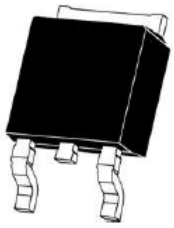
FEATURE

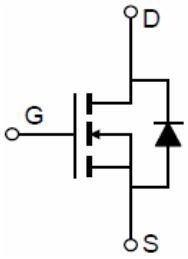
- Low gate charge
- Low Ciss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

Product Summary

V_{DS}	60	V
$R_{DS(on),Typ}$@ V_{GS}=10 V	8.5	mΩ
I_D	50	A



TO-252-2L top view



Schematic diagram

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	50	A
Drain Current-Continuous(T_C=100℃)	I_D (100) ℃	42	A
Pulsed Drain Current	I_{DM}	200	A
Maximum Power Dissipation	P_D	62.5	W
Derating factor		0.73	W/℃
Single pulse avalanche energy (Note 5)	E_{AS}	31	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

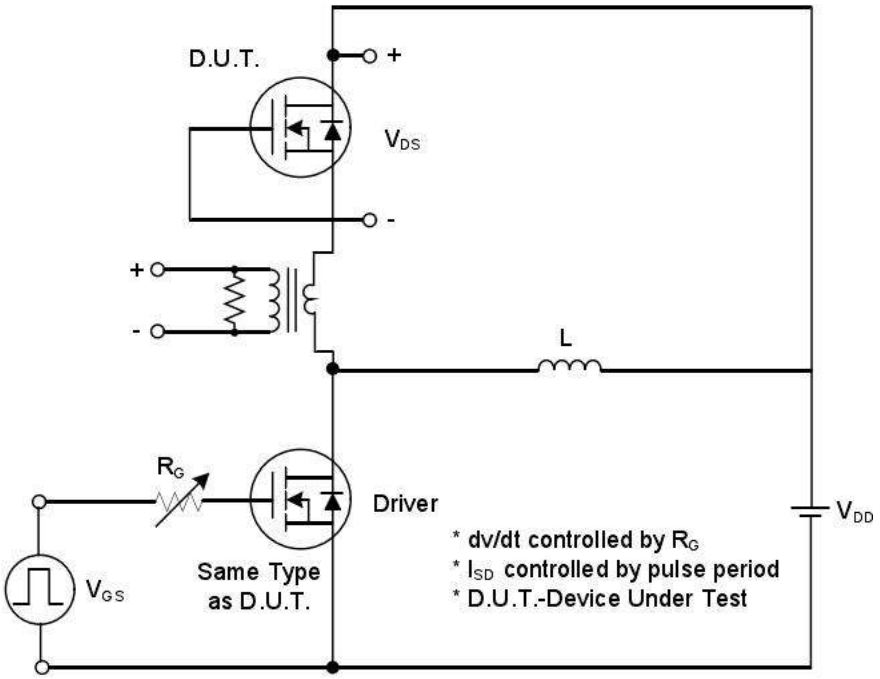
Thermal Characteristics

Parameter	Symbol	Limit	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.0	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	°C/W

