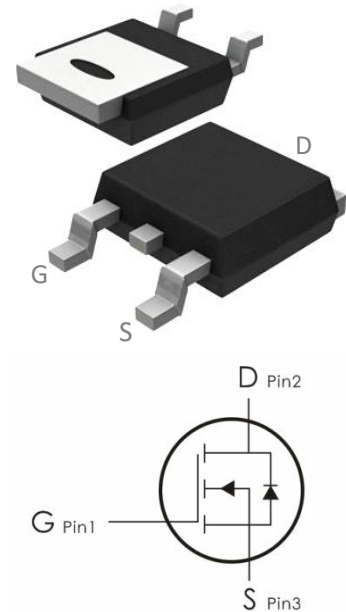


Description:

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) $V_{DS}=60V, I_D=10A, R_{DS(ON)}<90m\ \Omega @V_{GS}=10V$
- 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: ($T_A=25^\circ\text{C}$ 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- $T_C=25^\circ\text{C}^1$	10	A
	Continuous Drain Current- $T_C=100^\circ\text{C}^1$	7	
	Continuous Drain Current- $T_A=25^\circ\text{C}^1$	3.4	
	Continuous Drain Current- $T_A=100^\circ\text{C}^1$	2.7	
I_{DM}	Pulsed Drain Current ²	20	A
P_D	Power Dissipation- $T_C=25^\circ\text{C}^4$	20.8	W
	Power Dissipation- $T_A=25^\circ\text{C}^4$	2	W
E_{AS}	Single pulse avalanche energy ³	6.3	mJ
I_{AS}	Avalanche Current	11.2	A
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case ¹	6	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62	

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250 \mu A$	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=48V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{GS}=0V, V_{DS}=48V, T_J=55^\circ\text{C}$	---	---	5	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	$V_{GS}=V_{DS}, I_D=250 \mu A$	1.2	---	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance ²	$V_{GS}=10V, I_D=10A$	---	---	90	m Ω
		$V_{GS}=4.5V, I_D=8A$	---	---	100	m Ω
G_{FS}	Forward Transconductance	$V_{DS}=5V, I_D=10A$	---	7.6	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	500	---	pF
C_{oss}	Output Capacitance		---	35	---	
C_{rss}	Reverse Transfer Capacitance		---	23	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{GS}=10V, V_{DD}=30V,$ $I_D=10A, R_G=3.3\Omega$	---	1.6	---	ns
t_r	Rise Time		---	7.4	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	17.6	---	ns
t_f	Fall Time		---	4	---	ns

Q_g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =48V, I _D =10A	---	4.9	---	nC
Q_{gs}	Gate-Source Charge		---	1.8	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	2.2	---	nC
R_G	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.2	---	Ω
Drain-Source Diode Characteristics						
I_S	Max. Diode Forward Current ^{1,5}	V _{GS} =V _D =0V, Force Current	---	---	10	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	20	A
V_{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V
trr	Reverse Recovery Time	I _F =10A, T _J =25°C	---	9.7	---	ns
Q_{rr}	Reverse Recovery Charge	diF/dt=100A/μs	---	6.1	---	nC

Notes:

1. The data tested by surface mounted on a 1 inch² 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=0.1mH, I_{AS}=11.2A
4. The power dissipation is limited by 150°C 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_A=25°C unless otherwise noted)

