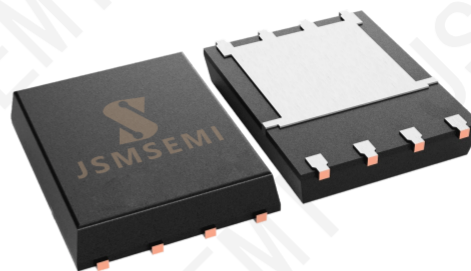


Product Summary

- V_{DS} 30V
- I_D 180A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<1.45m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

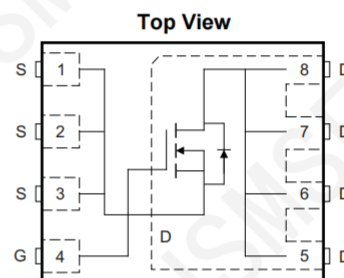


General Description

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor
- Motor drivers



■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_C=25^\circ\text{C}$	I_D	180	A
	$T_C=100^\circ\text{C}$		120	
Pulsed Drain Current ^A		I_{DM}	720	A
Avalanche energy ^B		EAS	240	mJ
Total Power Dissipation ^C	$T_C=25^\circ\text{C}$	P_D	100	W
	$T_C=100^\circ\text{C}$		75	
Junction and Storage Temperature Range		T_J, T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	Steady-State	$R_{\theta JA}$	30		$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	0.6		

■ Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

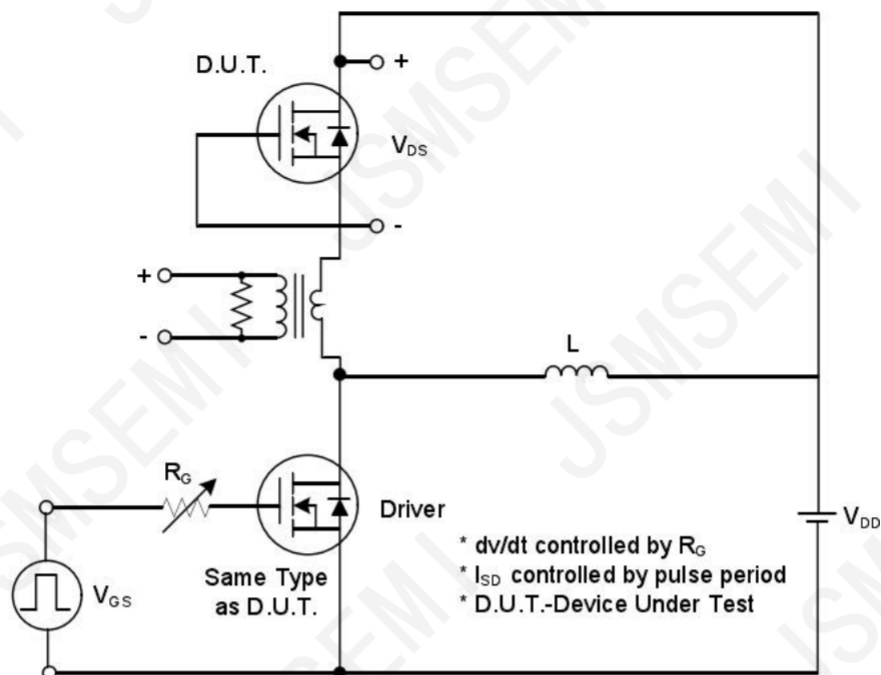
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	30	-	-	V
		V _{GS} = 0V, I _D =1mA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
		V _{DS} =30V, V _{GS} =0V, T _j =150°C	-	-	100	
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.0	1.7	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D =20A	-	1.1	1.45	mΩ
Diode Forward Voltage	V _{SD}	I _S =50A, V _{GS} =0V	-	-	1.2	V
Gate resistance	R _G	f=1MHz	-	1.7	-	Ω
Maximum Body-Diode Continuous Current	I _S		-	-	180	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f=1MHz	-	2915	-	pF
Output Capacitance	C _{oss}		-	1456	-	
Reverse Transfer Capacitance	C _{rss}		-	89	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =20V, I _D =30A	-	44	-	nC
Gate-Source Charge	Q _{gs}		-	8	-	
Gate-Drain Charge	Q _{gd}		-	4.4	-	
Reverse Recovery Charge	Q _{rr}	I _F =1A, di/dt=100A/us	-	35	-	nC
Reverse Recovery Time	t _{rr}		-	83	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =20V, I _D =30A R _{GEN} =1.6Ω	-	17	-	ns
Turn-on Rise Time	t _r		-	41	-	
Turn-off Delay Time	t _{D(off)}		-	53	-	
Turn-off fall Time	t _f		-	11	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

