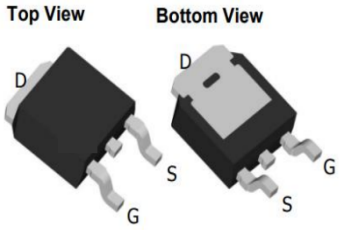
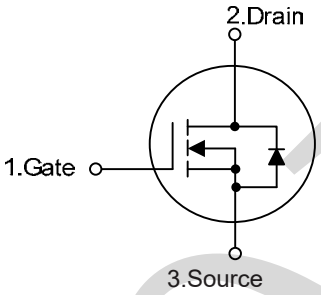
Trench N-channel Power MOSFET

MSR3R8N03D

TO-252





V_{DS}	30	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	3.2	mΩ
I_D	150	A

Features

1、Low on – resistance

2、Package TO-252

3、TrenchFET Power MOSFET

Applications

1、Load Switch for Portable Devices

2、DC/DC Converter

Maximum ratings, at TA =25°C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		30	V
V_{GS}	Gate-Source voltage		±20	V
I_S	Diode continuous forward current	T_C =25°C	--	A
I_D	Continuous drain current @VGS=10V	T_C = 25°C (Package limit)	150	A
		T_C = 100°C (Silicon limit)	100	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	400	A
EAS	Avalanche energy, single pulsed ②		529	mJ
P_D	Maximum power dissipation	T_C =25°C	110	W
T_{STG},T_J	Storage and Junction Temperature Range		-55 to +175	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.36	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @Tj=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, VGS=0V, Tj=25°C	--	--	1	μA
		V_{DS}=24V, VGS=0V, Tj=125°C	--	--	10	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.0	1.6	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=30A	--	3.2	3.8	mΩ

Dynamic Electrical Characteristics@Tj = 25°C (unless otherwise stated)

C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz	--	3400	--	pF
C_{oss}	Output Capacitance		--	356	--	pF
C_{rss}	Reverse Transfer Capacitance		--	308	--	pF
gfs	Forward Transconductance	V_{DS} = 5 V, I_D = 24A	--	28	--	S
Q_g (10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=30A, f=1MHz	--	70	--	nC
Q_{gs}	Gate-Source Charge		--	12	--	nC
Q_{gd}	Gate-Drain Charge		--	16.3	--	nC
R_G	Gate resistance	V_{GS}=0V,V_{DS}=0V, f=1MHz	--	1	--	Ω

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DD}=15V, I_{DS}=30A, R_L=1.8Ω, Tj=25°C	--	11	--	ns
Tr	Turn-on Rise Time		--	120	--	ns
Td(off)	Turn-Off Delay Time		--	25	--	ns
Tf	Turn-Off Fall Time		--	60	--	ns

Source-Drain Diode Characteristics @Tj = 25°C (unless otherwise stated)

V_{SD}	Forward on voltage	I_{SD}=40A,V_{GS}=0V	--	0.84	1.2	V
Trr	Reverse Recovery Time (Note1)	I_{SD}=30A , V_{GS}=0V di/dt=100A/μs	--	56	--	ns
Qrr	Reverse Recovery Charge (Note1)		--	110	--	nC

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 9A, V_{GS} =10V. Part not recommended for use above this value

③ The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 300μs; duty cycle≤ 2%.

