

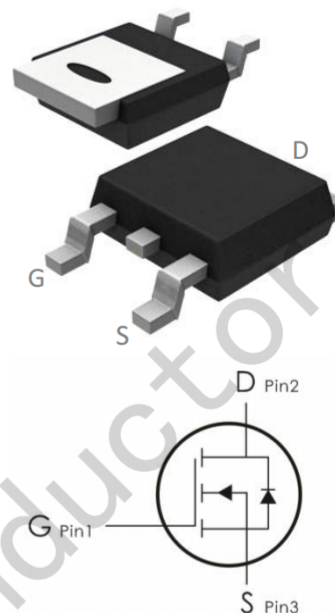
Description:

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) $V_{DS}=650V, I_D=5A, R_{DS(on)} < 2.7 \Omega @ V_{GS}=10V$
- 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: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Continuous Drain Current- $T_C=25^\circ\text{C}$	5	A
	Continuous Drain Current- $T_C=100^\circ\text{C}$	2.5	
I_{DM}	Pulsed Drain Current(Note 1)	25	A
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	80	mJ
I_{AR}	Avalanche Current (Note 1)	5	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	4.5	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5	V/ns
P_D	Power Dissipation, $T_C=25^\circ\text{C}$	24.5	W
	Power Dissipation-De-rate above 25°C	0.2	W/ $^\circ\text{C}$
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	5.1	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	45.3	

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

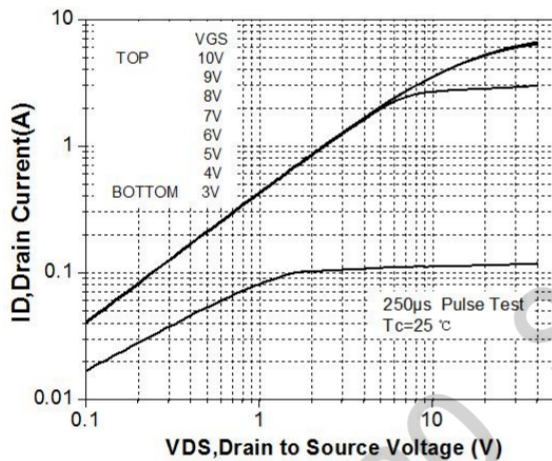
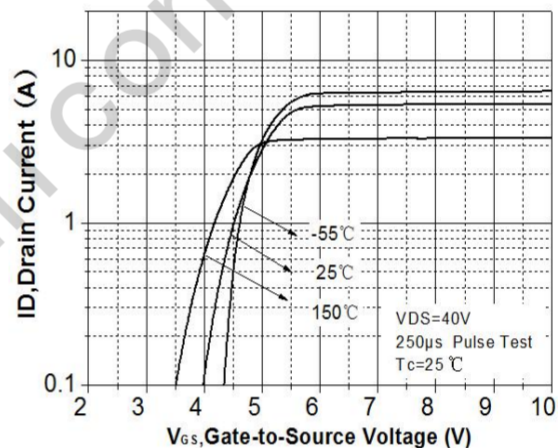
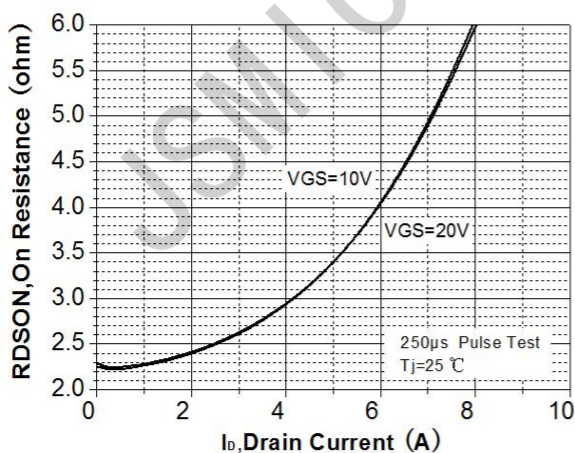
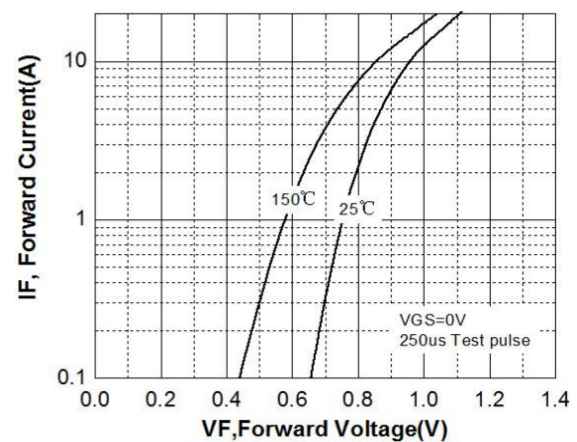
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\text{ }\mu\text{ A}$	650	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=650V$	---	---	1	$\mu\text{ A}$
		$V_{GS}=0V, V_{DS}=520V, T_C = 125^{\circ}\text{C}$	---	---	10	$\mu\text{ A}$
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\text{ }\mu\text{ A}$	2	---	4	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=2.5A$	---	2.3	2.7	Ω
G_{FS}	Forward Transconductance	$V_{DS}=40\text{ V}, I_D=2.5A(\text{Note }4)$	---	3.8	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1MHz$	---	400	---	pF
C_{oss}	Output Capacitance		---	55	---	
C_{rss}	Reverse Transfer Capacitance		---	1.3	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=325V, I_D=5A, R_G=25\Omega$ (Note 4,5)	---	7	---	ns
t_r	Rise Time		---	22	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	15	---	ns
t_f	Fall Time		---	23	---	ns
Q_g	Total Gate Charge	$V_{DS}=520V, V_{GS}=10V, I_D=5A$	---	13	---	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=520V, V_{GS}=10V, I_D=5A$	---	4.9	---	nC
Q_{gd}	Gate-Drain Charge	(Note 4,5)	---	2.3	---	nC