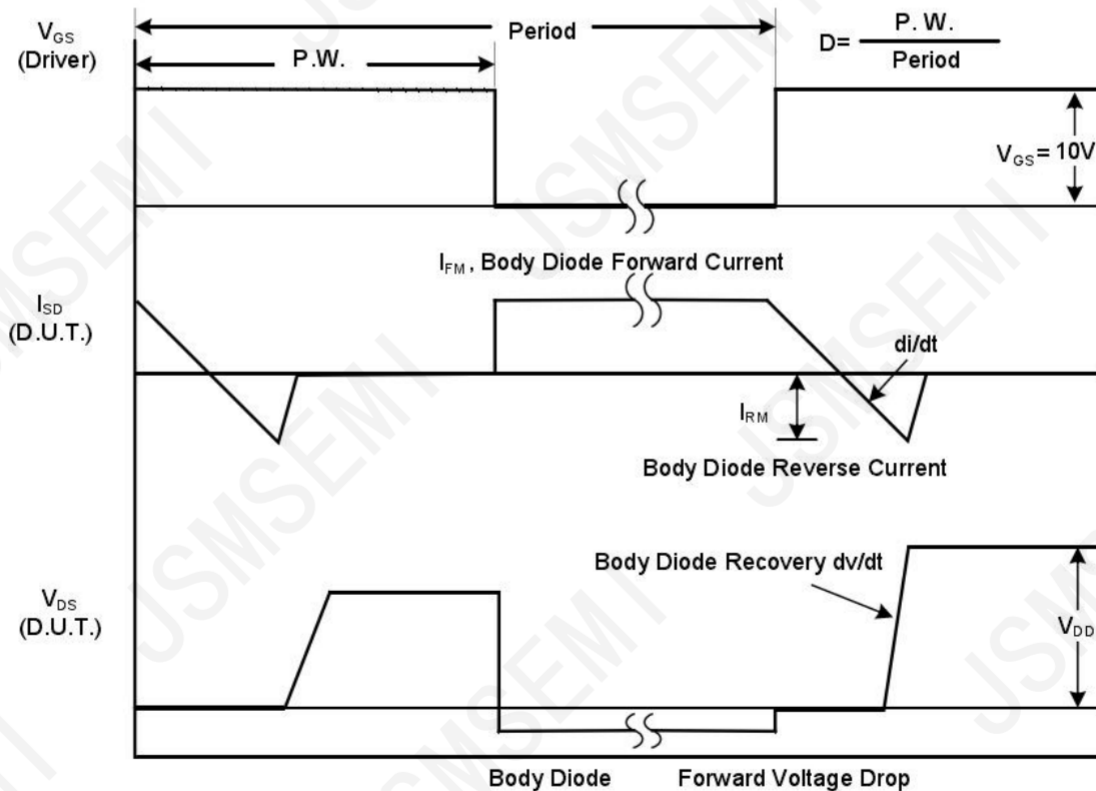
 B. $T_J=25^{\circ}\text{C}$, $V_G=10V$, $R_G=25\Omega$, $L=0.5mH$