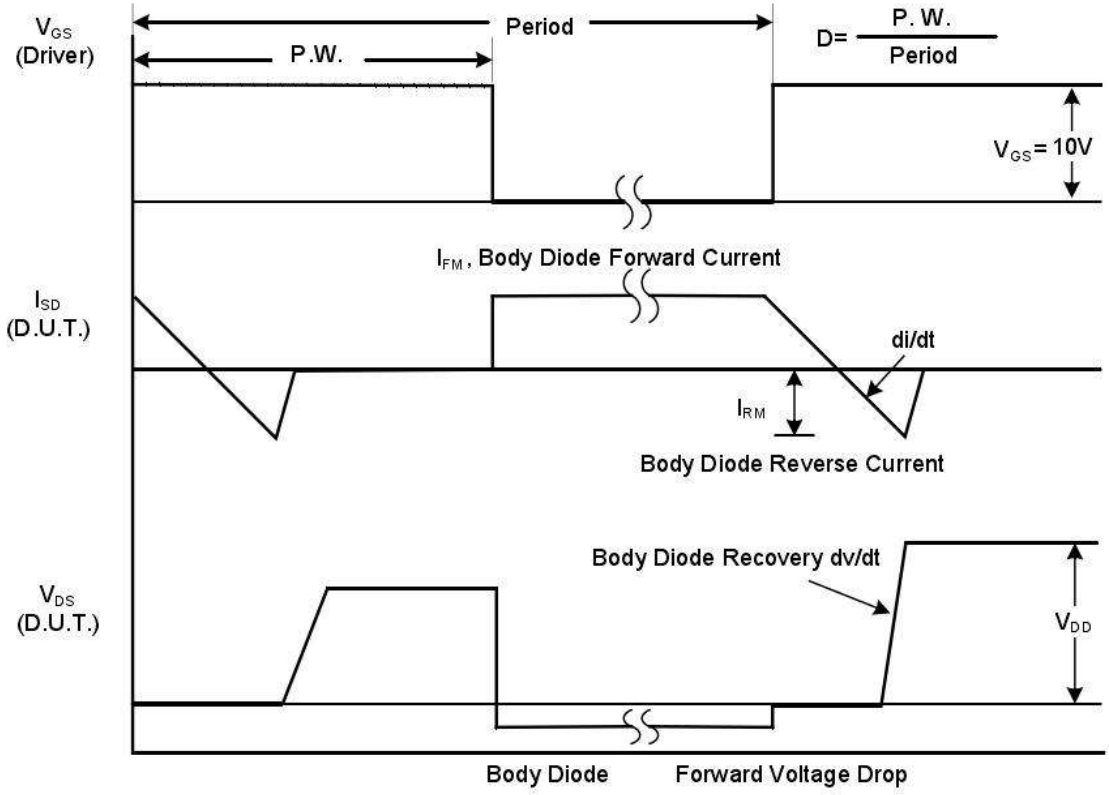
Electrical Characteristics (T_c=25℃,unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min**	**Typ**	**Max**	**Units**
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	60	—	—	V
Breakdown Temperature Coefficient	ΔBV_{DSS} /ΔT_J	Reference to 25℃, I_D=250uA	—	0.021	—	V/℃
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	—	—	1	uA
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	1.0	—	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=20A	—	8.5	9	mΩ
		V_{GS}=4.5V,I_D=20A	—	13	15	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=30V,V_{GS}=0V, f=1.0MHZ	—	880	—	pF
Output Capacitance	C_{oss}		—	255	—	pF
Reverse Transfer Capacitance	C_{rss}		—	16	—	pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=30V,V_{GS}=10V, R_G=2.7Ω (Note3,4)	—	8.8	—	ns
Turn-On Rise Time	t_r		—	42	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	21.5	—	ns
Turn-Off Fall Time	t_f		—	5.4	—	ns
Total Gate Charge	Qg	V_{DD}=30V,I_D=12A, V_{GS}=10V, (Note3,4)	—	18	—	nC
Gate-Source Charge	Qgs		—	3.7	—	nC
Gate-Drain Charge	Qgd		—	2.9	—	nC
Drain-Source Body Diode Charcteristics and Maximum Ratings						
Diode Forward Voltage	V_{SD}	I_S=1A,V_{GS}=0V	—	—	1.0	V
Reverse Recovery Time	t_{rr}	V_R=30V,I_F=12A, dI$_F$/dt=300A/us	—	78	—	ns
Reverse Recovery Charge	Qrr		—	192	—	nC

Notes

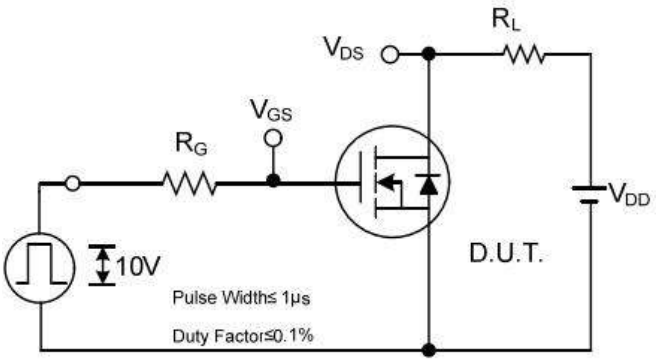
1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. V_{DD}=30V,L=0.3mH,R_g=10Ω,I_{AS}=10A , T_J=25℃.
3. I_{SD}≤I_D,dI/dt=200A/us,V_{DD}≤BV_{DSS},starting T_J=25℃,Pulse width≤300us;duty cycle≤2%.
4. Repetitive rating; pulse width limited by maximum junction temperature.



