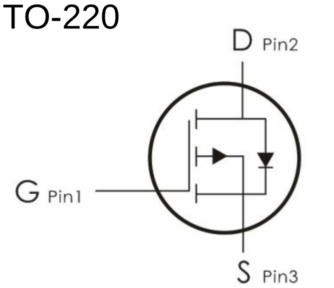
P-Channel MOSFET

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.

TO-220



Features:

1) V_{DS}=-100V,I_D=-20A,$R_{DS(ON)}$<90mΩ @V_{GS}=-10V
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: (Tc=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current-T_C=25℃	-20	A
	Continuous Drain Current-T_C=100℃	-14	A
I_{DM}	Pulsed Drain Current[1]	-85	A
P_D	Total Power Dissipation	58	W
E_{AS}	Single Pulsed Avalanche Energy	177	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	2.15	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	62	℃/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	-100	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-100V	---	---	-50	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=-250μA	-1.2	-1.7	-2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V,I_D=-10A	---	78	90	mΩ
		V_{GS}=-4.5V,I_D=-8A	---	86	110	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-20V, V_{GS}=0V, f=1MHz	---	3020	---	pF
C_{oss}	Output Capacitance		---	120	---	
C_{rss}	Reverse Transfer Capacitance		---	73	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=-50V, I_D=-10A, V_{GS}=-10V, R_G=3.3Ω	---	11	---	ns
t_r	Rise Time[2,3]		---	27	---	ns
$t_{d(off)}$	Turn-Off Delay Time[2,3]		---	78	---	ns
t_f	Fall Time[2,3]		---	53	---	ns
Q_g	Total Gate Charge[2,3]	V_{GS}=-10V, V_{DS}=-50V,	---	44	---	nC

Q_{gs}	Gate-Source Charge[2,3]	I_D=-20A	---	9	---	nC
Q_{gd}	Gate-Drain "Miller" Charge[2,3]		---	5.5	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Drain Diode Forward Voltage[2]	V_{GS}=0V,I_S=-1A	---	---	-1.2	V
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-20	A
Trr	Reverse Recovery Time	I_F=-8A , di/dt=-100A/μs , T_J=25℃	---	38.7	---	nS
Qrr	Reverse Recovery Charge		---	22.4	---	nC

Notes:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.88mH,I_{AS}=-18.9A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