 C. P_d is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.

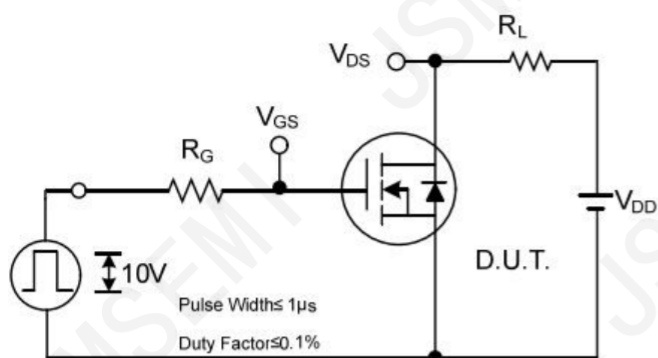
■ RATING AND CHARACTERISTIC CURVES



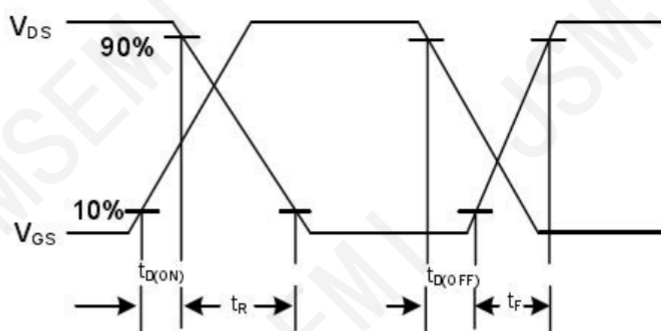
Peak Diode Recovery dv/dt Test Circuit



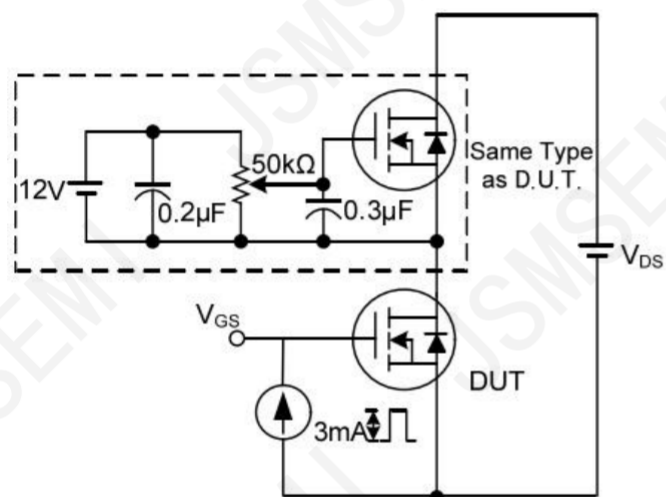
Peak Diode Recovery dv/dt Waveforms



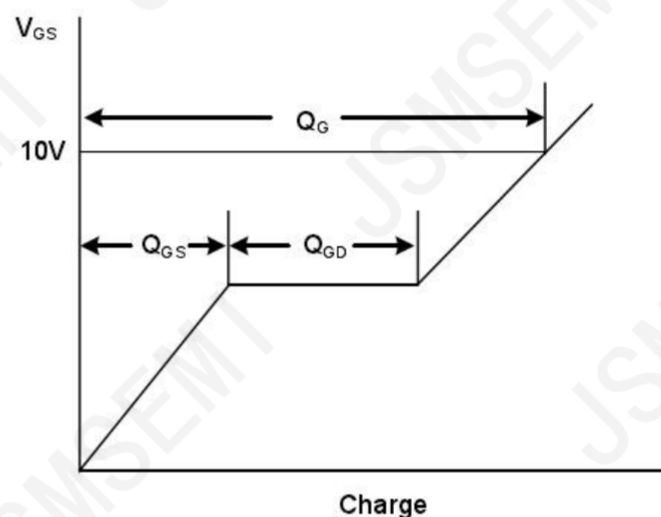
Switching Test Circuit



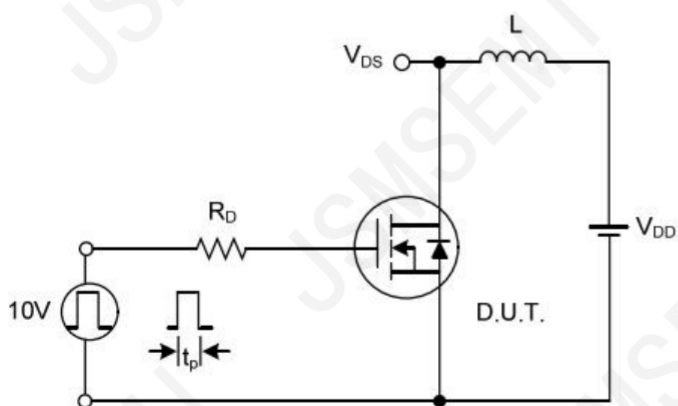
Switching Waveforms



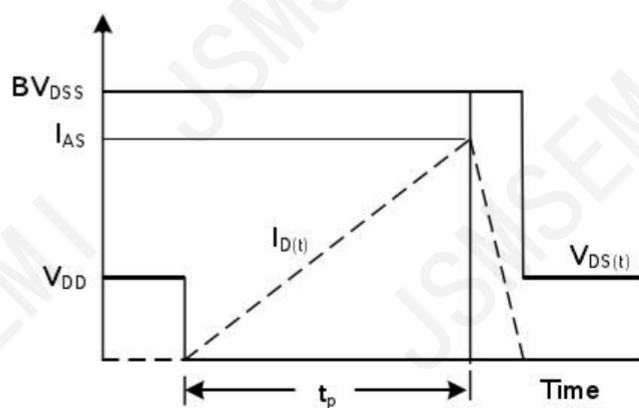
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ Typical Electrical and Thermal Characteristics Diagrams