Drain-Source Diode Characteristics

V_{SD}	Source-Drain Diode Forward Voltage	I _S =5A, V _{GS} =0V	---	---	1.2	V
I_S	Continuous Source Current	---	---	---	4	A
I_{SM}	Pulsed Source Current	---	---	---	16	A
T_{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 5 A,	---	378	---	ns
Q_{rr}	Reverse Recovery Charge	dI / dt = 100 A / μ s (Note 4)	---	1.35	---	μ C

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 40 mH, I_{AS} = 2 A, V_{DD} = 50V, R_G = 25 Ω , Starting T_J = 25°C
3. I_{SD} ≤ 4A, di/dt ≤ 200A/ μ s, V_{DD} ≤ BVDSS, Starting T_J = 25°C
4. Pulse Test : Pulse width ≤ 300 μ s, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

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

Figure 1. On-Region Characteristics

Figure 2. Transfer Characteristics

Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

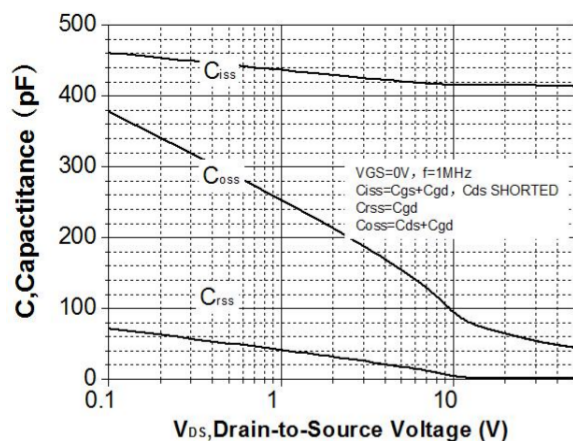


Figure 5 Capacitance Characteristics

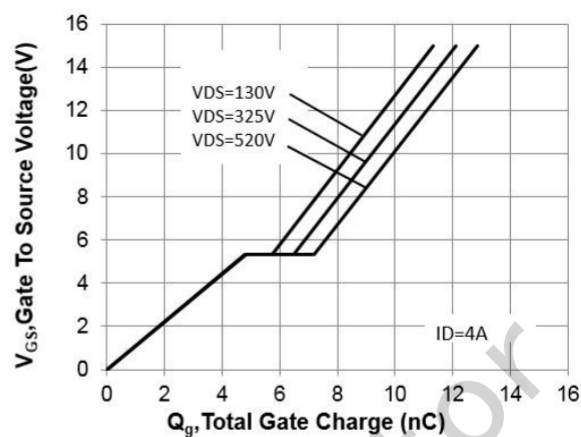


Figure 6. Gate Charge Characteristics

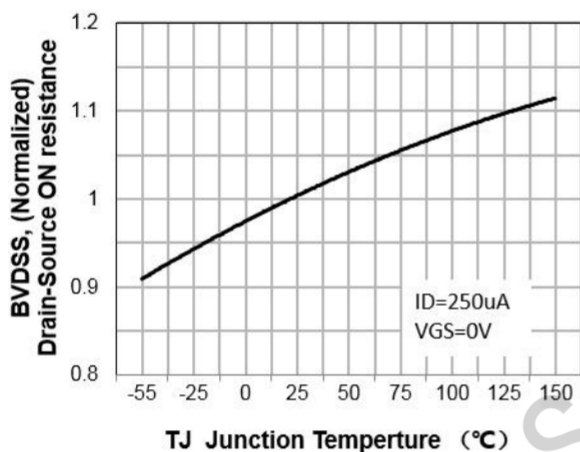


