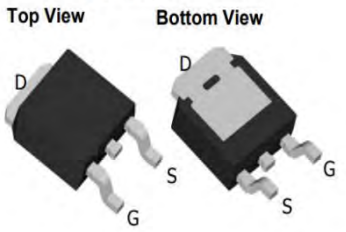
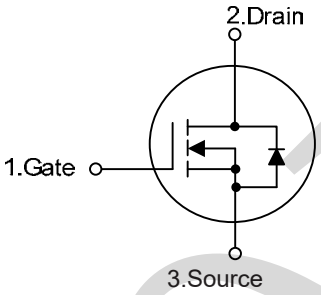
Trench N-channel Power MOSFET

MSR033N06D

TO-252





V_{DS}	60	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	26	mΩ
I_D	20	A

Features

1、Low on – resistance

2、Package TO-252

3、TrenchFET Power MOSFET

Applications

1、Load Switch for Portable Devices

2、PWM Application

3、Power management

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		60	V
V_{GS}	Gate-Source voltage		±20	V
I_D	Continuous drain current	T_C = 25°C	20	A
		T_C = 100°C	13	A
I_{DM}	Pulse drain current tested (Note1)	T_C =25°C	80	A
E_{AS}	Avalanche energy, single pulsed (Note2)		40	mJ
P_D	Maximum power dissipation	T_C =25°C	23	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	6.5	°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	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, VGS=0V, Tj=25°C	--	--	1	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 (Note3)	V_{GS}=10V, I_D=10A	--	26	33	mΩ
		V_{GS}=4.5V, I_D=5A	--	33	45	mΩ

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

C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	--	1269	--	pF
C_{oss}	Output Capacitance		--	61.3	--	pF
C_{rss}	Reverse Transfer Capacitance		--	54.3	--	pF
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=10A	--	20.3	--	nC
Q_{gs}	Gate-Source Charge		--	3.7	--	nC
Q_{gd}	Gate-Drain Charge		--	3.3	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DS}=30V, I_D=15A, R_G=1.8Ω, V_{GS}=10V	--	7.6	--	ns
Tr	Turn-on Rise Time		--	20	--	ns
Td(off)	Turn-Off Delay Time		--	15	--	ns
Tf	Turn-Off Fall Time		--	24	--	ns

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

I_S	Maximum Continuous Drain to Source Diode Forward Current		--	--	20	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		--	--	80	A
V_{SD}	Forward on voltage	Is=20A,V_{GS}=0V	--	--	1.2	V
Trr	Reverse Recovery Time	I_F=10A , di/dt=100A/μs	--	29	--	ns
Qrr	Reverse Recovery Charge		--	43	--	nC

NOTE: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} condition : T_J=25℃,V_{DD}=30V,V_G=10V,L=0.5mH,Rg=25Ω.

