
I_{DM}	300μs Pulse Drain Current Tested(1)	T_C=25°C	165	A
I_D	Continuous Drain Current	T_C=25°C	45	A
P_D	Maximum Power Dissipation	T_C=25°C	63	W

1. Pulse width limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max	2.4	°C/W
R_{thJA}	Thermal resistance junction-ambient max	72	°C/W

Electrical Characteristics (TA=25°C Unless Otherwise Noted)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
On/off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250uA	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 48V, V_{GS}=0V	--	--	1	uA
		V_{DS}=48V, V_{GS}=0V T_J=55°C	--	--	5	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	2	--	4	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	--	--	±100	nA
$R_{DS(ON)}$	Drain-SourceOn-stateResistance(2)	V_{GS}= 10V, I_{DS}=40A	--	11.0	15.0	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V,	--	1100	--	pF
C_{oss}	Output Capacitance	V_{DS}= 25V,	--	166	--	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	--	67	--	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time(1)	V_{DD}=30V,	--	6.8	--	ns
t_r	Turn-on Rise Time(1)	I_D= 46A, V_{GS}= 10V,	--	16	--	
$t_{d(OFF)}$	Turn-off Delay Time(1)	R_{GEN}=10Ω	--	17	--	
t_f	Turn-off Fall Time(1)		--	8.6	--	
Q_g	Total Gate Charge(1)	V_{DS}=30V, V_{GS}= 10V,	--	18	--	nC
Q_{gs}	Gate-Source Charge(1)	I_{DS}=46A	--	7	--	
Q_{gd}	Gate-Drain Charge(1)		--	4	--	
Diode Characteristics						
V_{SD}	Diode Forward Voltage(2)	I_{SD} = 1A, V_{GS} = 0	--	--	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=23A, dI_{SD}/dt=50A/μs	--	27.0	--	ns
q_{rr}	Reverse Recovery Charge		--	36.0	--	nC

NOTES:

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

Typical Performance Characteristics

Figure 1: On-Region Characteristics

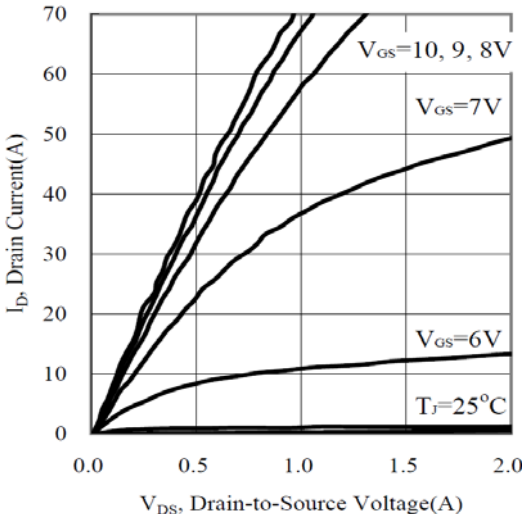


Figure 2: Power Dissipation

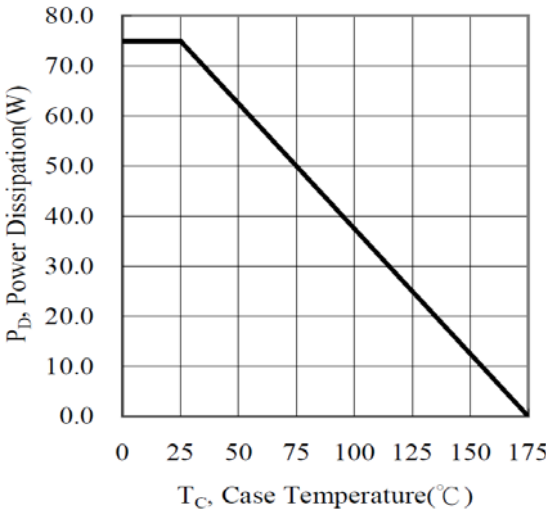


Figure 3: Drain Current

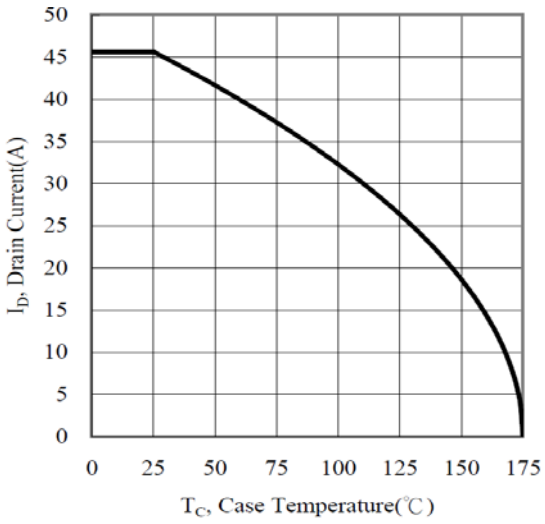


Figure 4: Drain-to-Source Breakdown Voltage

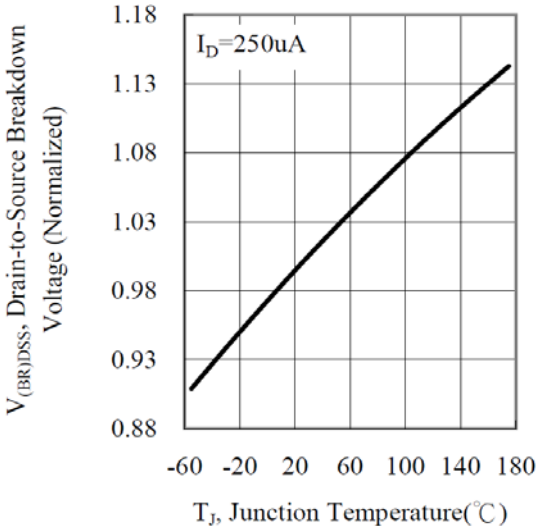


Figure 5: Capacitance Characteristics