Figure 7. Breakdown Voltage Variation vs Temperature

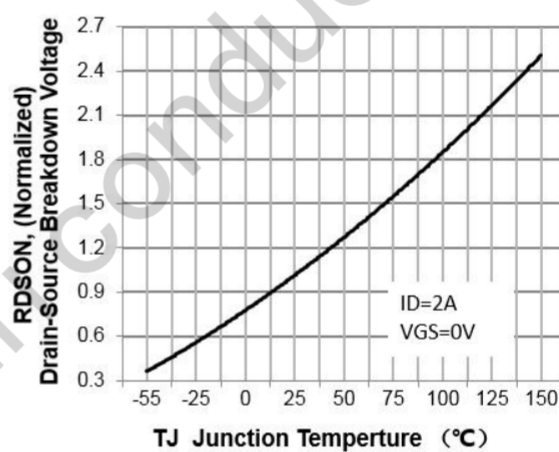


Figure 8. On-Resistance Variation vs Temperature

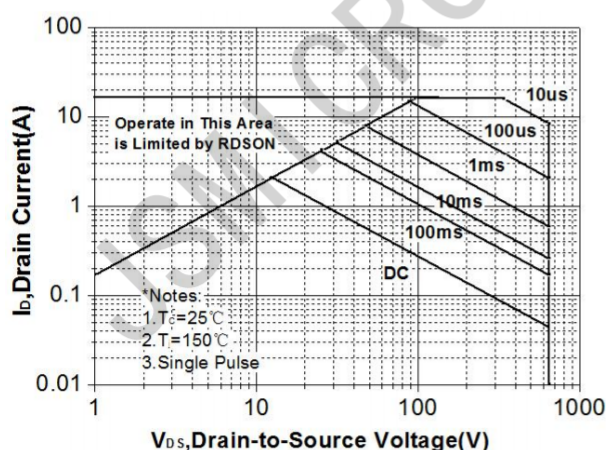


Figure 9. Maximum Safe Operating Area

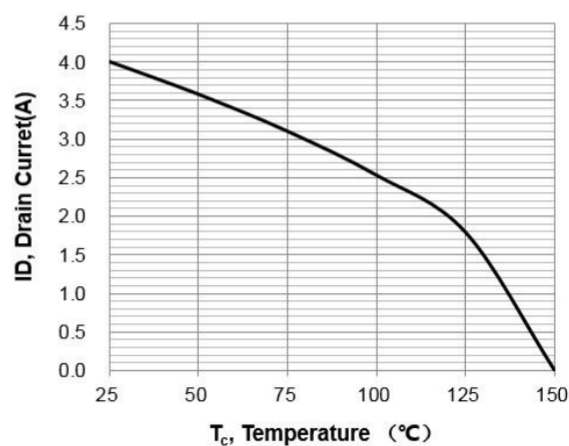


Figure 10. Maximum Drain Current vs Case Temperature

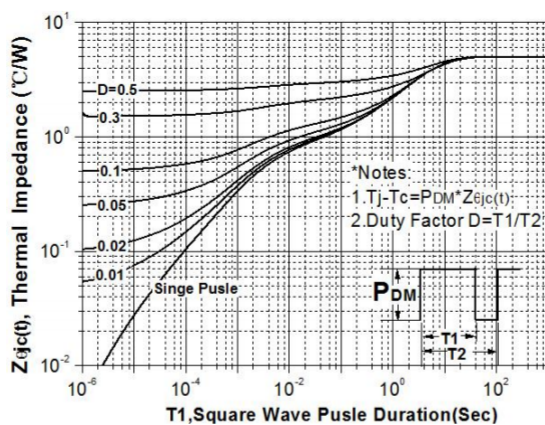
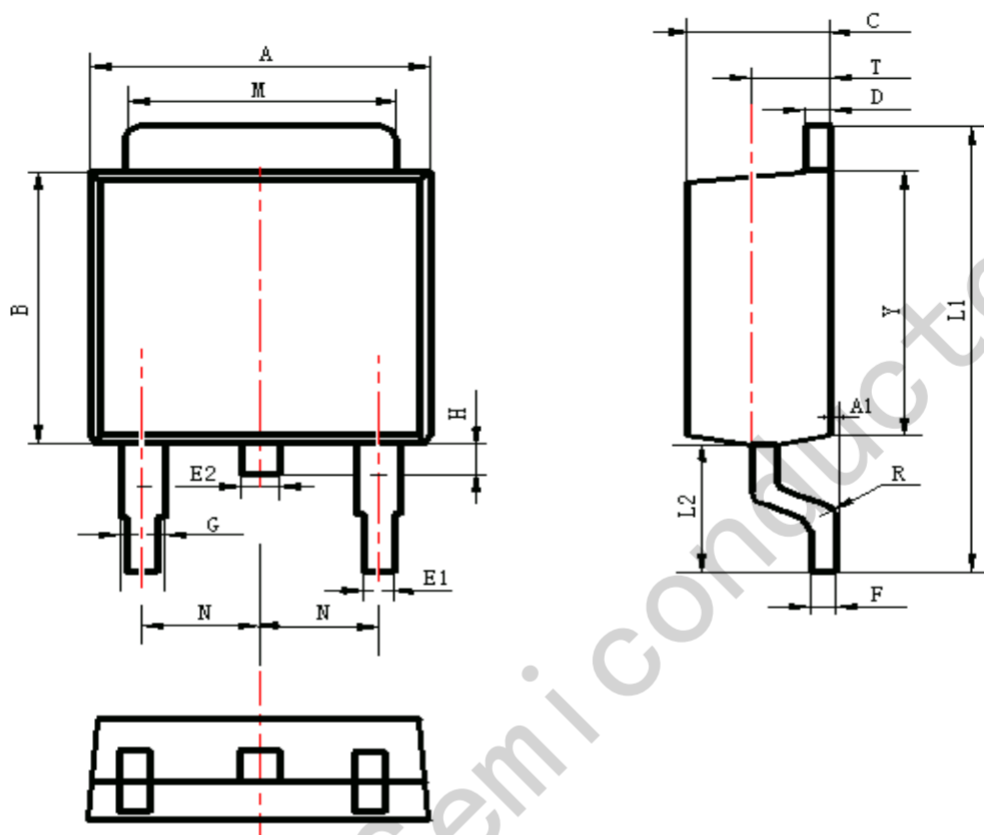


Figure 11. Transient Thermal Response Curve

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