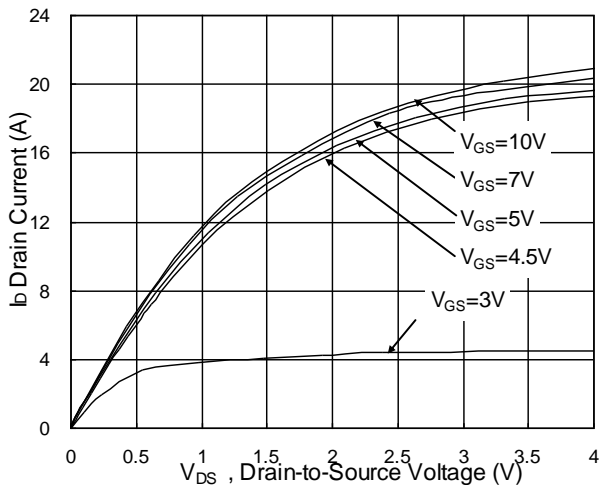


Fig.1 Typical Output Characteristics

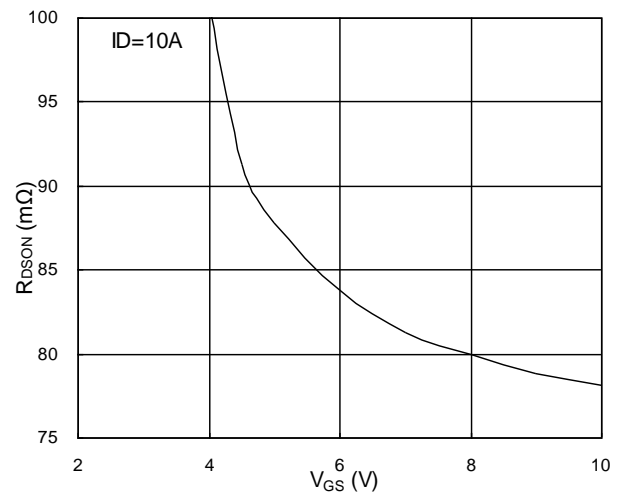


Fig.2 On-Resistance v.s Gate-Source

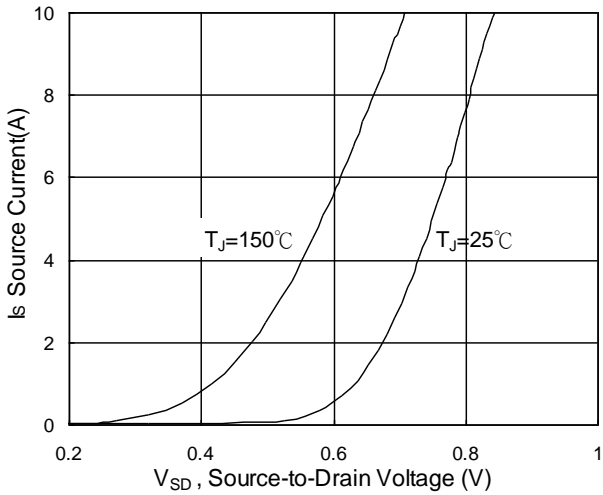


Fig.3 Forward Characteristics of Reverse

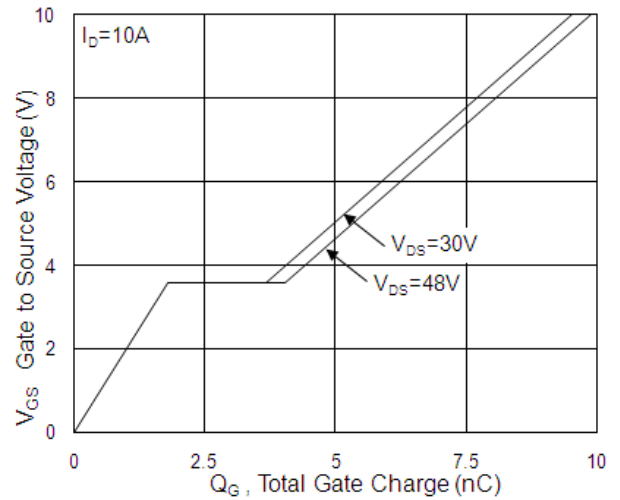


Fig.4 Gate-Charge Characteristics