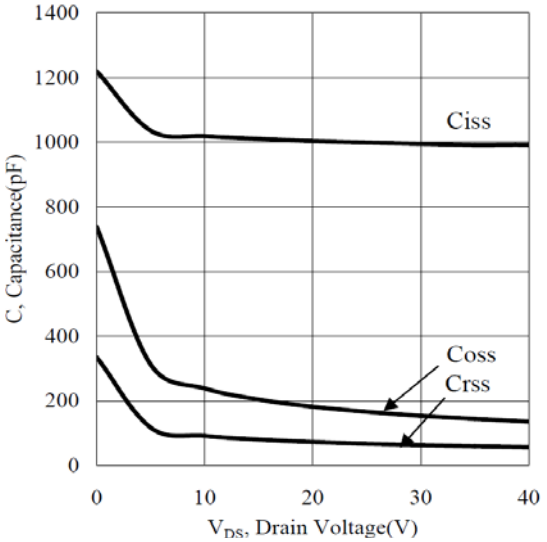


Figure 6: Gate Charge Characteristics

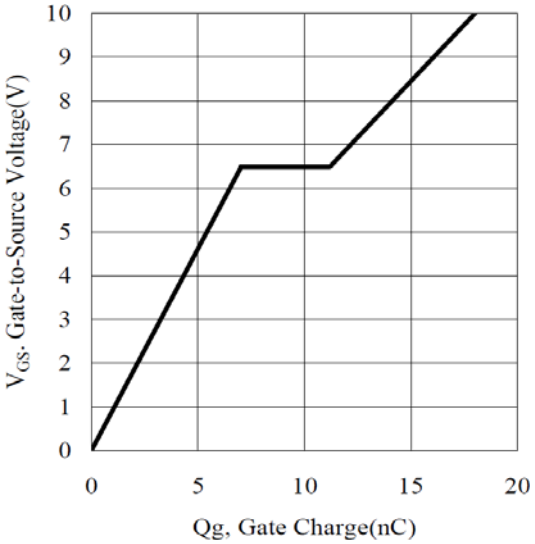


Figure 7: Gate Threshold Voltage

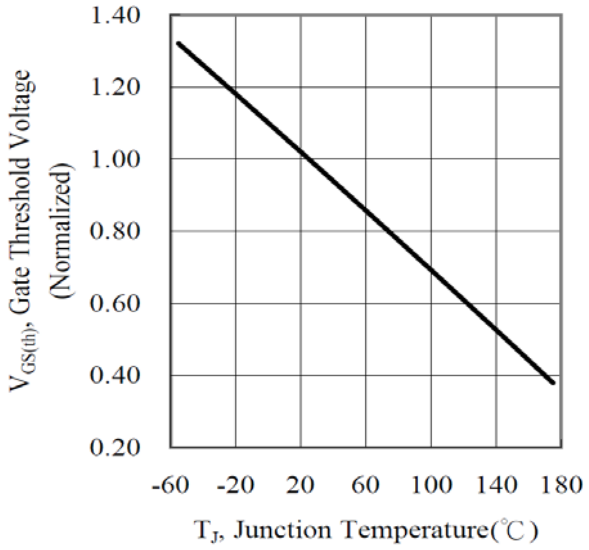


Figure 8: Drain-to-Source On-Resistance

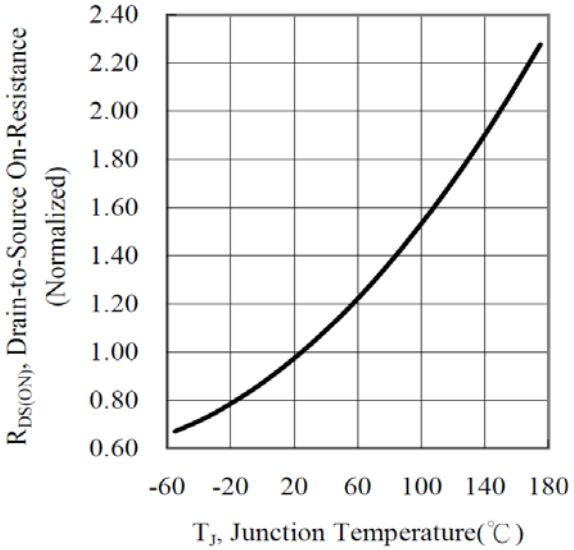


Figure 9: Avalance Characteristics

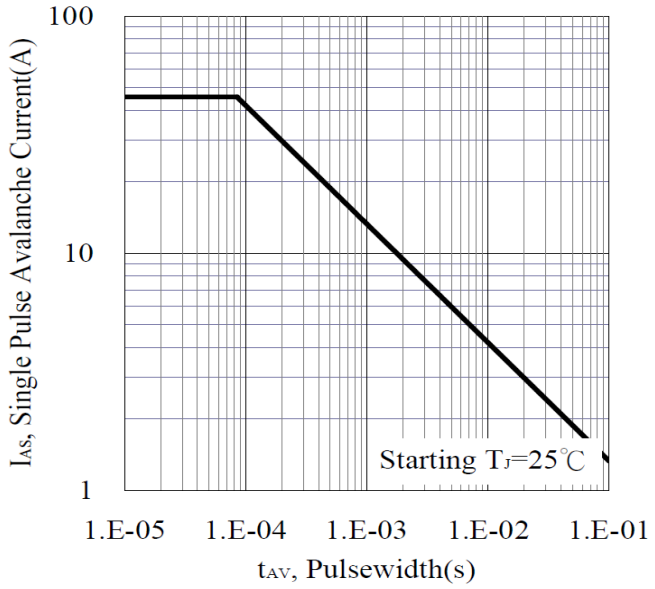
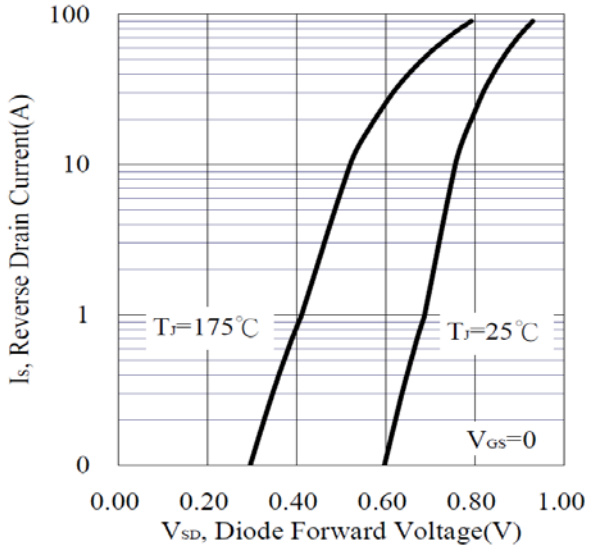
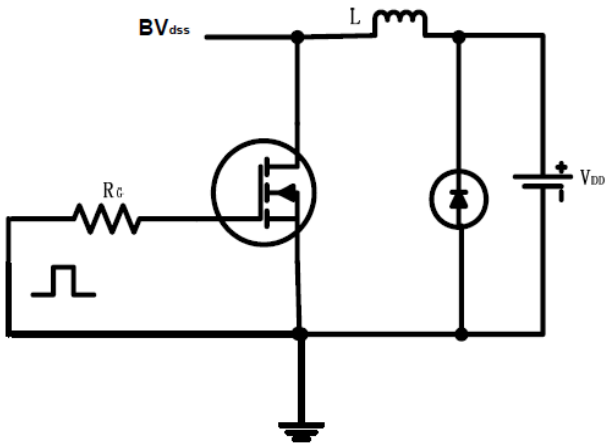


