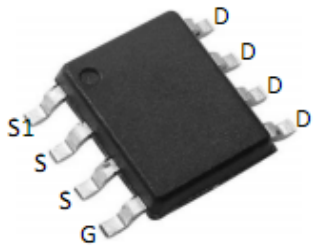
N-Channel 20-V(D-S)MOSFET

Description:

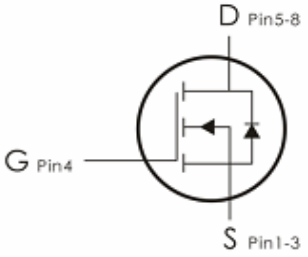
This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.



Features:

1) V_{DS}=20V,I_D=12A,$R_{DS(ON)}$<10mΩ @V_{GS}=4.5V
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.



Absolute Maximum Ratings: (T_a=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Continuous Drain Current -T_C=25℃	12	A
	Continuous Drain Current- T_C=100℃	7.5	
I_{DM}	Drain Current-Pulsed[1]	35	A
P_D	Power Dissipation	1.25	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	100	℃/W

Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	20	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=20V,T_J=25℃	---	---	1	μA
		V_{GS}=0V, V_{DS}=16V,T_J=125℃	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V, V_{DS}=0A	---	---	±10	μA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	0.3	0.6	1	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=4.5V,I_D=5A	---	8.5	10	mΩ
		V_{GS}=2.5V,I_D=3A	---	14	18	
G_{FS}	Forward Transconductance	V_{DS}=10V, I_D=5A	---	11	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=10V, V_{GS}=0V, f=1MHz	---	1000	1450	pF
C_{oss}	Output Capacitance		---	158	230	
C_{rss}	Reverse Transfer Capacitance		---	105	155	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=10V, I_D=1A R_G=25Ω . V_{GS}=4.5V,	---	6.8	13	ns
t_r	Rise Time[2,3]		---	20	38	ns
$t_{d(off)}$	Turn-Off Delay Time[2,3]		---	41.8	79	ns
t_f	Fall Time[2,3]		---	13.2	25	ns
Q_g	Total Gate Charge[2,3]	V_{GS}=4.5V, V_{DS}=10V, I_D=5A	---	16.9	26	nC
Q_{gs}	Gate-Source Charge[2,3]		---	1.1	3	nC
Q_{gd}	Gate-Drain "Miller" Charge[2,3]		---	4	7	nC
Drain-Source Diode Characteristics						

V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=1A,T_J=25℃	---	---	1	V
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	7.5	A
I_{SM}	Pulsed Source Current		---	---	30	A

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

Typical Characteristics: (T_C=25℃ unless otherwise noted)