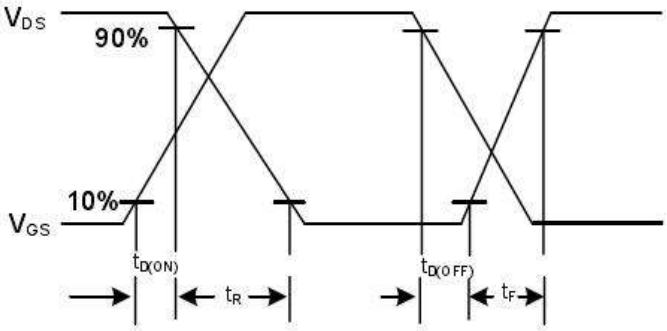
Peak Diode Recovery dv/dt Test Circuit



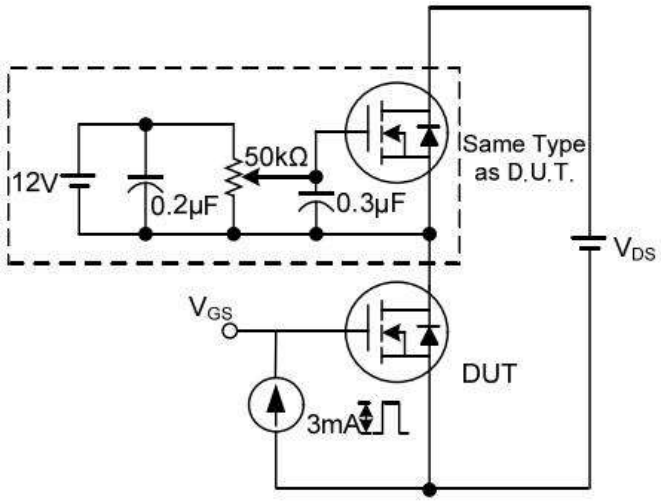
Peak Diode Recovery dv/dt Waveforms



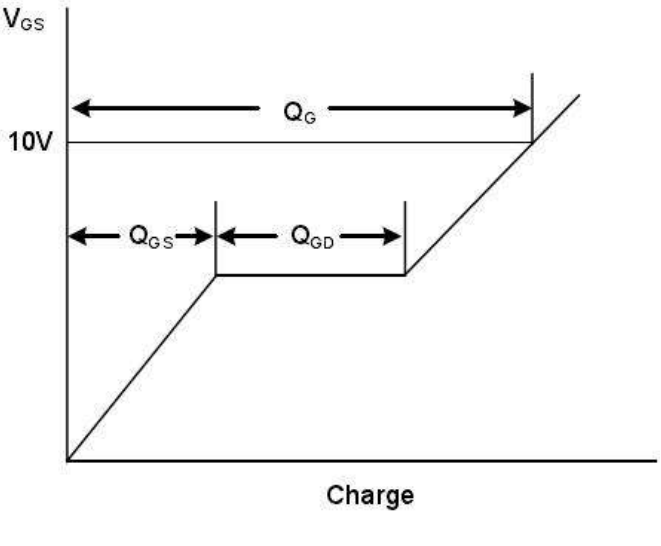
Switching Test Circuit



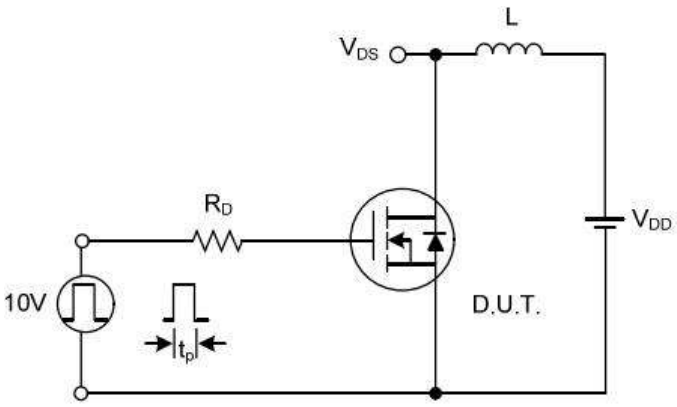