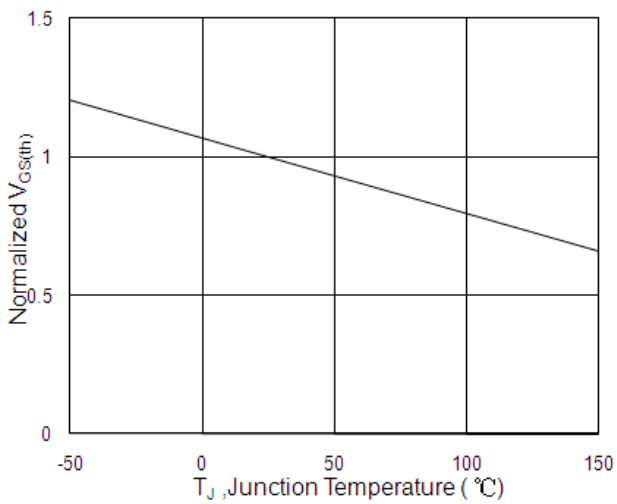


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

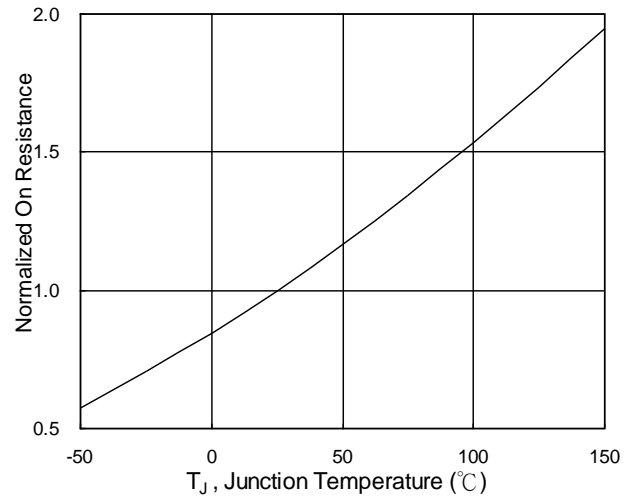


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

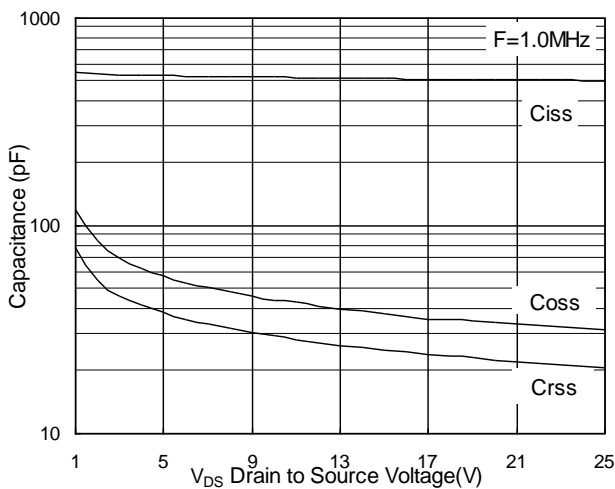


Fig.7 Capacitance

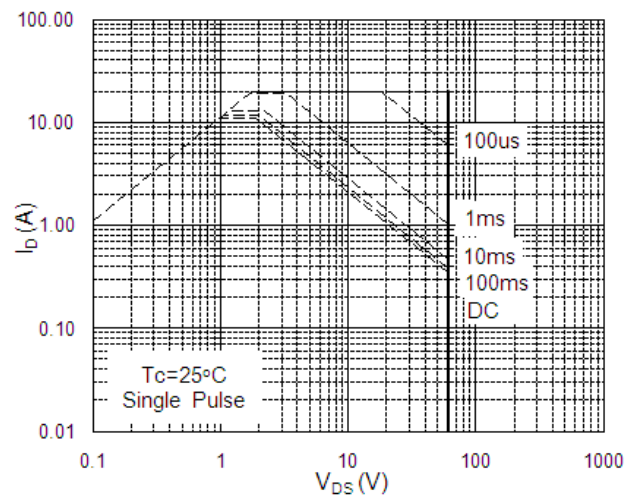


Fig.8 Safe Operating Area