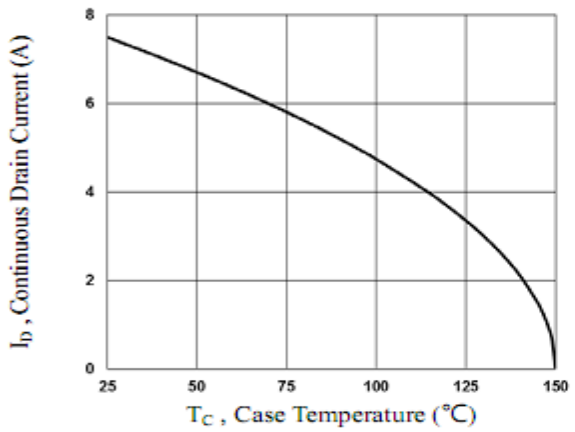


Fig.1 Continuous Drain Current vs. T_C

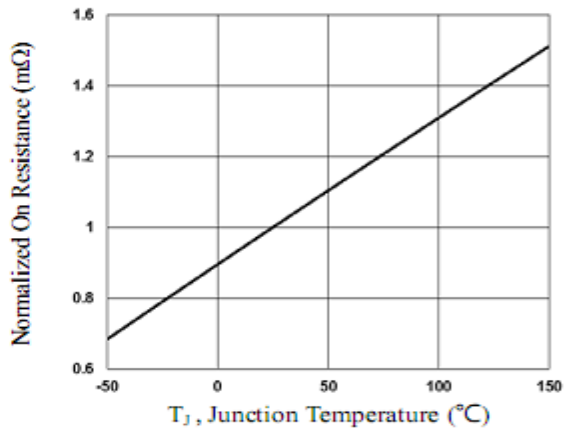


Fig.2 Normalized RDSON vs. T_J

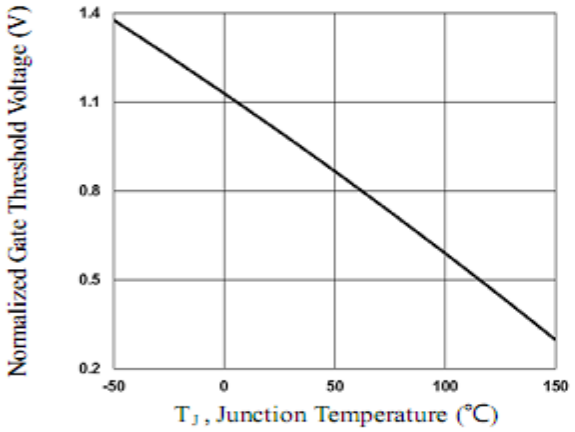


Fig.3 Normalized V_{th} vs. T_J

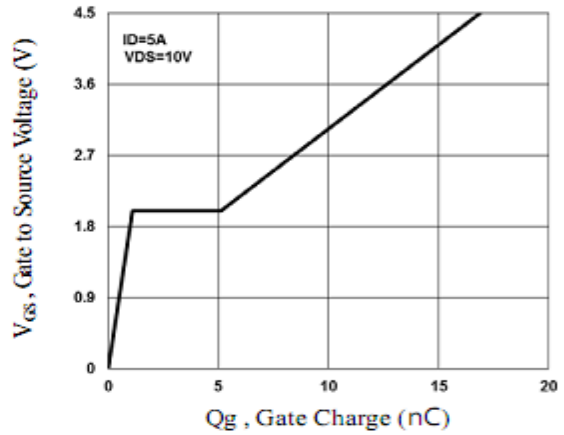


Fig.4 Gate Charge Waveform

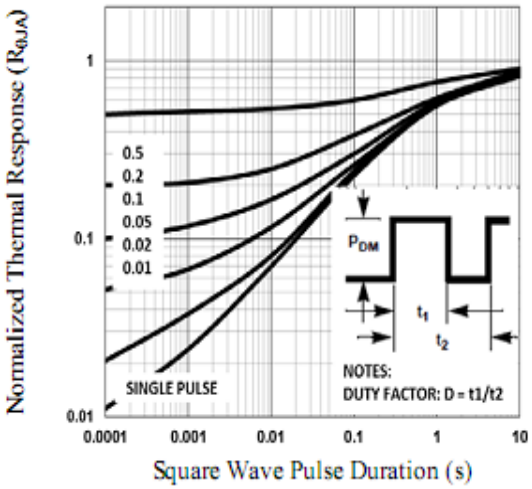


Fig.5 Normalized Transient Impedance

