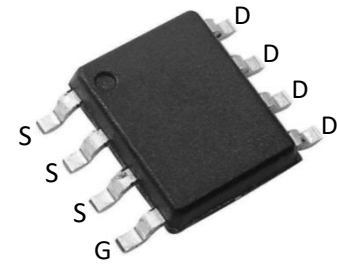


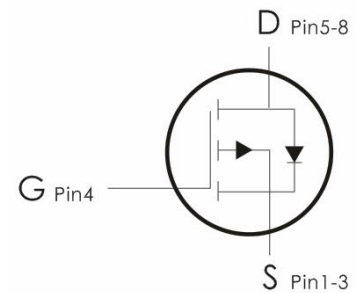
60V P-Channel MOSFET
Description:

This P-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) $V_{DS}=-60V, I_D=-8.5A, R_{DS(ON)}<30m\ \Omega @V_{GS}=-10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(ON)}$.
- 5) Excellent package for good heat dissipation.


Absolute Maximum Ratings: ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current- $T_C=25^\circ C$	-8.5	A
	Continuous Drain Current- $T_C=100^\circ C$	-5.4	
I_{DM}	Drain Current-Pulsed ¹	-34	A
E_{AS}	Single Pulse Avalanche Energy ²	105	mJ
I_{AS}	Single Pulse Avalanched Current ²	-46	A
P_D	Power Dissipation	4.1	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	30	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu\text{A}$	-60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=-60V, T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{GS}=0V, V_{DS}=-48V, T_J=125^\circ\text{C}$	---	---	-10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
V_{GS(th)}	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu\text{A}$	-1	-1.6	-2.5	V
R_{DS(on)}	Drain-Source On Resistance	$V_{GS}=-10V, I_D=-8A$	---	23	30	m Ω
		$V_{GS}=-4.5V, I_D=-6A$	---	28	40	
G_{FS}	Forward Transconductance	$V_{DS}=-10V, I_D=-3A$	---	18	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=-25V, V_{GS}=0V, f=1\text{MHz}$	---	2550	3850	pF
C_{oss}	Output Capacitance		---	160	230	
C_{rss}	Reverse Transfer Capacitance		---	110	165	
Switching Characteristics						
t_{d(on)}	Turn-On Delay Time ^{3,4}	$V_{DD}=-30V, V_{GS}=-10V$ $I_D=-1A, R_{GEN}=6\ \Omega$	---	25	50	ns
t_r	Rise Time ^{3,4}		---	13.8	28	ns
t_{d(off)}	Turn-Off Delay Time ^{3,4}		---	148	290	ns
t_f	Fall Time ^{3,4}		---	51	100	ns
Q_g	Total Gate Charge ^{3,4}	$V_{DS}=-30V, V_{GS}=-10V, I_D=-5A$	---	43.8	88	nC
Q_{gs}	Gate-Source Charge ^{3,4}		---	4.6	9	nC
Q_{gd}	Gate-Drain "Miller" Charge ^{3,4}		---	8.3	17	nC
Drain-Source Diode Characteristics						

I_S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	-8.5	A
I_{SM}	Pulsed Source Current		---	---	-17	A
V_{SD}	Diode Forward Voltage	V _G S=0V, I _S =-1A, T _J =25°C	---	---	-1	V
t_{rr}	Reverse Recovery Time	V _R =-50V, I _S =-5A	---	40	---	ns
Q_{rr}	Reverse Recovery Charge	di/dt=100A/μs, T _J =25°C	---	30	---	nC

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-46A., R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

Typical Characteristics: (T_C=25°C unless otherwise noted)