Switching Waveforms



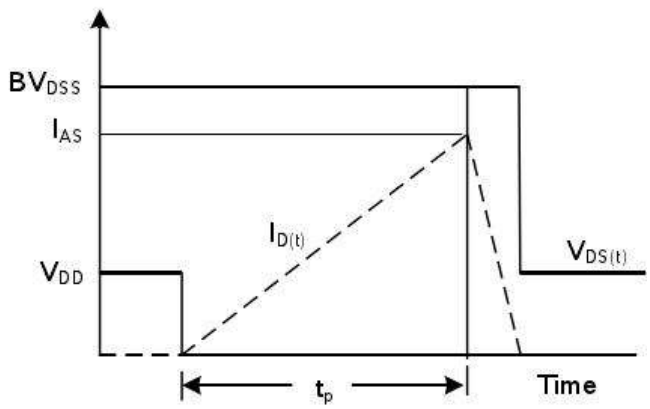
Gate Charge Test Circuit



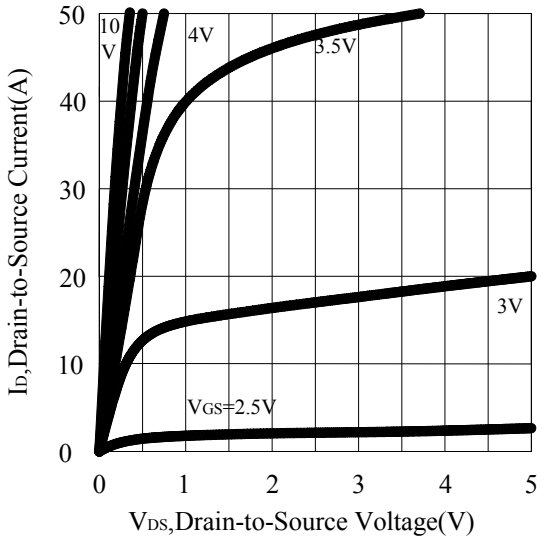
Gate Charge Waveform

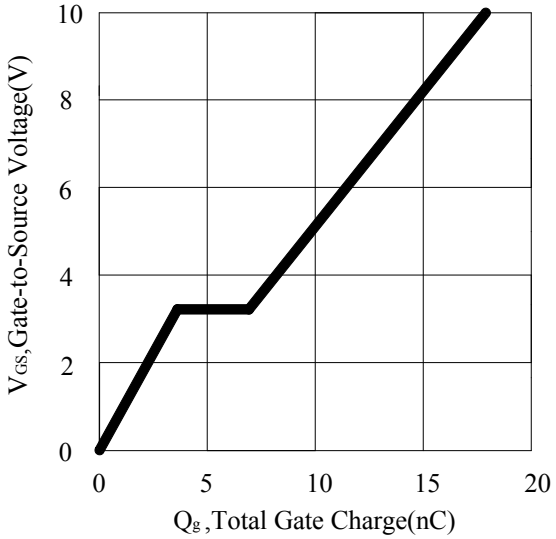


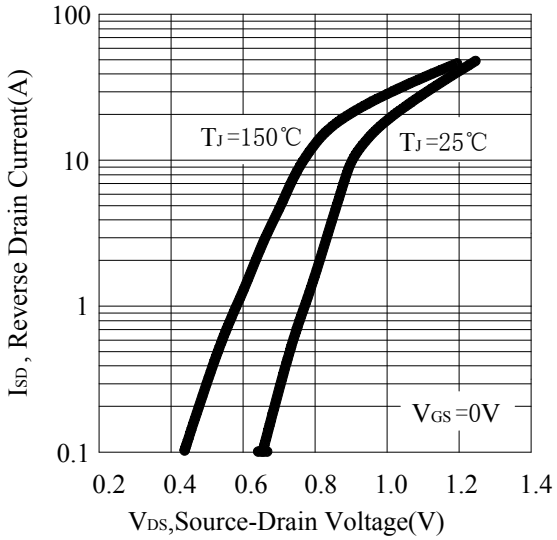
Unclamped Inductive Switching Test Circuit