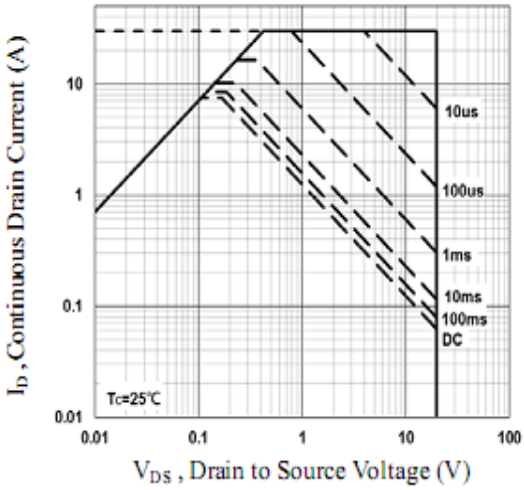


Fig.6 Maximum Safe Operation Area

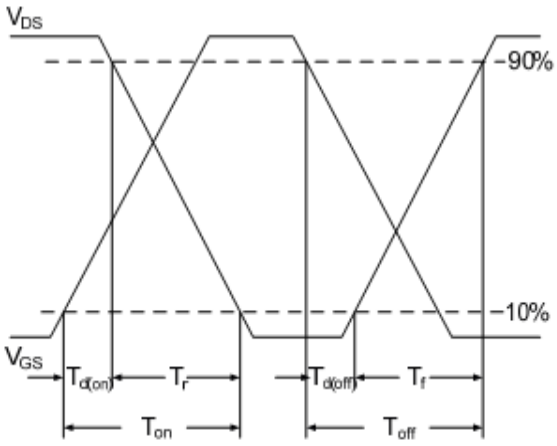


Fig.7 Switching Time Waveform

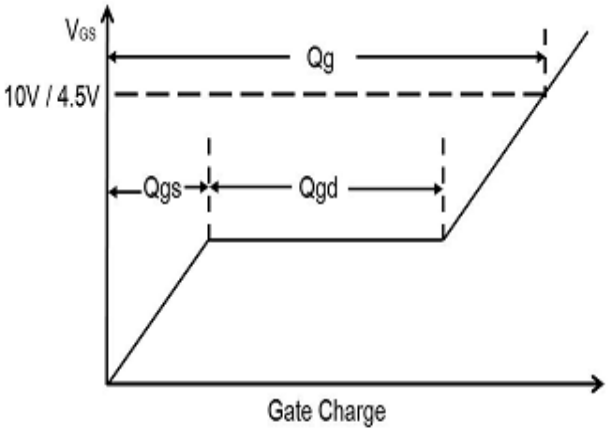
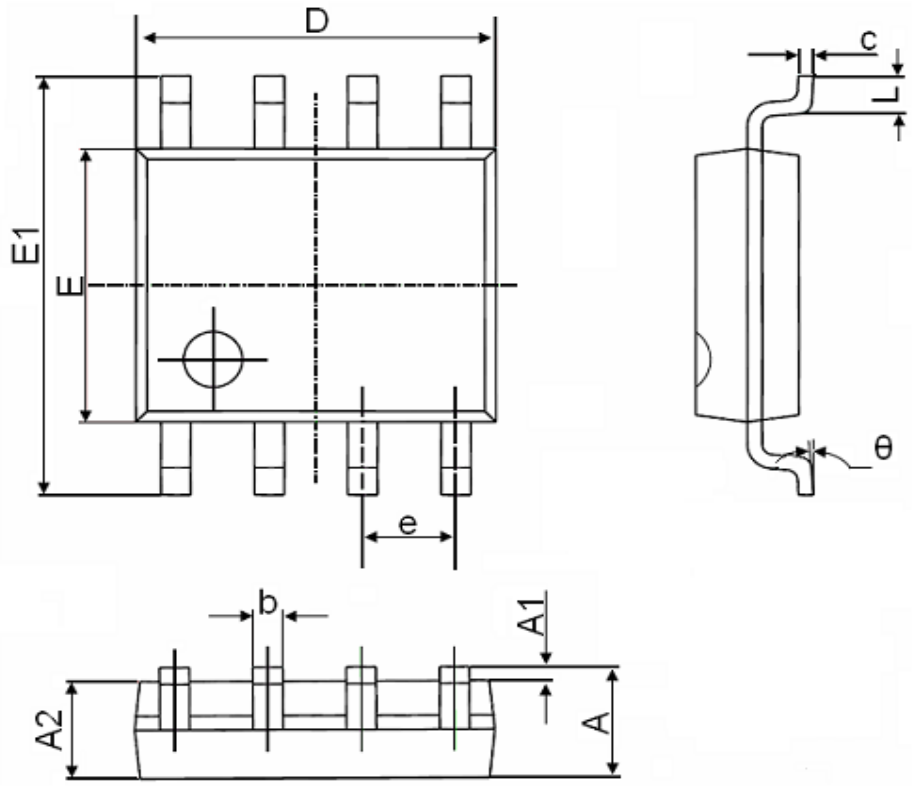


Fig.8 Gate Charge Waveform

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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