Figure 10: Forward Characteristics of reverse diode

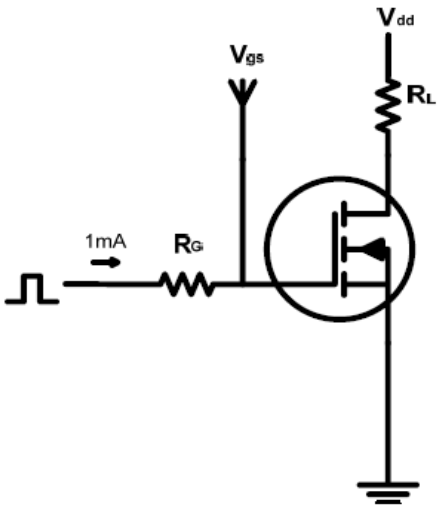


Test circuits and Waveforms

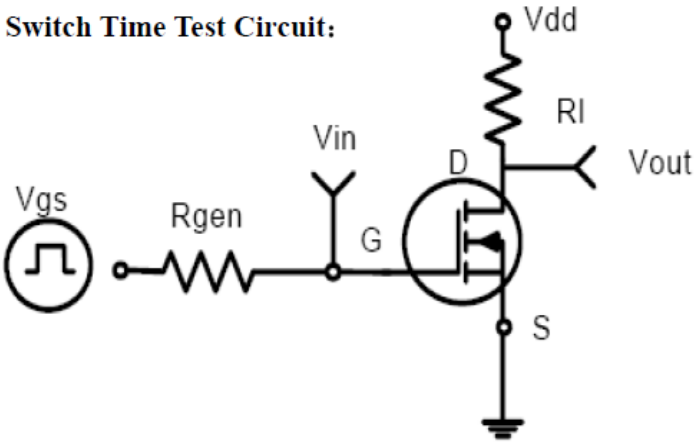
EAS test circuits:



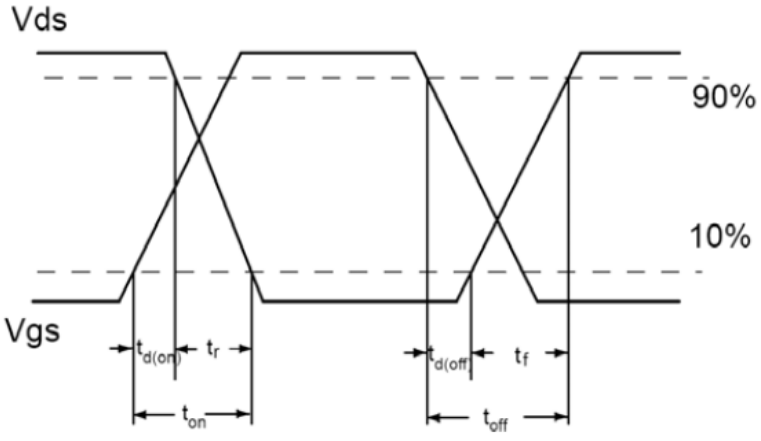
Gate charge test circuit:



Switch Time Test Circuit:

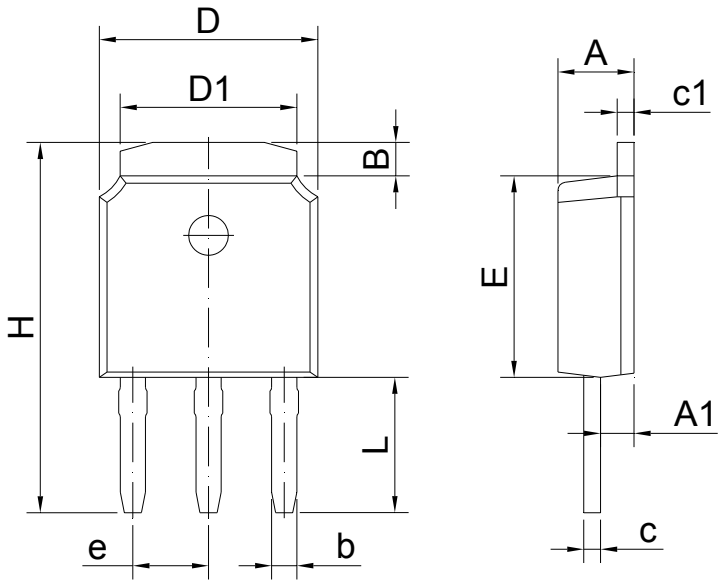


Switch Waveforms:



PACKAGE MECHANICAL DATA

TO-251 Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.100	2.500	0.083	0.098
A1	0.970	1.170	0.038	0.046
B	0.880	1.250	0.035	0.049
b	0.680	0.900	0.027	0.035
c	0.430	0.630	0.017	0.025
c1	0.430	0.630	0.017	0.025
D	6.350	6.800	0.250	0.267
D1	5.150	5.500	0.203	0.216
E	5.900	6.300	0.232	0.248
e	2.286TYP		0.089TYP	
H	10.600	11.800	0.417	0.465
L	3.900	4.300	0.153	0.169