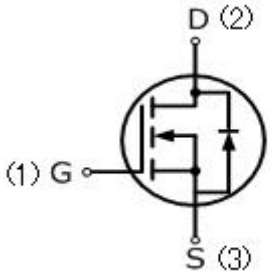
47N60YS

47 Amps,600 Volts N-Channel Super Junction Power MOSFET

FEATURE

- 47A,600V,$R_{DS(ON)MAX}$=90m Ω @V_{GS}=10V/15.6A
- Low gate charge
- Low C_{iss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



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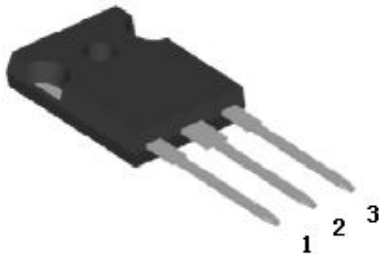


Absolute Maximum Ratings(T_C=25℃,unless otherwise noted)

Parameter		Symbol	47N60YS	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±20	
Continuous Drain Current		I_D	47	A
Pulsed Drain Current(Note1)		I_{DM}	132	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	720	mJ
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to +150	℃
Maximum lead temperature for soldering purposes, 1/8″from case for 5 seconds		T_L	260	℃
Mounting Torque	6-32 or M3 screw		10	lbf • in
			1.1	N • m

Thermal Characteristics

Parameter		Symbol	47N60YS	Units
Maximum Junction-to-Case		R_{thJC}	0.68	℃/W
Maximum Power Dissipation	T_C=25℃	P_D	183	W

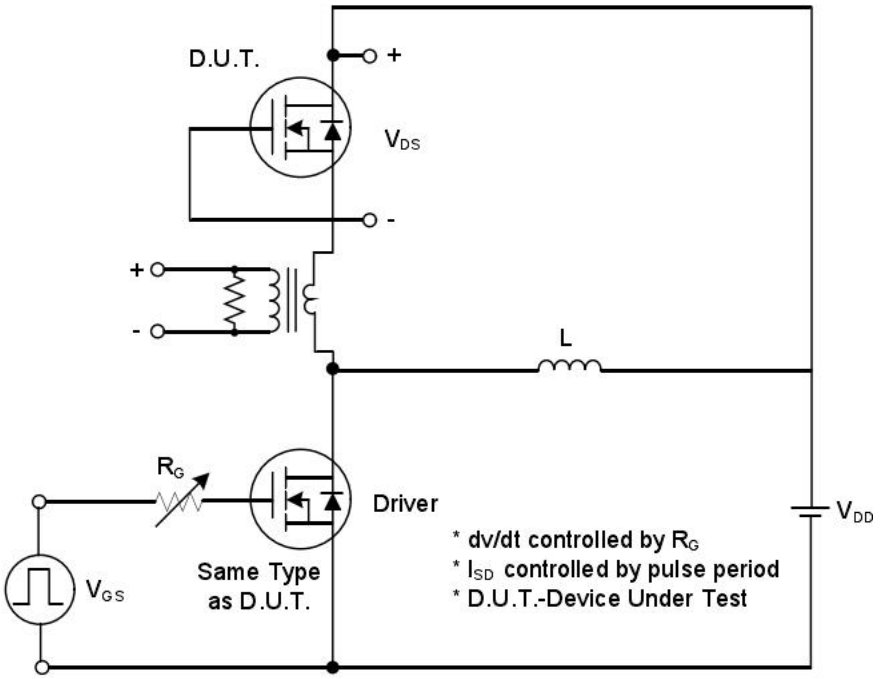
Electrical Characteristics (T_c=25℃,unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA,T_C=25℃	600	—	—	V
		V_{GS}=0V,I_D=250uA,T_C=125℃	—	700	—	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=600V,V_{GS}=0V	—	—	1	μA
Gate-Body Leakage Current,Forward	I_{GSSF}	V_{GS}=20V,V_{DS}=0V	—	—	100	nA
Gate-Body Leakage Current,Reverse	I_{GSSR}	V_{GS}=-20V,V_{DS}=0V	—	—	-100	nA
On Characteristics						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	2	—	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=15.6A	—	68	90	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V,	—	3112	—	pF
Output Capacitance	C_{oss}	f=1.0MHZ	—	2399	—	pF
Reverse Transfer Capacitance	C_{rss}		—	62	—	pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=300V,I_D=20A,	—	45.5	—	ns
Turn-On Rise Time	t_r	R_G=25Ω	—	120.6	—	ns
Turn-Off Delay Time	$t_{d(off)}$	(Note3,4)	—	137	—	ns
Turn-Off Fall Time	t_f		—	116.2	—	ns
Total Gate Charge	Qg	V_{DS}=480V,I_D=20A,	—	88	—	nC
Gate-Source Charge	Qgs	V_{GS}=10V, (Note3,4)	—	21.7	—	nC
Gate-Drain Charge	Qgd		—	41	—	nC
Drain-Source Body Diode Charcteristics and Maximum Ratings						
Continuous Diode Forward Current	I_S		—	—	47	A
Pulsed Diode Forward Current	I_{SM}		—	—	132	A
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V	—	—	1.5	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V,I_S=20A,	—	947.1	—	ns
Reverse Recovery Charge	Q_{rr}	dI_F/dt=100A/us, (Note3)	—	6.8	—	μC