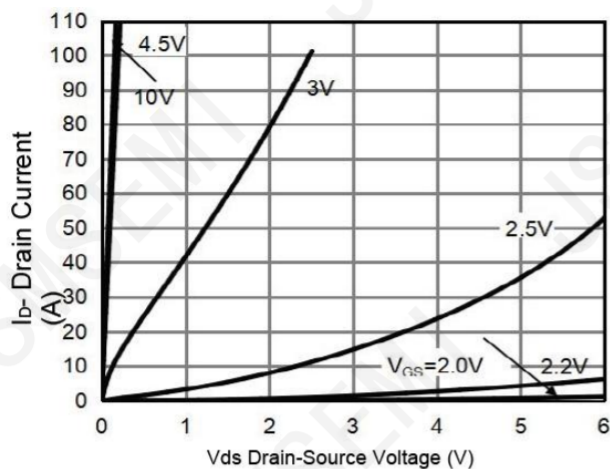


Figure.1 Output Characteristics $T_j = 25^\circ\text{C}$

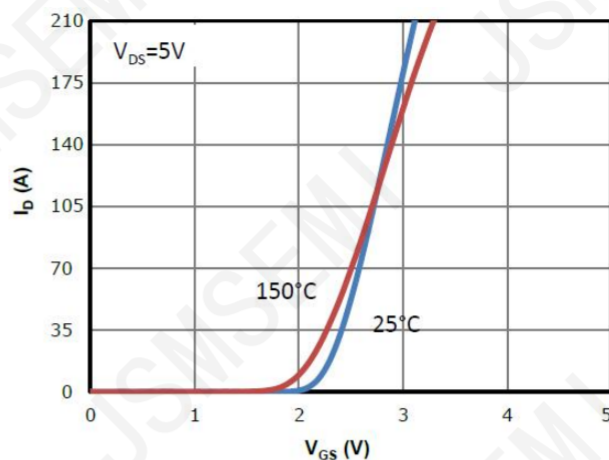


Figure.2 Transfer Characteristic for Various Junction Temperatures

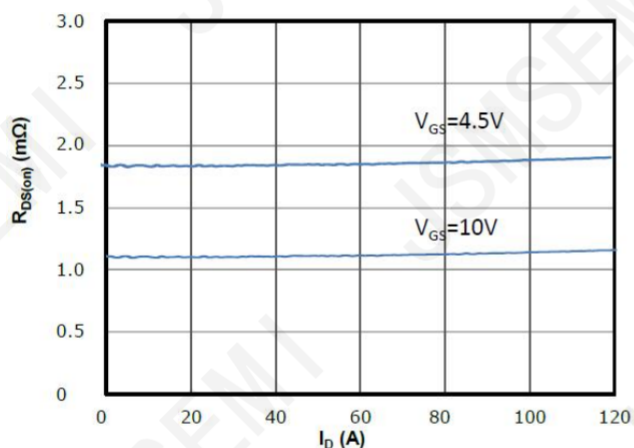


Figure.3 On-Resistance vs Drain Current For Various Gate Voltage

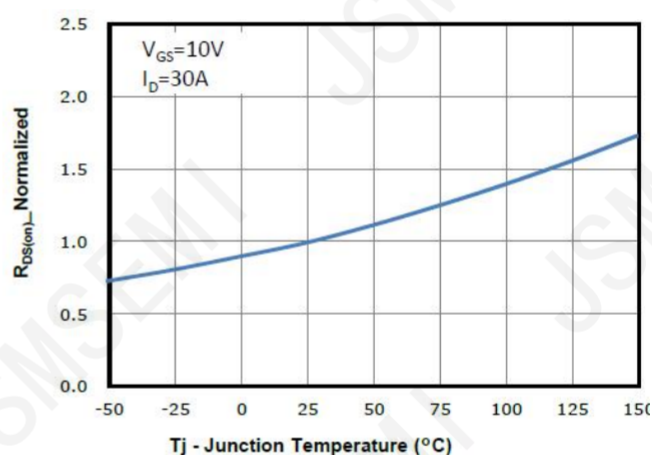