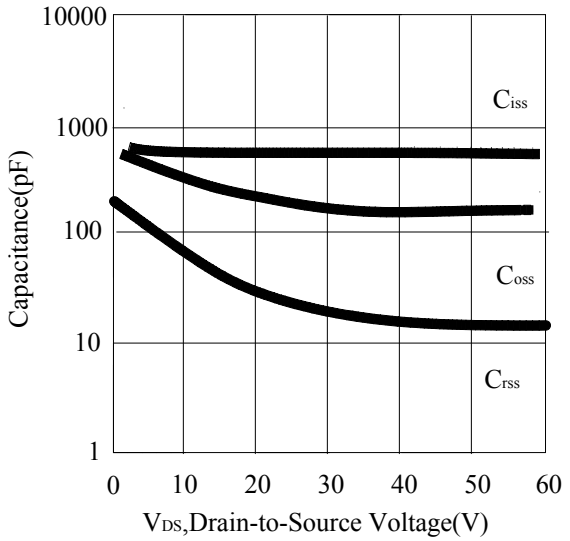


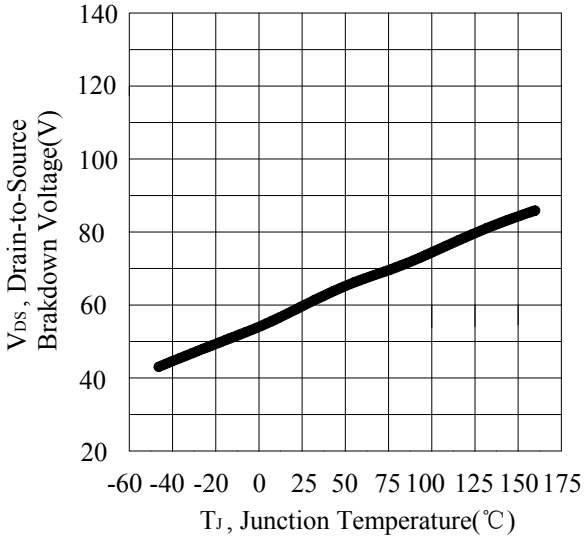
Unclamped Inductive Switching Waveforms

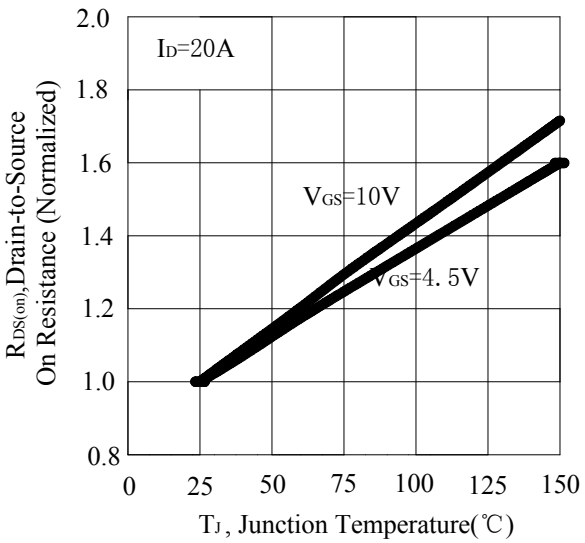

10 V
4V
3.5V
3V
VGS=2.5V
ID,Drain-to-Source Current(A)
VDS,Drain-to-Source Voltage(V)

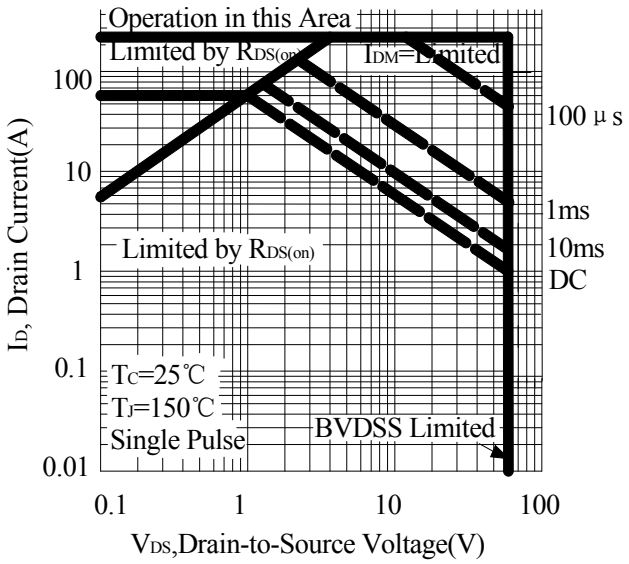

VGS,Gate-to-Source Voltage(V)
Qg,Total Gate Charge(nC)