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

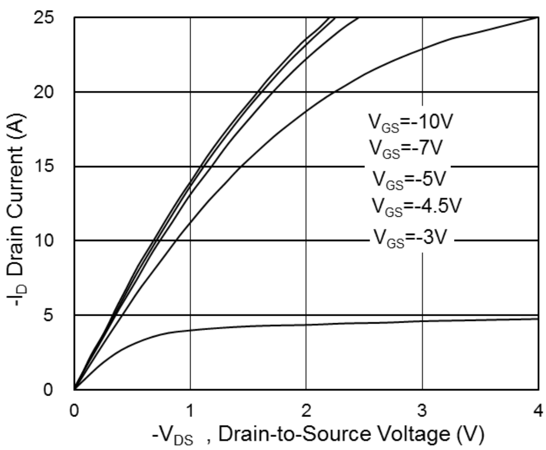


Fig.1 Typical Output Characteristics

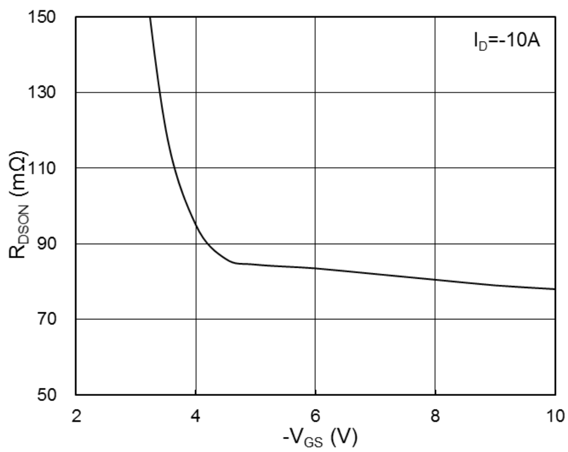


Fig.2 On-Resistance vs G-S Voltage

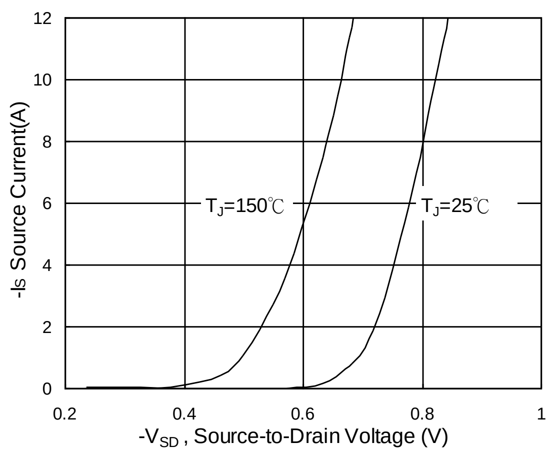


Fig.3 Typical S-D Diode Forward Voltage

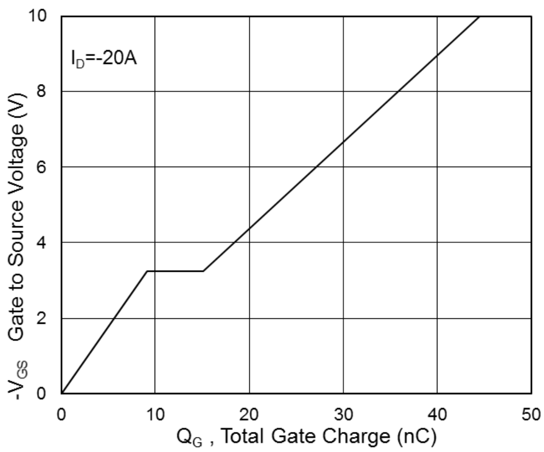


Fig.4 Gate-Charge Characteristics

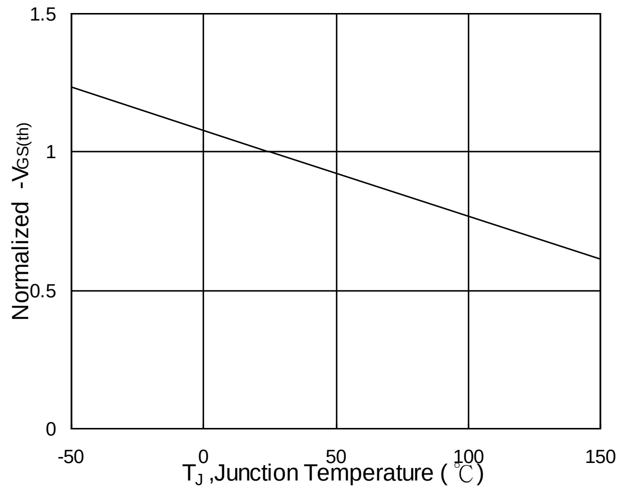


Fig.5 Normalized $V_{GS(th)}$ vs T_J

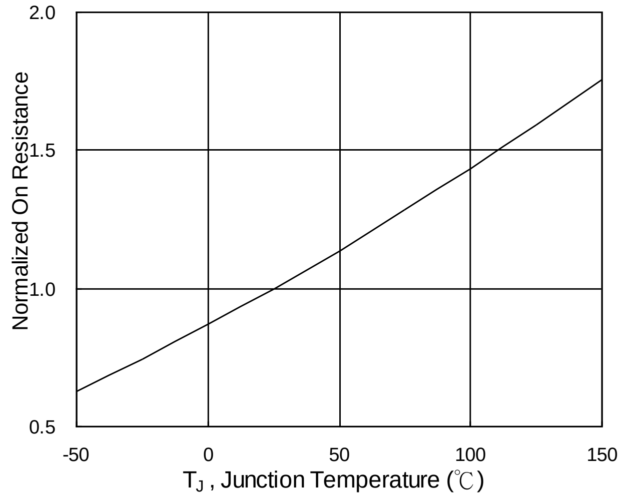