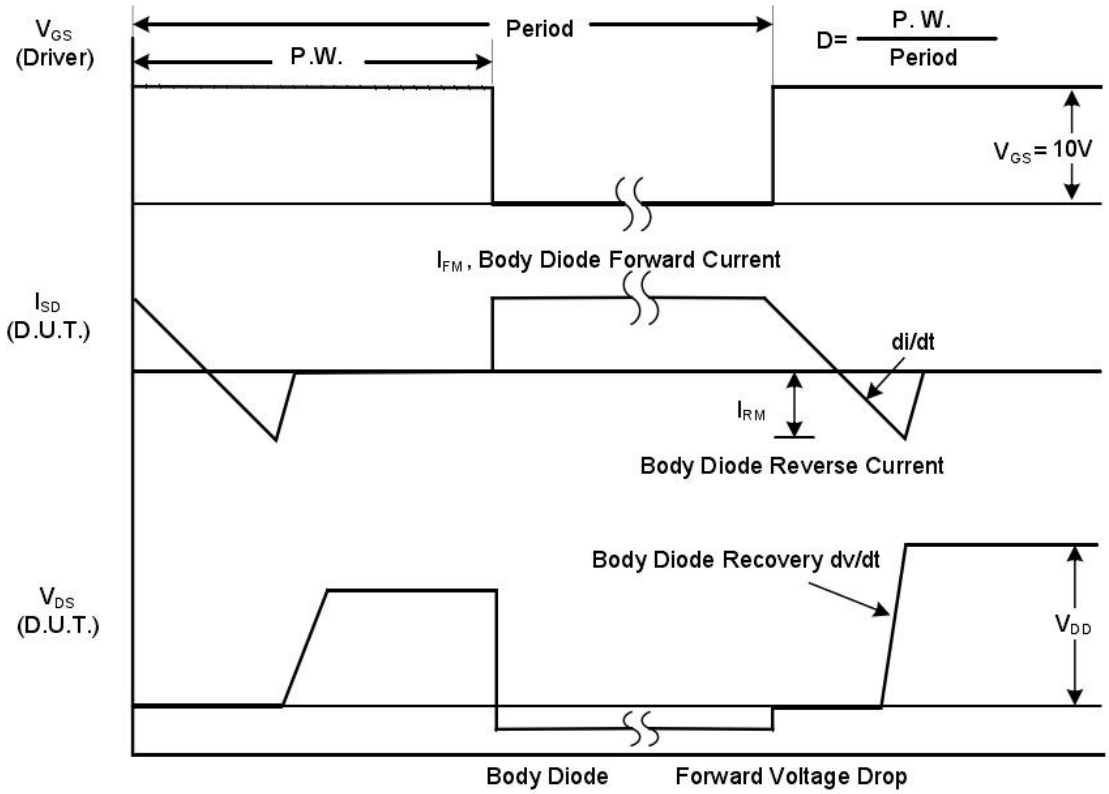
Notes

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. L=10mH,R_g=25Ω,I_{AS}=12A ,starting T_J=25℃.
3. dI/dt=200A/us,starting T_J=25℃.Pulse width≤300us;duty cycle≤2%.
4. Repetitive rating; pulse width limited by maximum junction temperature.

