

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) $V_{DS}=60V, I_D=30A, R_{DS(on)} < 30m\Omega @ V_{GS}=10V$
- 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- $T_C=25^\circ C$	30	A
	Continuous Drain Current- $T_C=100^\circ C$	16	
I_{DM}	Drain Current - Pulsed1	100	A
E_{AS}	Single Pulse Avalanche Energy (note1)	24	mJ
I_{AS}	Avalanche Current (note2)	22	A
P_D	Power Dissipation	40	W
	Power Dissipation - Derate above $25^\circ C$	0.32	W/ $^\circ C$
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.1	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62	

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 μ A	60	---	---	V
ΔBVDSS/ΔT _J	BVDSS Temperature Coefficient	Reference to 25 °C , I _D =1mA	---	0.07	---	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =650V	---	---	1	μ A
		V _{GS} =0V, V _{DS} =480V, T _J =125 °C	---	---	10	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ± 30V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	1.2	1.7	2.5	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V, I _D =15A	---	25	30	m Ω
		V _{GS} =4.5V, I _D =10A	---	31	40	m Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	1150	1700	pF
C _{oss}	Output Capacitance		---	60	90	
C _{rss}	Reverse Transfer Capacitance		---	43	65	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time ^{2,3}	V _{DD} =30V, I _D =1A, R _G =6 Ω (Note 3,4)	---	15	40	ns
t _r	Rise Time ^{2,3}		---	4.5	8	ns
t _{d(off)}	Turn-Off Delay Time ^{2,3}		---	27	50	ns

t_f	Fall Time ^{2,3}		---	7.5	13	ns
Q_g	Total Gate Charge ^{2,3}	V _{GS} =30V, V _{DS} =10V, I _D =20A(Note 3,4)	---	16	20	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	2	4	nC
Q_{gd}	Gate-Drain “Miller” Charge ^{2,3}		---	3.5	7	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V _{GS} =0V,I _S =1A,	---	---	1	V
I_S	Continuous Source Current	---	---	---	25	A
I_{SM}	Pulsed Source Current	---	---	---	100	A
T_{rr}	Reverse Recovery Time	V _{GS} =0V,I _S =1A ,	---	17	---	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs(Note 3)	---	12	---	nC

Notes:

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
- 2.VDD=25V,VGS=10V,L=0.1mH,IAS=22A.,RG=25 ,Starting TJ=25℃
- 3.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 4.Essentially independent of operating temperature.

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

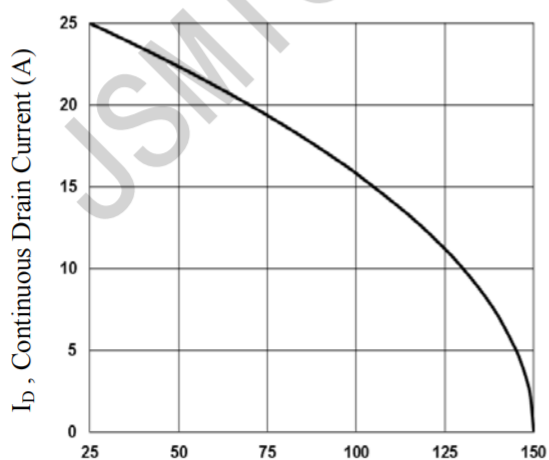


Fig.1 Continuous Drain Current vs. T_c

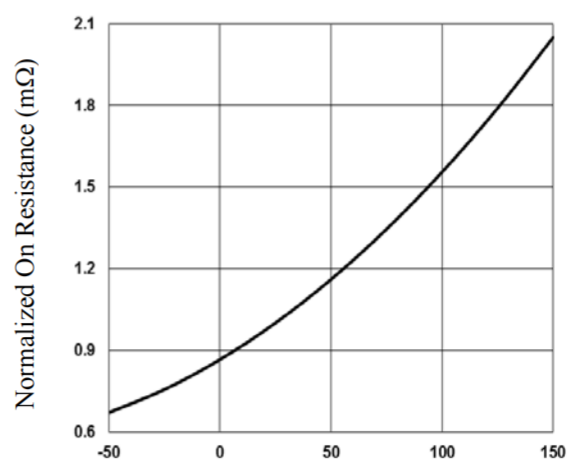


Fig.2 Normalized R_{DS(on)} vs. T_j



Fig.3 Normalized V_{th} vs. T_j



Fig.4 Gate Charge Waveform



Fig.5 Normalized Transient Impedance



Fig.6 Maximum Safe Operation Area

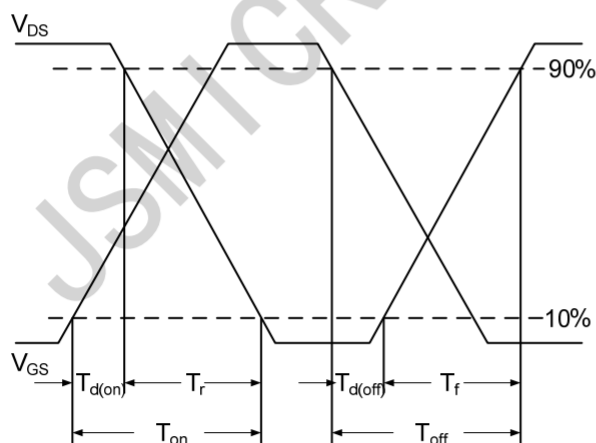


Fig.7 Switching Time Waveform



Fig.8 EAS Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

Package Information

TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	6.30	6.90	0.248	0.272
A1	0.00	0.16	0.000	0.006
B	5.70	6.30	0.224	0.248
C	2.10	2.50	0.083	0.098
D	0.30	0.70	0.012	0.028
E1	0.60	0.90	0.024	0.035
E2	0.70	1.00	0.028	0.039
F	0.30	0.60	0.012	0.024
G	0.70	1.20	0.028	0.047
L1	9.60	10.50	0.378	0.413
L2	2.70	3.10	0.106	0.122
H	0.40	1.00	0.016	0.039
M	5.10	5.50	0.201	0.217
N	2.09	2.49	0.082	0.098
R	0.30		0.012	
T	1.40	1.60	0.055	0.063
Y	5.10	6.30	0.201	0.248