Typical Characteristics

Figure1: Output Characteristics

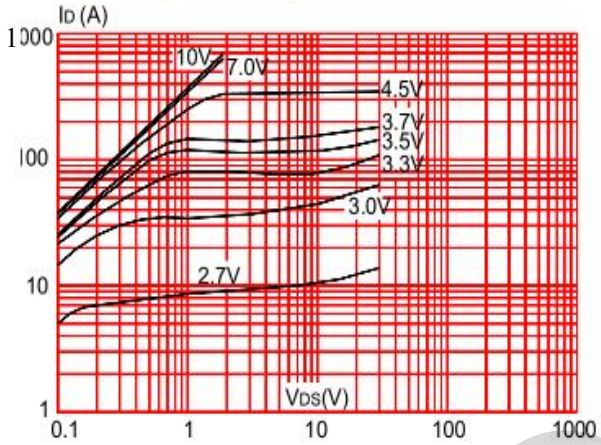


Figure 2: Typical Transfer Characteristics

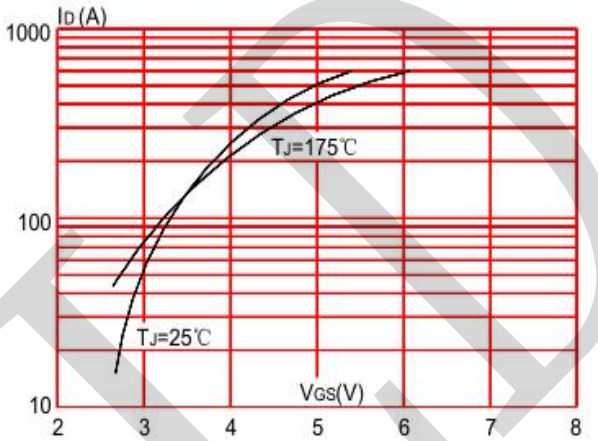


Figure 3: On-resistance vs. Drain Current

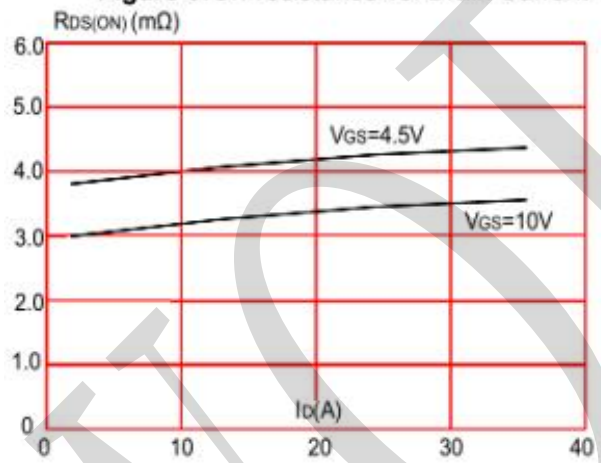


Figure 4: Body Diode Characteristics

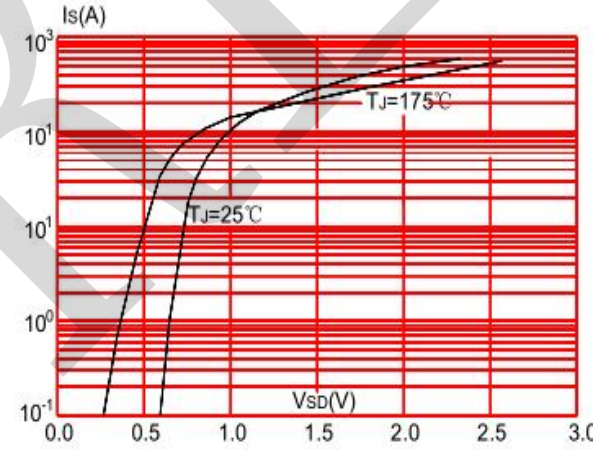


Figure 5: Gate Charge Characteristics

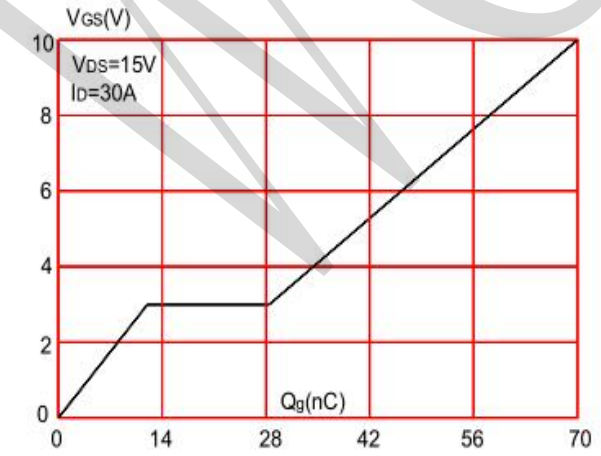
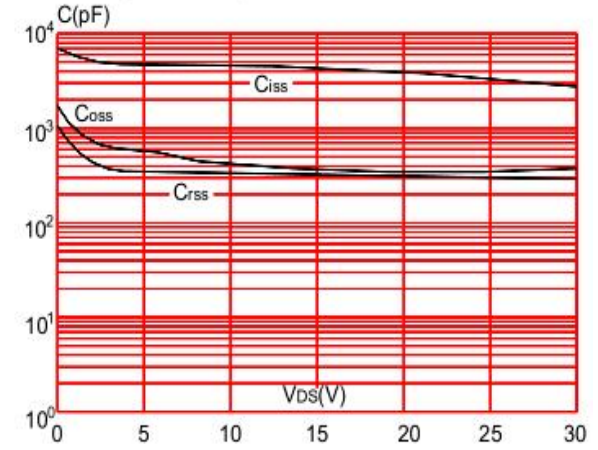