Figure.4 Typical On-Resistance vs Junction Temperature

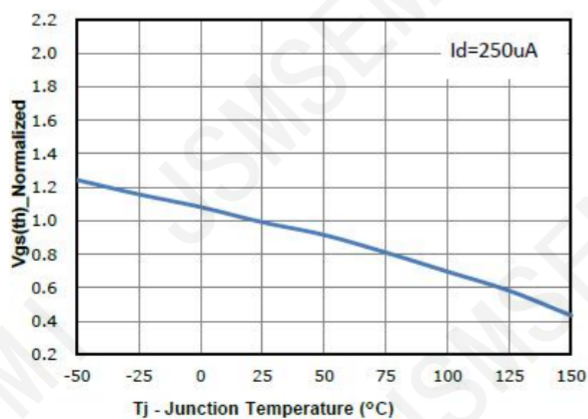


Figure.5 Typical Threshold Voltage vs Junction Temperature

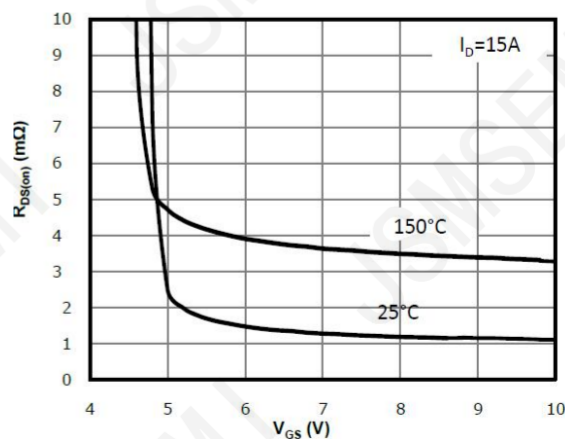


Figure.6 $R_{DS(on)}$ vs Gate Voltage

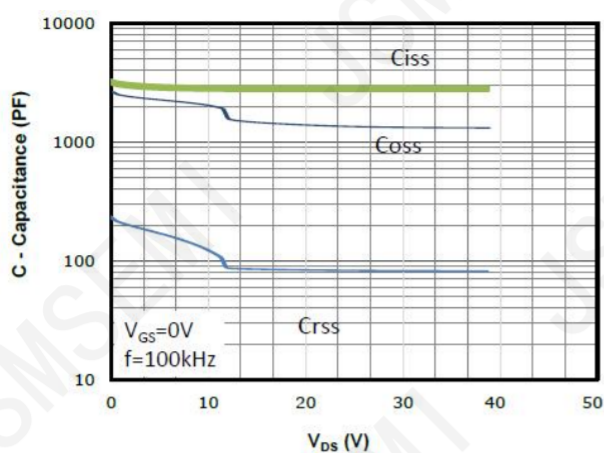


Figure.7 Typical Capacitance vs Drain to Source Voltage

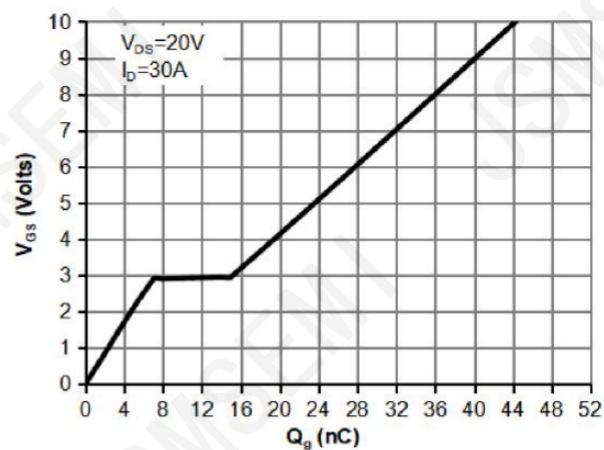


Figure.8 Typical Gate Charge vs Gate to Source Voltage