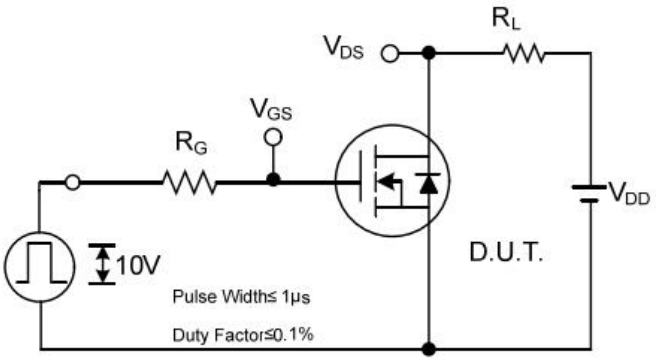
TEST CIRCUIT AND WAVEFORM



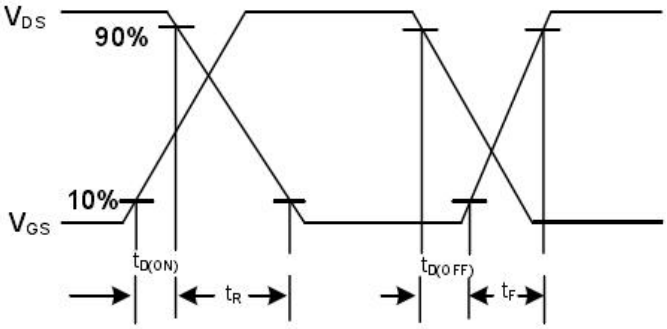
Peak Diode Recovery dv/dt Test Circuit



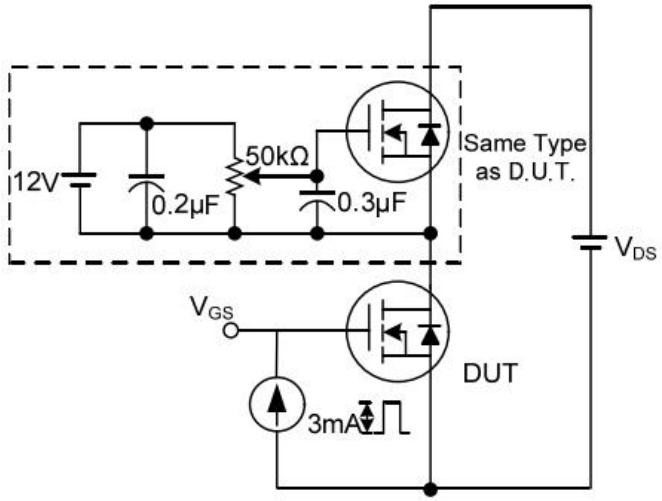
Peak Diode Recovery dv/dt Waveforms



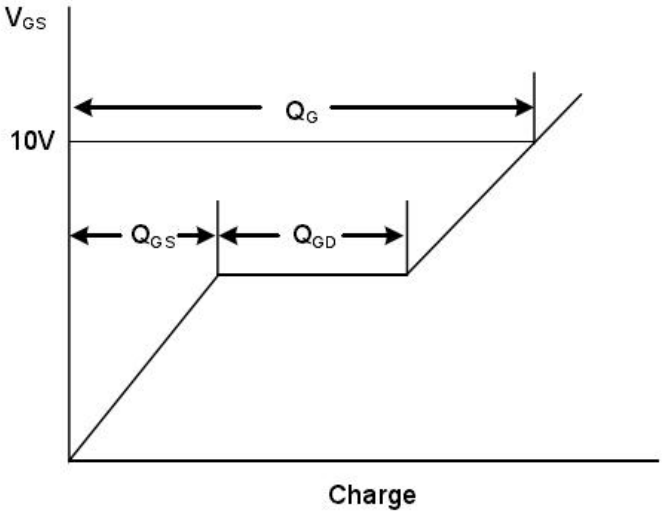
Switching Test Circuit