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

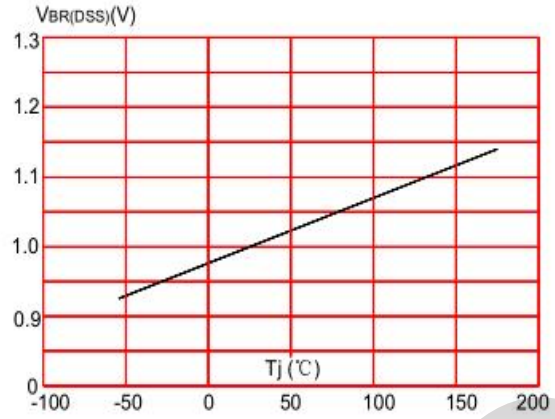


Figure 8: Normalized on Resistance vs. Junction Temperature

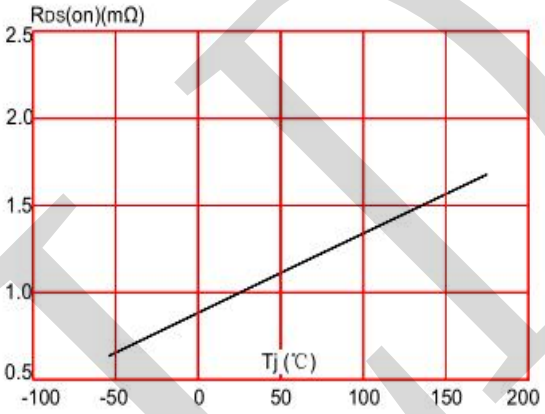


Figure 9: Maximum Safe Operating Area

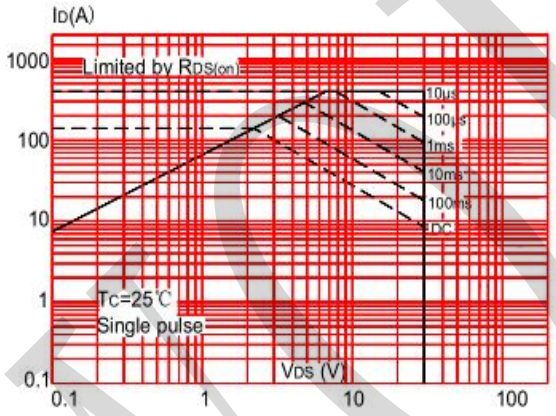


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

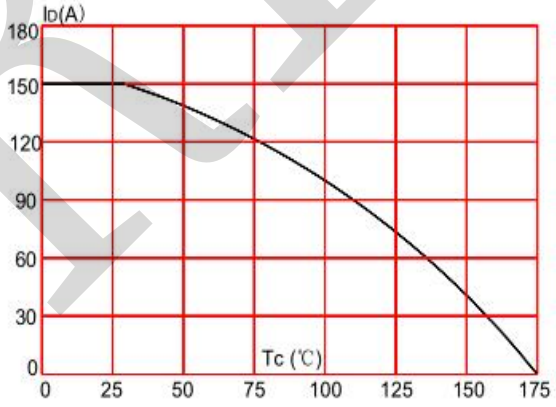


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-252)