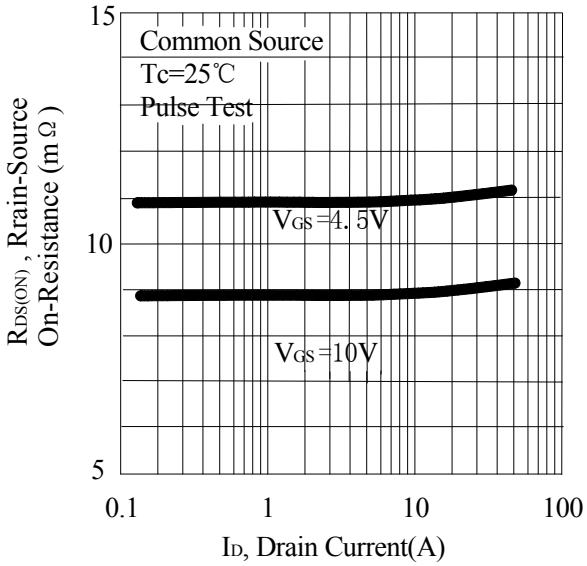

TJ=150℃
TJ=25℃
VGS=0V
ISD, Reverse Drain Current(A)
VDS,Source-Drain Voltage(V)

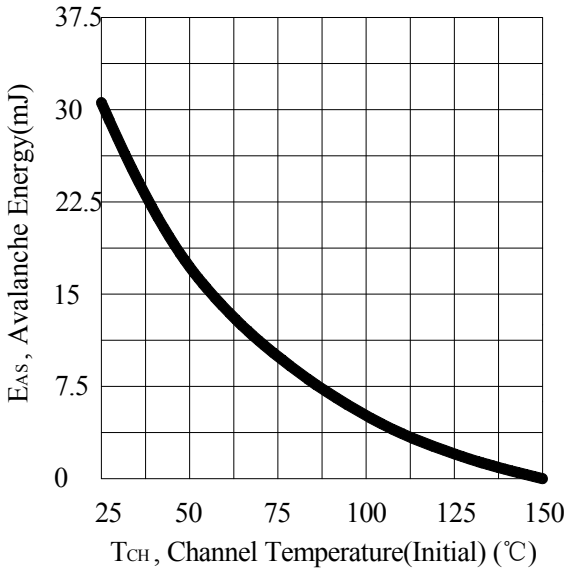

Ciss
Coss
Crss
Capacitance(pF)
VDS,Drain-to-Source Voltage(V)

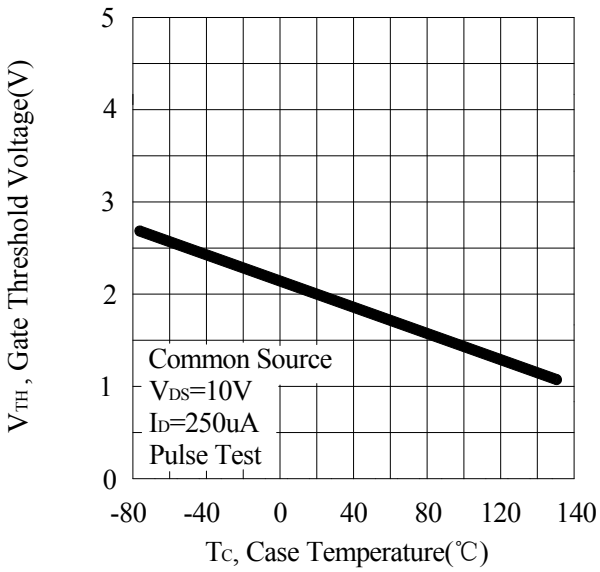

VDS, Drain-to-Source Brakdown Voltage(V)
TJ, Junction Temperature(℃)