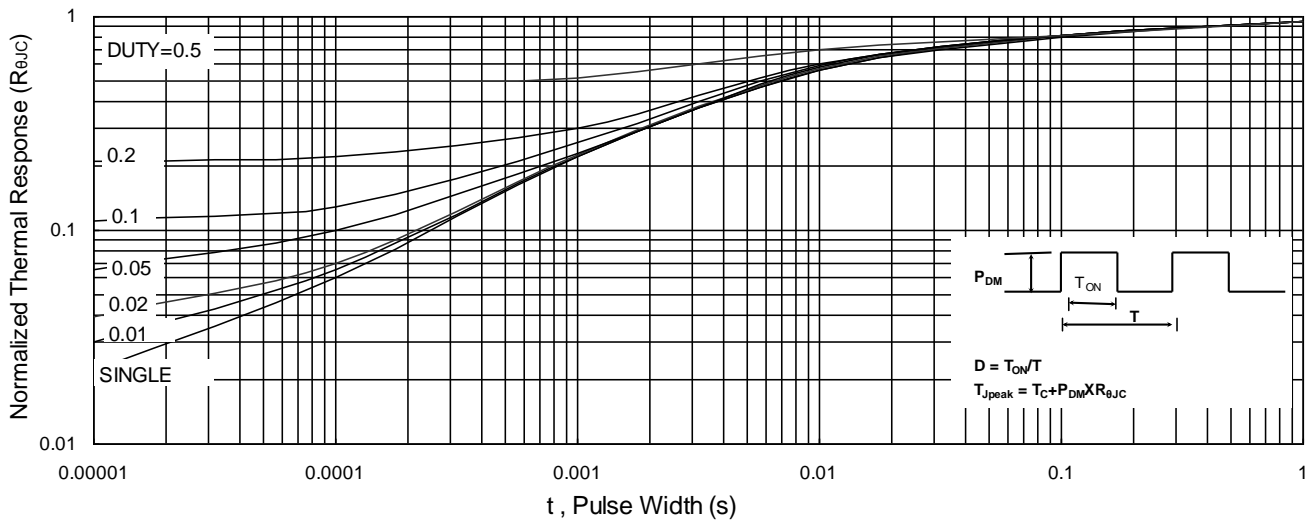


Fig.9 Normalized Maximum Transient Thermal Impedance

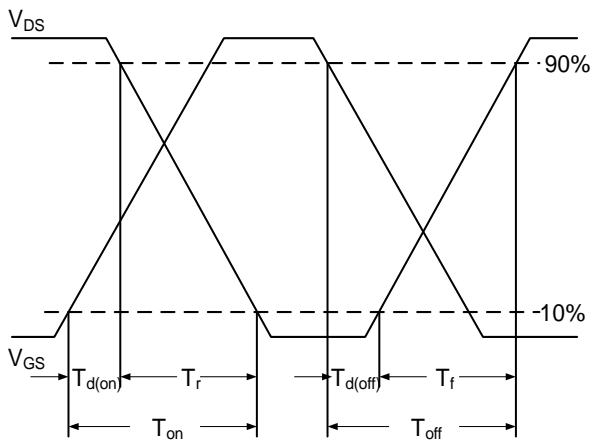


Fig.10 Switching Time Waveform

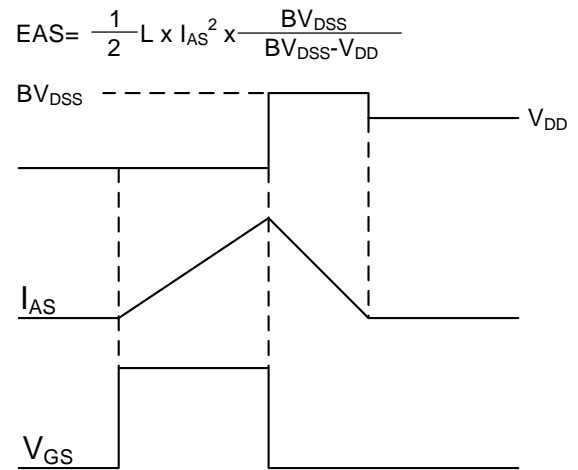


Fig.11 Unclamped Inductive Switching Waveform



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