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Characteristics

Figure1: Output Characteristics

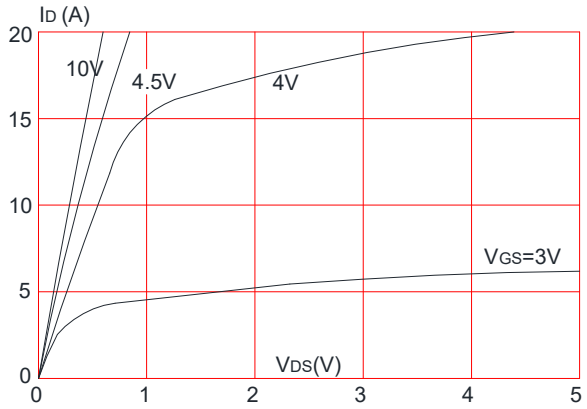


Figure 2: Typical Transfer Characteristics

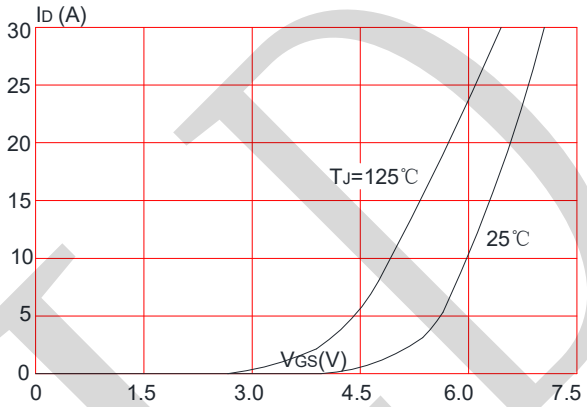


Figure 3: On-resistance vs. Drain Current

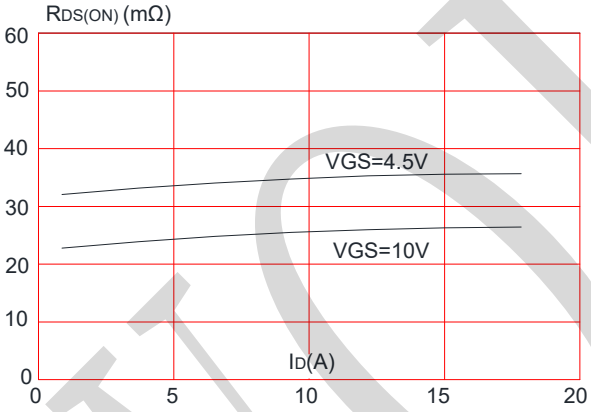


Figure 4: Body Diode Characteristics

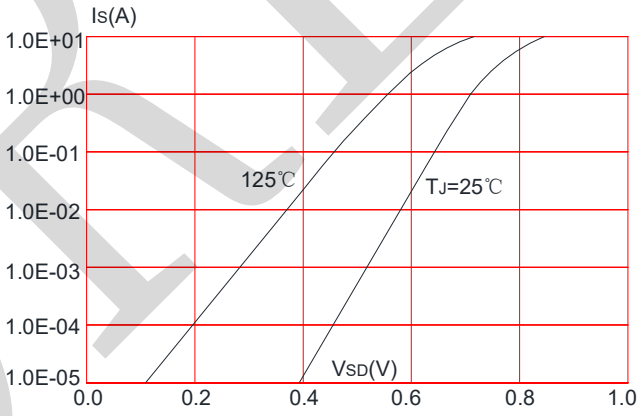


Figure 5: Gate Charge Characteristics

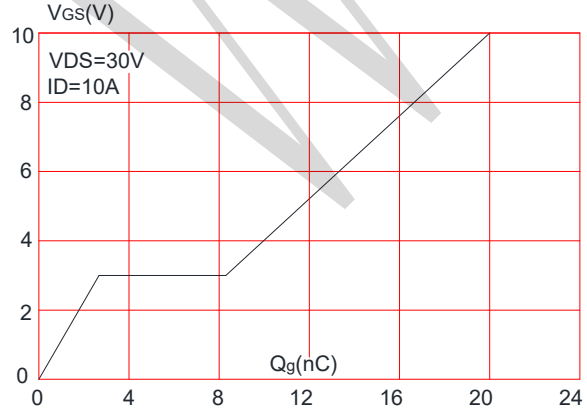
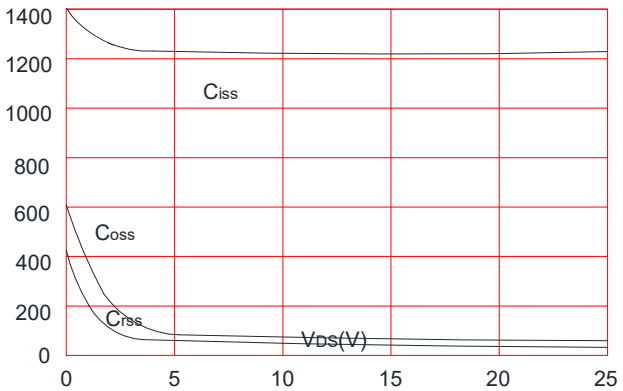