Fig.6 Normalized R_{DSON} vs T_J

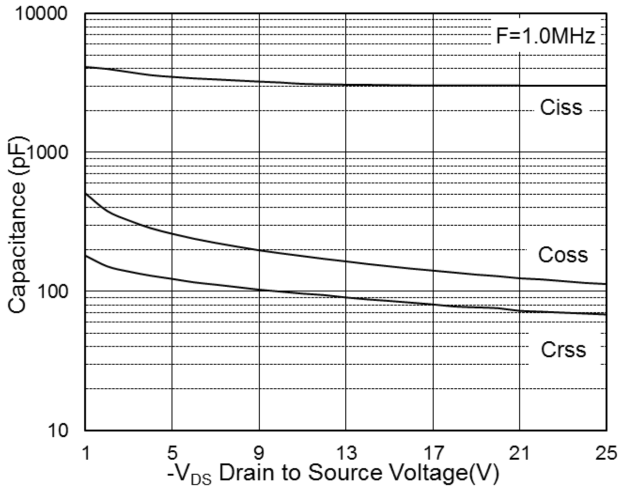


Fig.7 Capacitance

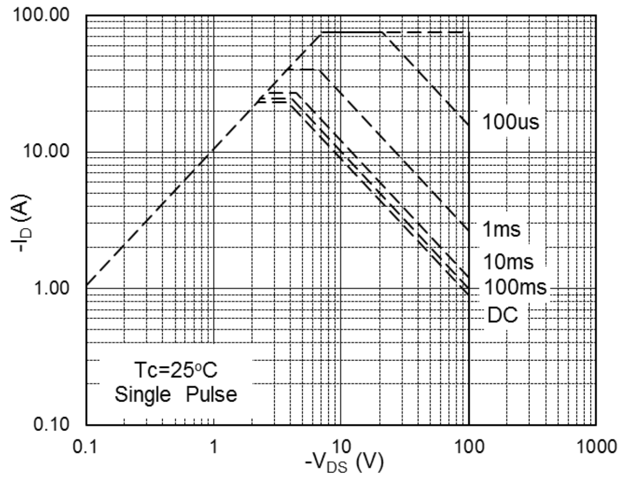


Fig.8 Safe Operating Area

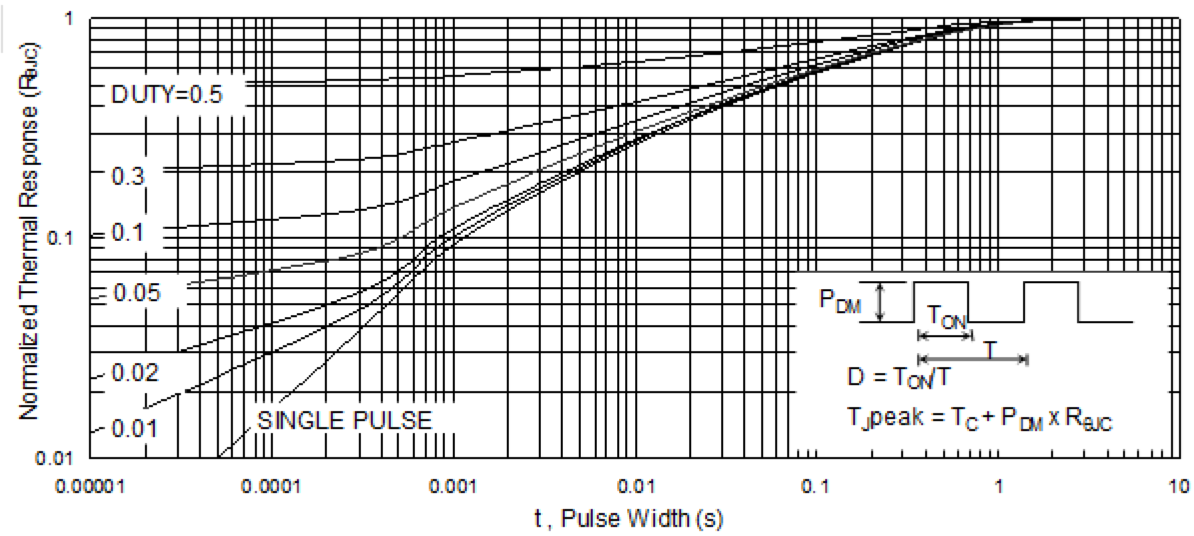


Fig.9 Normalized Maximum Transient Thermal Impedance

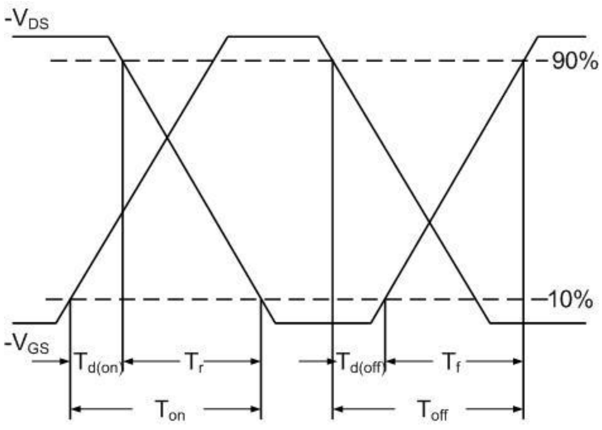


Fig.10 Switching Time Waveform

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

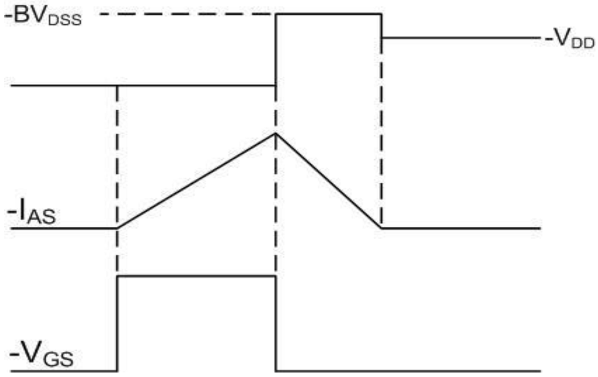
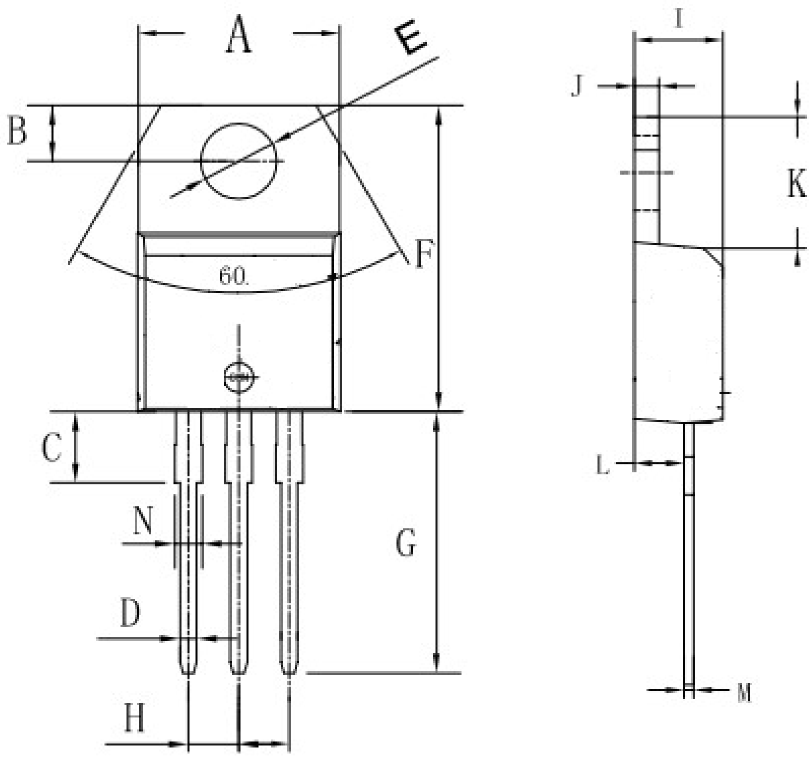


Fig.11 Unclamped Inductive Waveform

Package Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	9.8	10.4	0.385	0.409
B	2.65	3.1	0.104	0.122
C	2.8	4.2	0.110	0.165
D	0.7	0.92	0.027	0.036
E	3.75	3.95	0.147	0.155
F	14.8	16.1	0.582	0.633
G	13.05	13.6	0.513	0.535
H	2.4	2.7	0.094	0.106
I	4.38	4.61	0.172	0.181
J	1.15	1.36	0.045	0.053
K	5.85	6.82	0.230	0.268
L	2.35	2.75	0.092	0.108
M	0.35	0.65	0.013	0.025
N	1.18	1.42	0.046	0.055

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