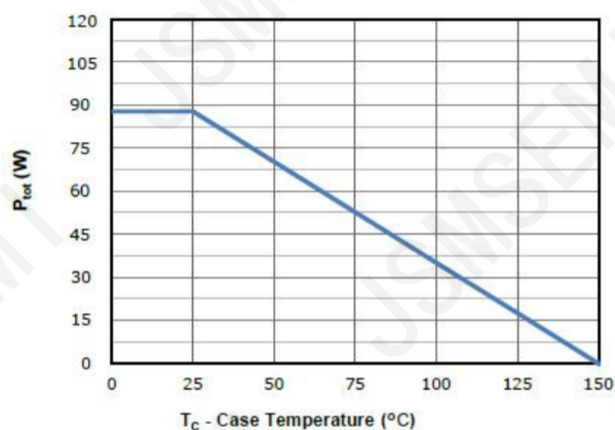


Figure.9 Maximum power Dissipation Derating vs Case Temperature

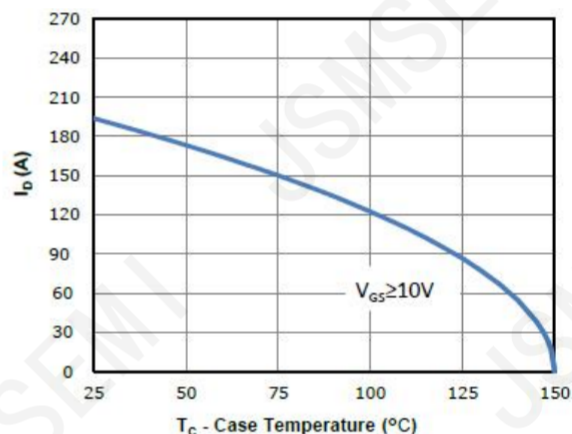


Figure.10 Continuous Drain Current Derating vs Case Temperature

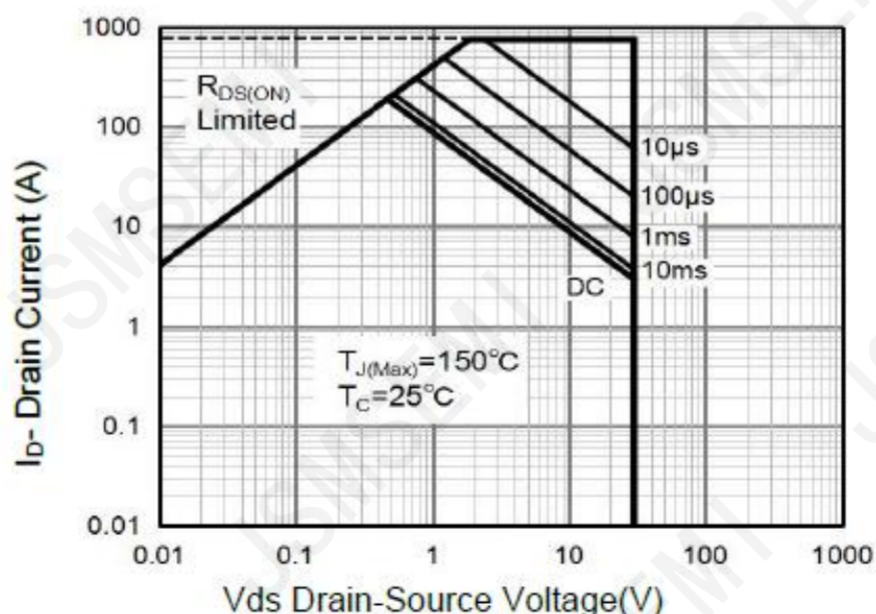


Figure.11 Safe Operating Area

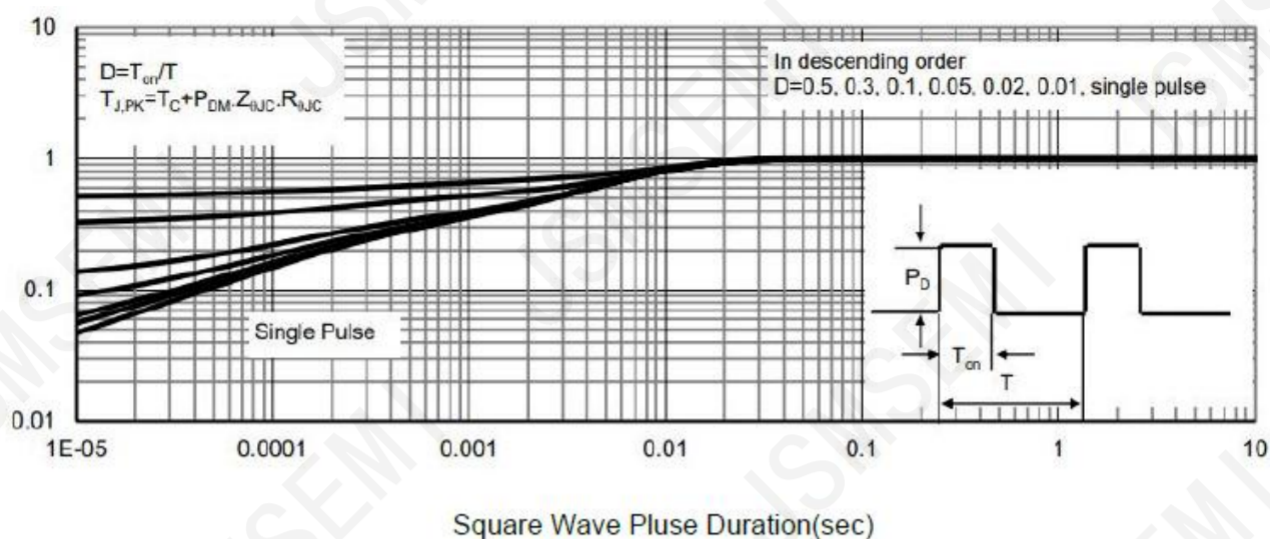


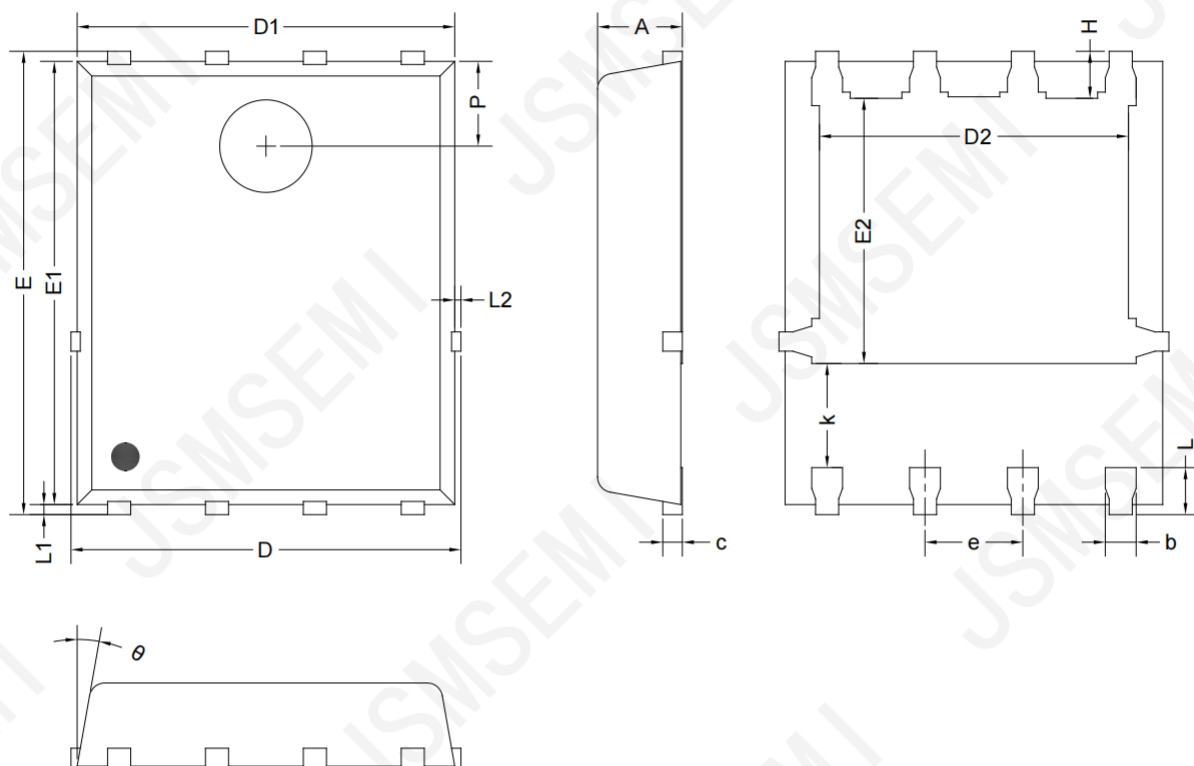
Figure.12 Transient Thermal Impedance (Junction - Case)

Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship,Quantity	Green
QN3109M6N-JSM	DFN5060-8L	JSM3109	-55 to 150°C	1	T&R,5000	Rohs

Package Information

PDFN5060-8L



Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	1.000	1.100	1.200
b	0.350	0.400	0.450
c	0.210	0.250	0.340
D	4.800	-	5.100
D1	4.800	4.900	5.000
D2	3.910	4.010	4.110
E	5.900	6.000	6.100
E1	5.700	5.750	5.800
E2	3.340	3.440	3.540
e	1.270 BSC		
H	0.510	0.610	0.710
k	1.100	-	-
L	0.510	0.610	0.710
L1	0.060	0.130	0.200
L2	-	-	0.100
P	1.000	1.100	1.200
θ	8°	10°	12°

NOTE: This drawing is subject to change without notice.

Revision History

Rev.	Change	Date
V1.0	Initial version	3/27/2021

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