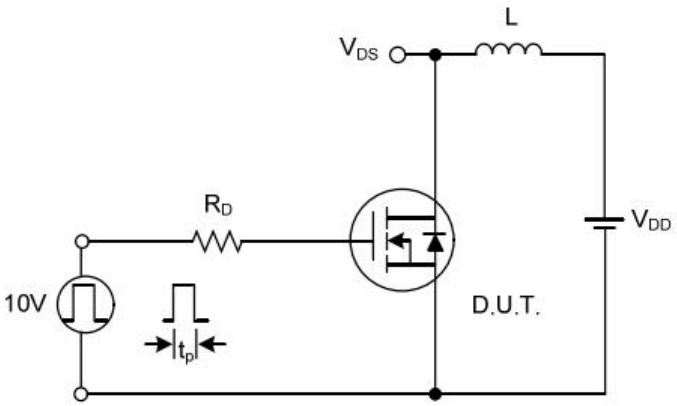
Switching Waveforms



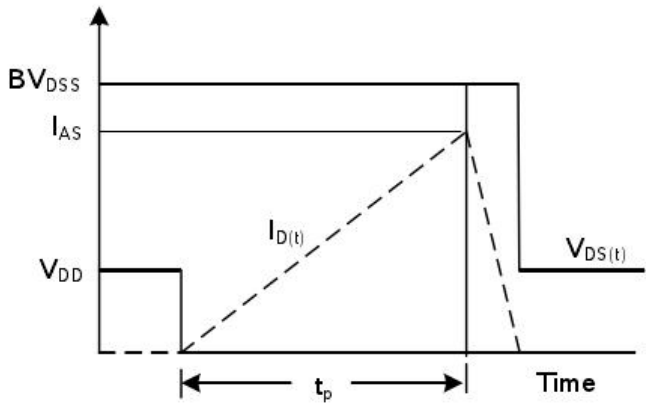
Gate Charge Test Circuit



Gate Charge Waveform

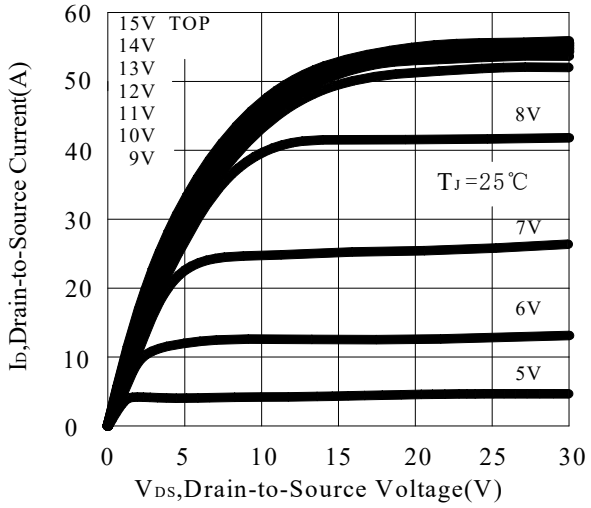


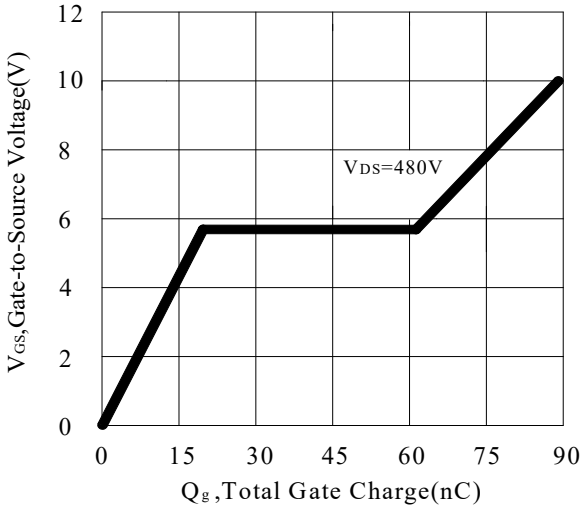
Unclamped Inductive Switching Test Circuit