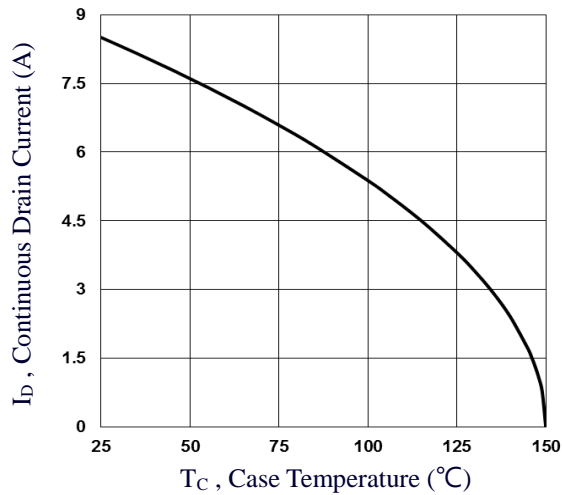


Fig.1 Continuous Drain Current vs. T_C

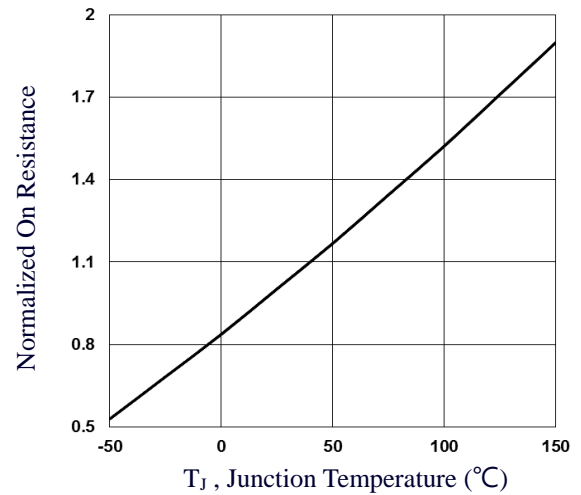


Fig.2 Normalized R_{DSon} vs. T_J

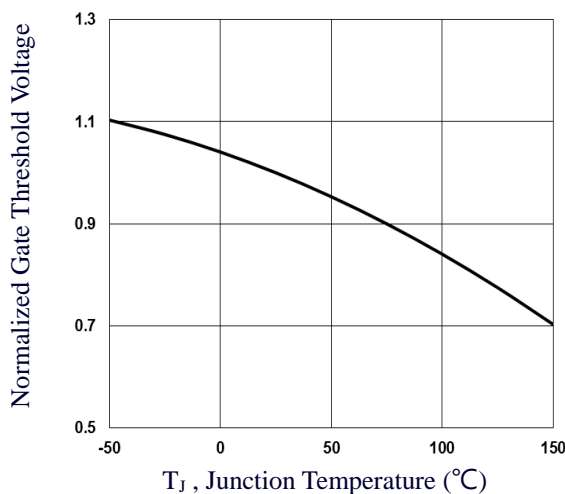


Fig.3 Normalized V_{th} vs. T_J

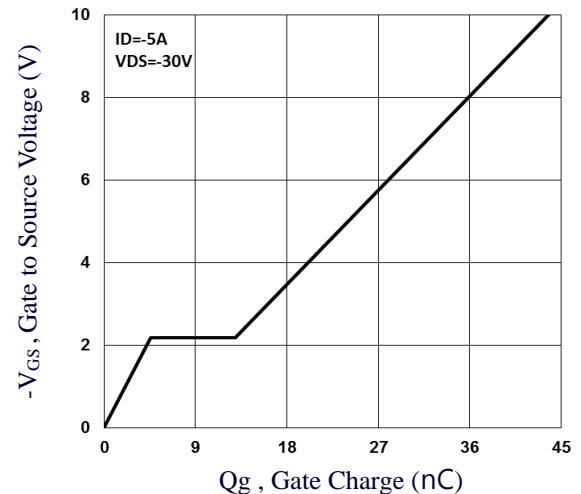


Fig.4 Gate Charge Waveform

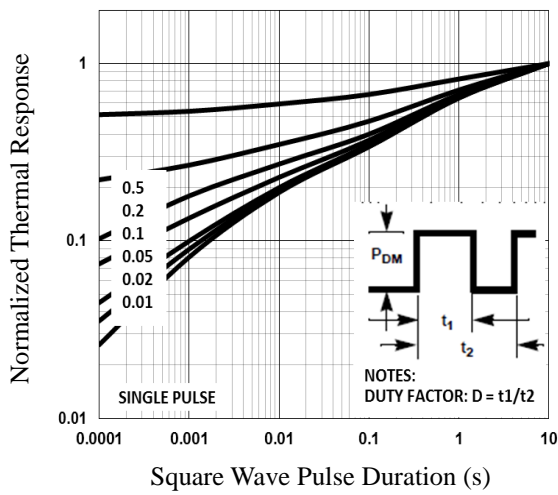


Fig.5 Normalized Transient Impedance

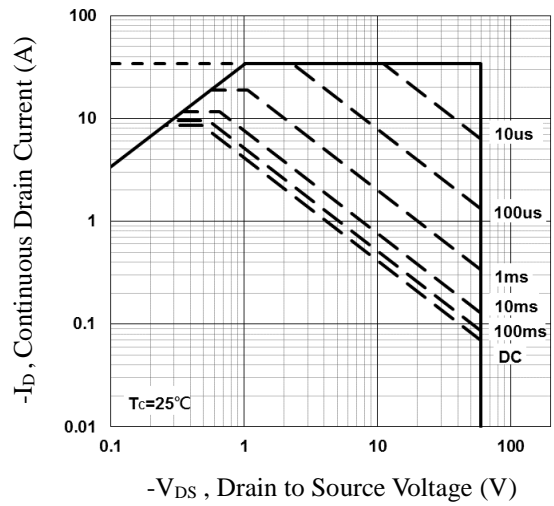


Fig.6 Maximum Safe Operation Area