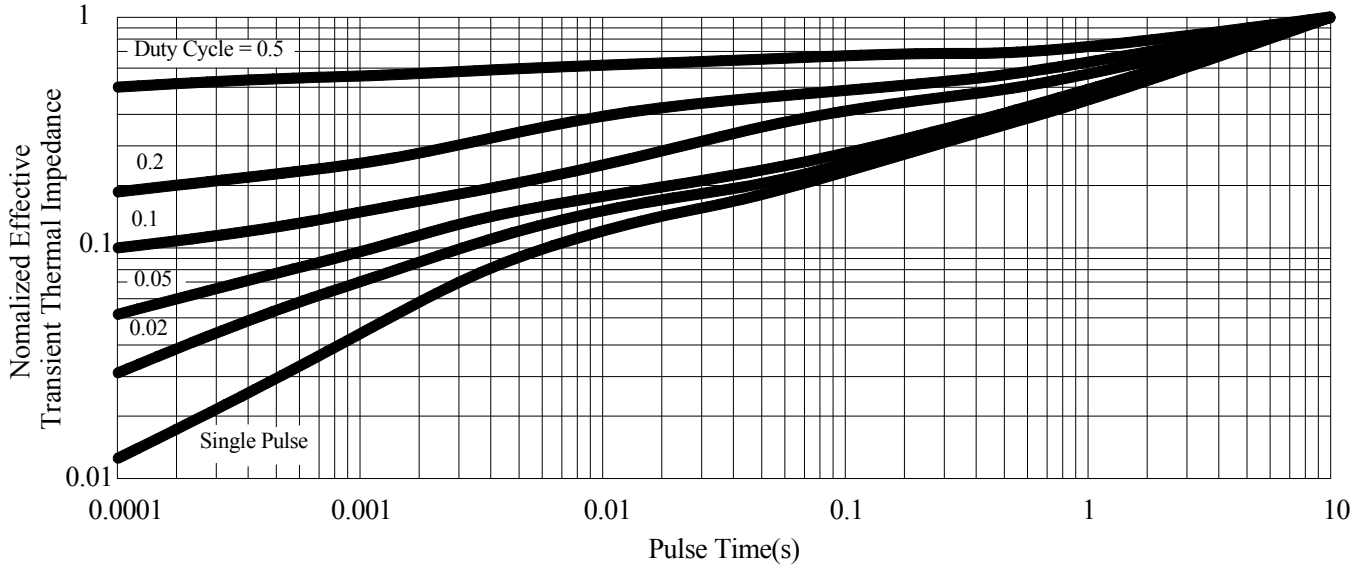

ID=20A
VGS=10V
VGS=4. 5V
RDS(on),Drain-to-Source On Resistance (Normalized)
TJ, Junction Temperature(℃)


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)
100
10
1
0.1
0.01
0.1
1
10
100


Common Source
Tc=25℃
Pulse Test
VGS =4. 5V
VGS =10V
RDS(ON) , Rrain-Source On-Resistance (m Ω)
ID, Drain Current(A)
15
10
5
0.1
1
10
100

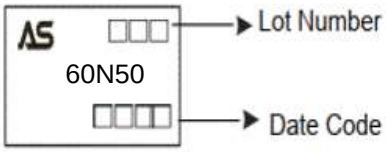

EAS , Avalanche Energy(mJ)
TCH , Channel Temperature(Initial) (℃)
37.5
30
22.5
15
7.5
0
25
50
75
100
125
150


VTH , Gate Threshold Voltage(V)
Common Source
VDS=10V
ID=250uA
Pulse Test
TC, Case Temperature(℃)
5
4
3
2
1
0
-80
-40
0
40
80
120
140