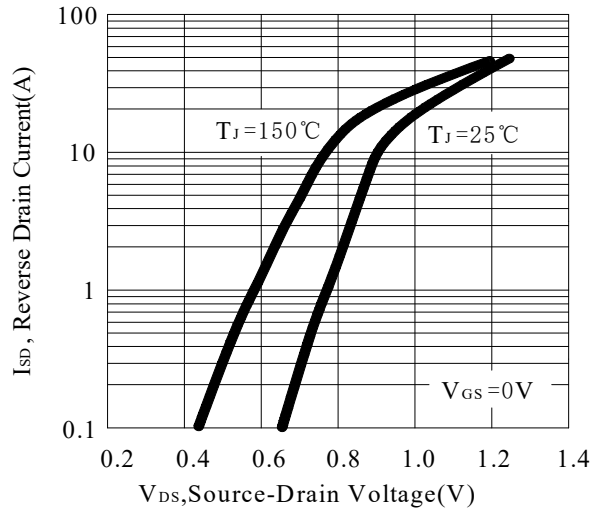


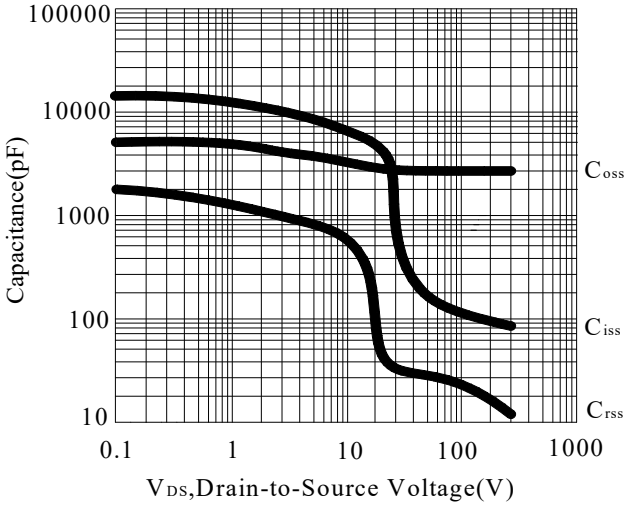
Unclamped Inductive Switching Waveforms

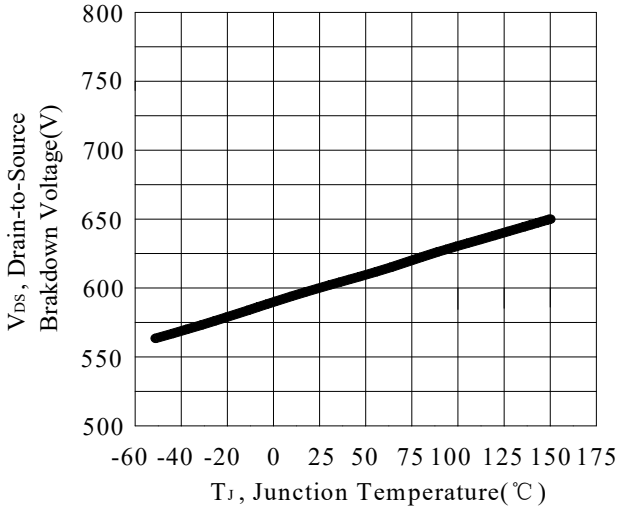
RATINGAND CHARACTERISTIC CURVES

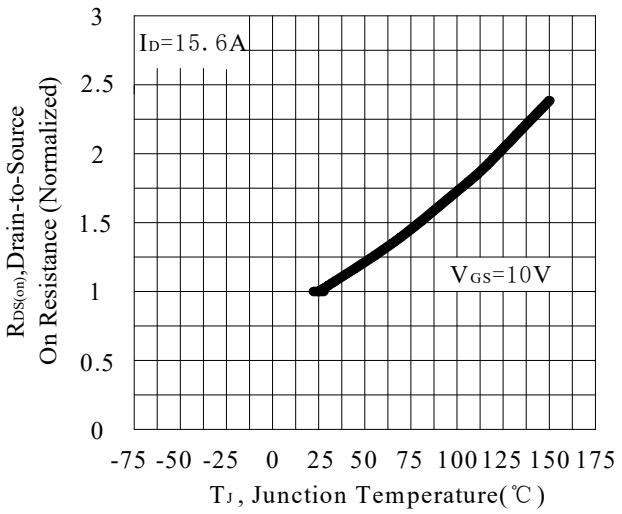


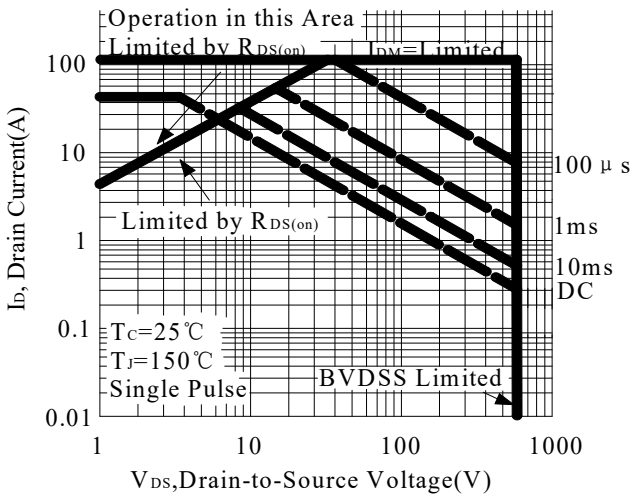


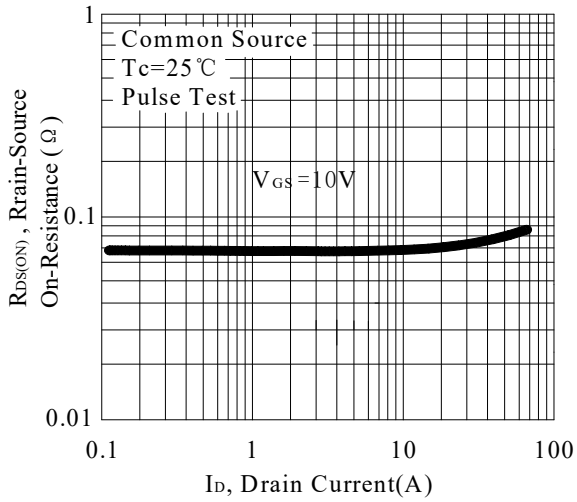


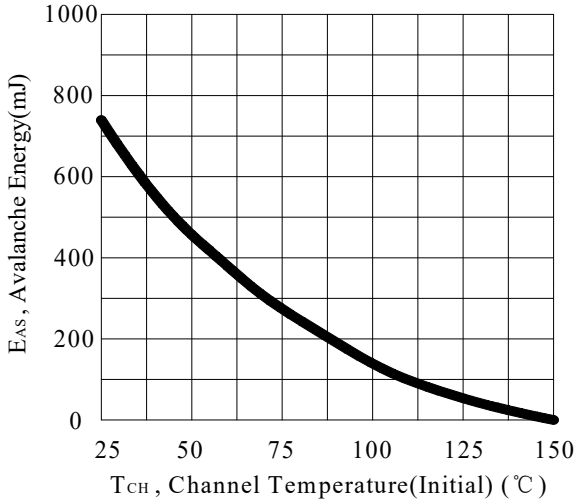


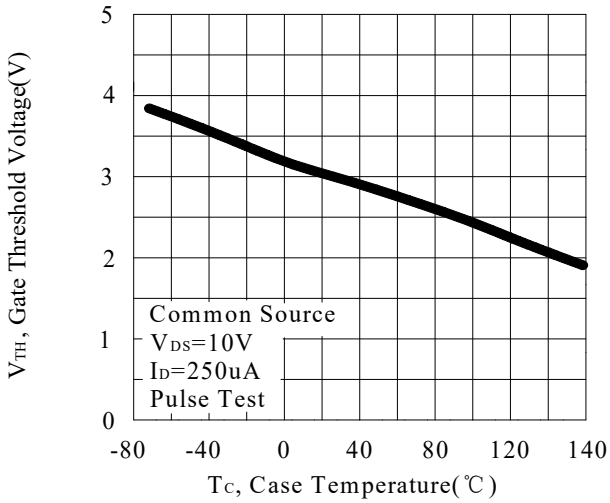


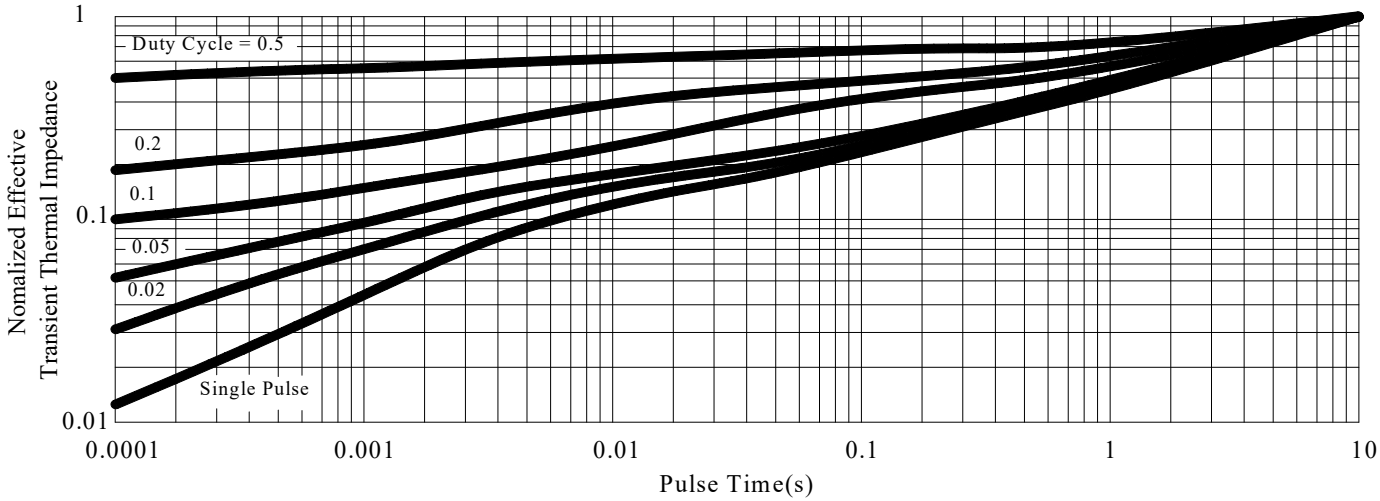