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

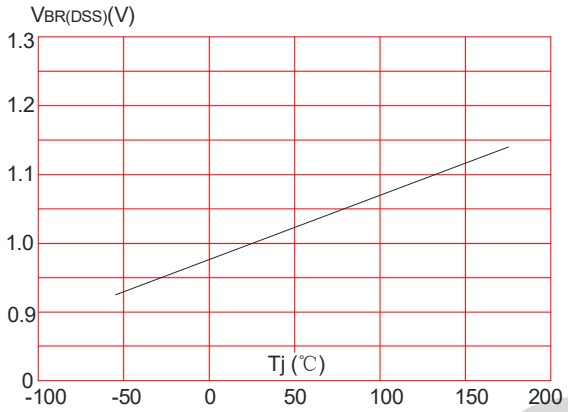


Figure 8: Normalized on Resistance vs. Junction Temperature

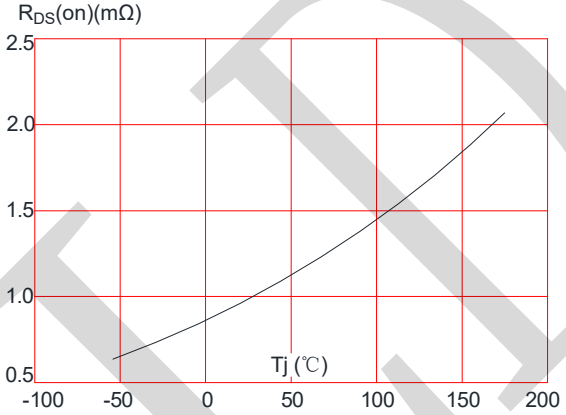


Figure 9: Maximum Safe Operating Area

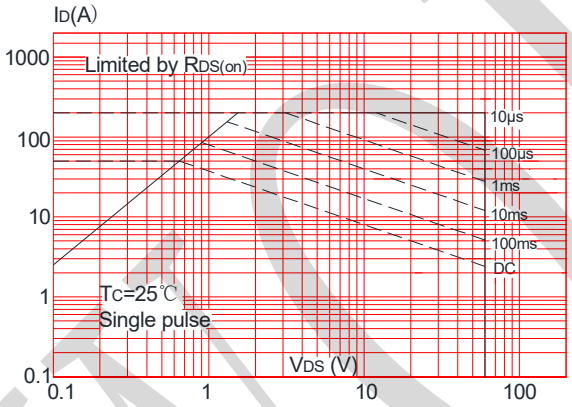


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

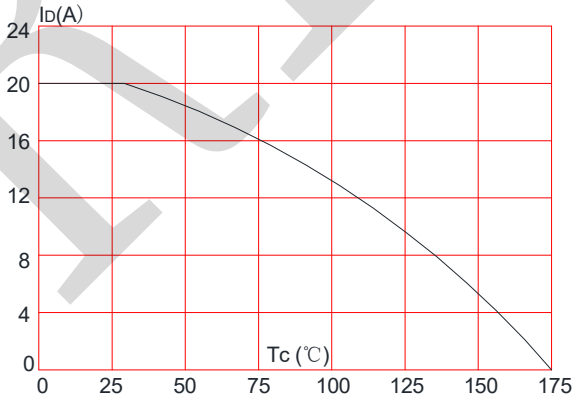
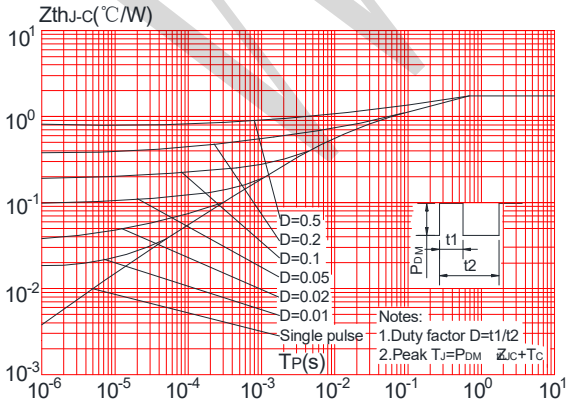


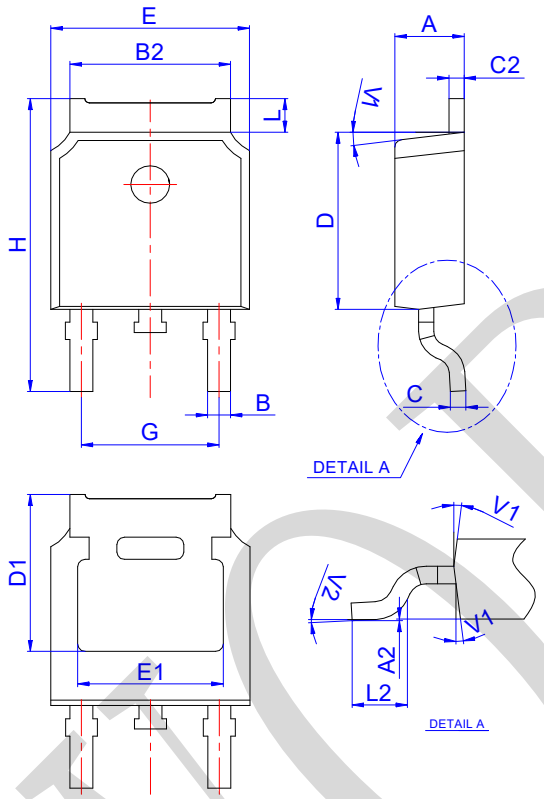
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



PACKAGE OUTLINE DIMENSIONS

Note:unit mm

TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°