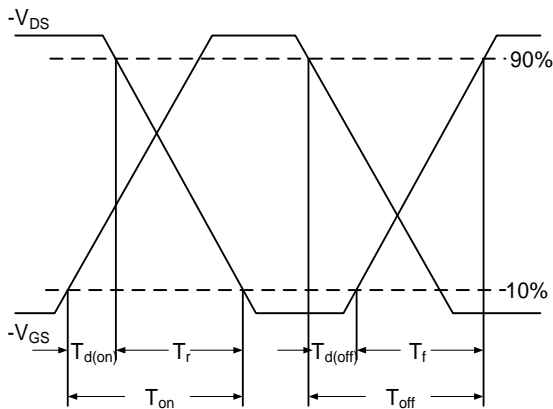


Fig.7 Switching Time Waveform

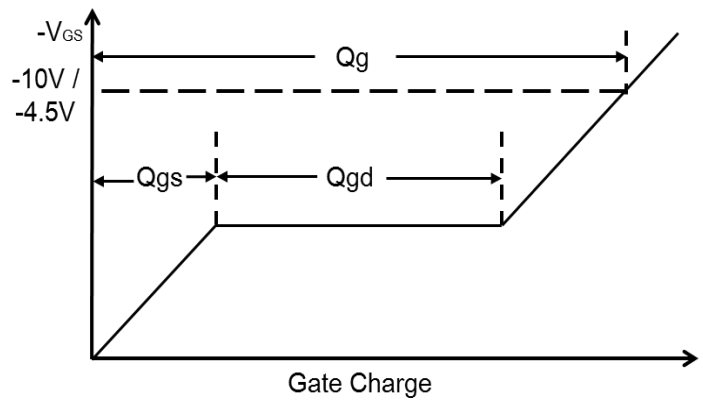
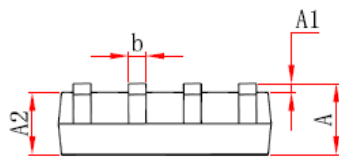
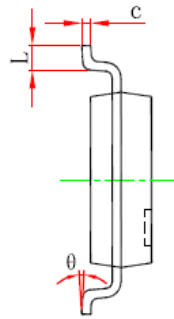
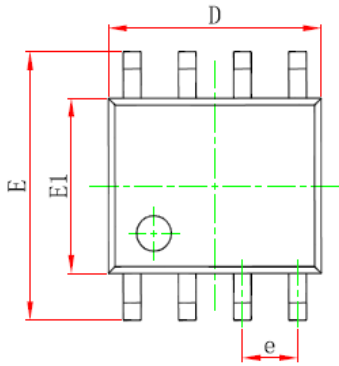


Fig.8 Gate Charge Waveform

SOP-8 Package information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.450	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	0.007	0.010
D	4.700	5.100	0.185	0.201
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°