Operation in this Area
Limited by RDS(on)
IDM=Limited
100 μs
1ms
10ms
DC
Limited by RDS(on)
TC=25℃
TJ=150℃
Single Pulse
BVDSS Limited
ID, Drain Current(A)
VDS,Drain-to-Source Voltage(V)


Common Source
Tc=25℃
Pulse Test
VGS=10V
RDS(ON), Rrain-Source On-Resistance (Ω)
ID, Drain Current(A)


EAS, Avalanche Energy(mJ)
TCH, Channel Temperature(Initial) (℃)


Common Source
VDS=10V
ID=250uA
Pulse Test
VTH, Gate Threshold Voltage(V)
TC, Case Temperature(℃)


Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse
Nomalized Effective Transient Thermal Impedance
Pulse Time(s)

PACKAGE OUTLINE DIMENSIONS

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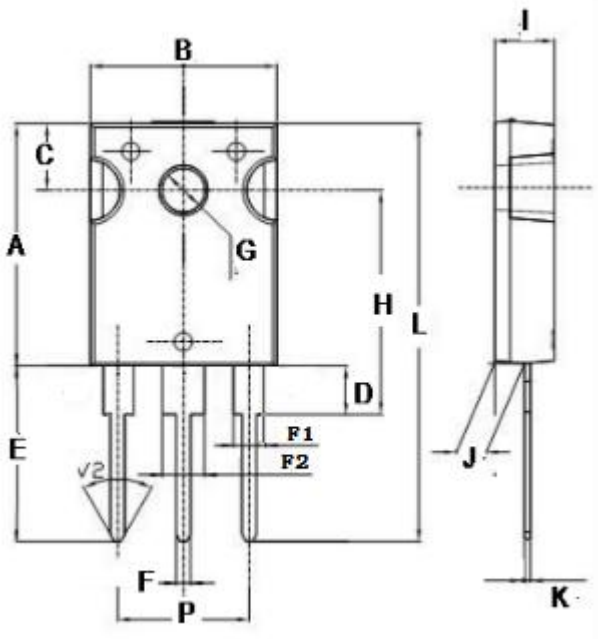

Dim	Min	Max
A	20.0	22.0
B	15.5	16.0
C	5.7	6.3
D	4.0	4.4
E	19.0	21.0
F	1.1	1.3
G	3.5	3.8
H	18.3	20.2
I	4.9	5.2
J	2.3	2.5
K	0.55	0.65
L	39.0	42.0
P	10.7	10.9
F1	1.9	2.1
F2	2.9	3.1
mm		