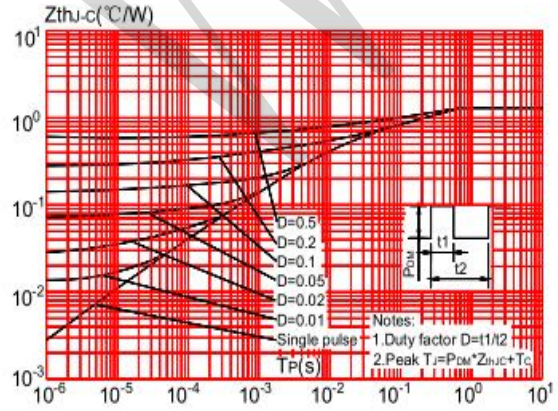
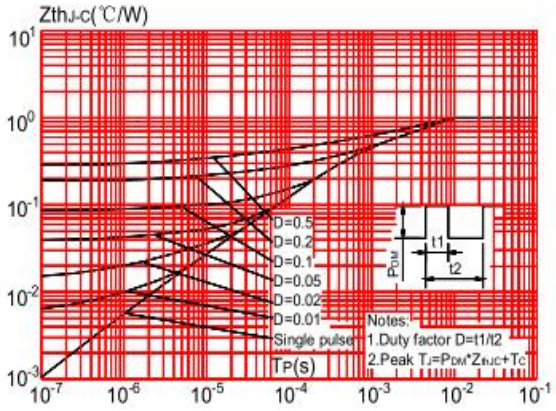


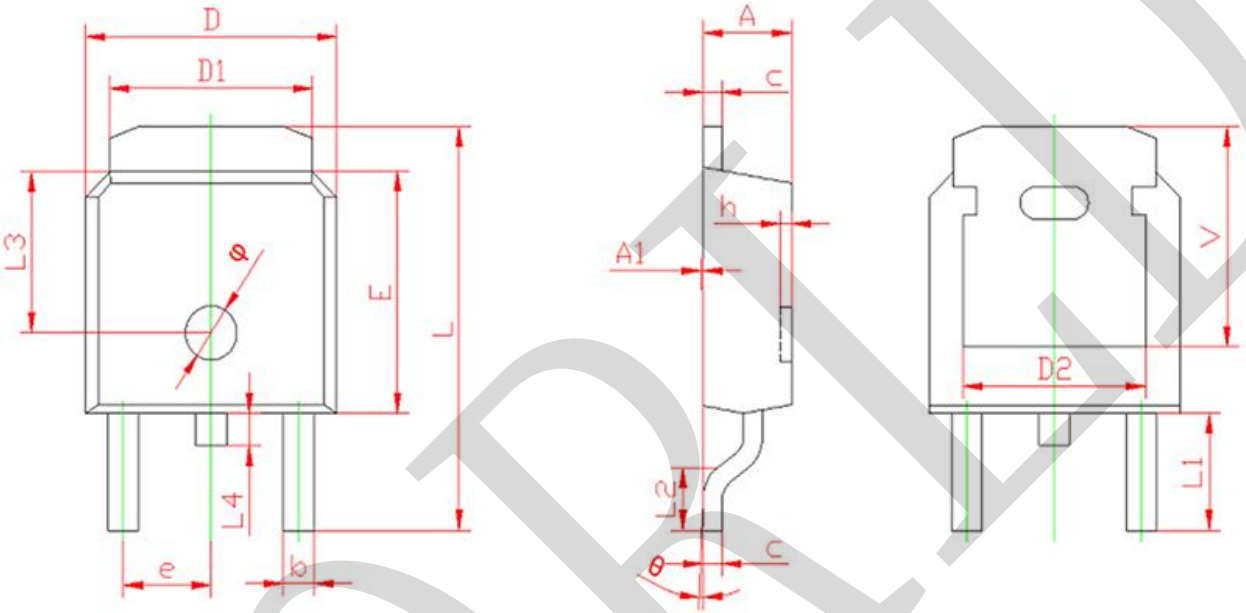
Figure.12: Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-263,TO-220C)



PACKAGE OUTLINE DIMENSIONS

Note:unit mm

TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.800 REF		0.189 REF	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF		0.114 REF	
L2	1.400	1.700	0.055	0.067
L3	4.00 REF		0.157 REF	
L4	0.600	1.000	0.024	0.039
φ	1.200	1.400	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.500 REF		0.217 REF	

Package：TO-252