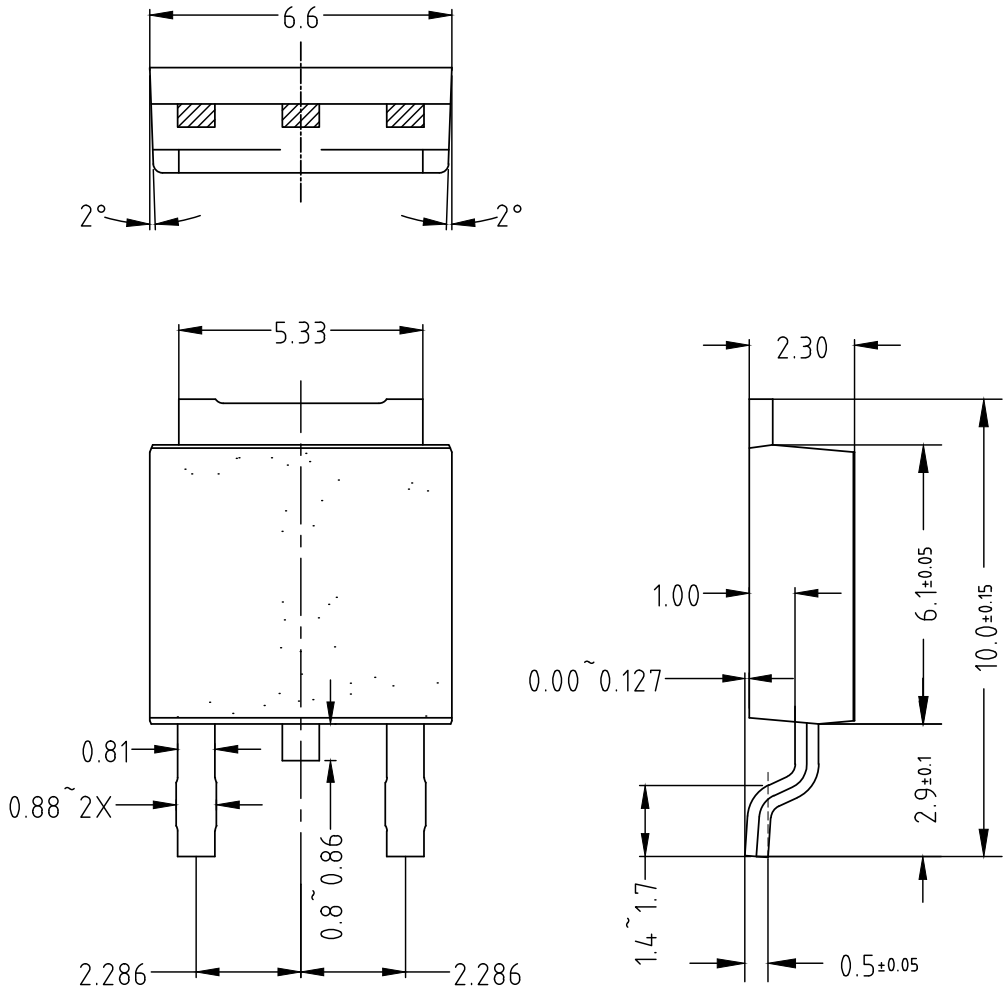

Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse
Nomalized Effective Transient Thermal Impedance
Pulse Time(s)
1
0.1
0.01
0.0001
0.001
0.01
0.1
1
10

Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM60N50KQ-R	60N50	TO-252	Tape&Reel	2500/Reel

PACKAGE	MARKING
TO-252	

TO-252


6.6
2°
2°
5.33
0.81
0.88~2X
0.8~0.86
2.286
2.286
2.30
1.00
0.00~0.127
6.1±0.05
10.0±0.15
2.9±0.1
1.4~1.7
0.5±0.05

IMPORTANT NOTICE

Xi'an Ascend Semiconductor incorporated MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Xi'an Ascend Semiconductor Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Xi'an Ascend Semiconductor Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Xi'an Ascend Semiconductor Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume .

all risks of such use and will agree to hold Ascendsemi Incorporated and all the companies whose products are represented on Xi'an Ascend Semiconductor Incorporated website, harmless against all damages.

Xi'an Ascend Semiconductor Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Xi'an Ascend Semiconductor Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Xi'an Ascend Semiconductor Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

www.ascendsemi.com