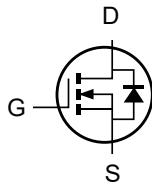
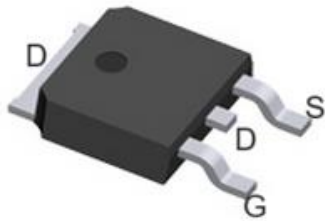


N-Channel Advanced Trench MOSFET

MSR006N03D

TO-252



Features

- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

Applications

- Power Management Switches
- PWM Application
- Load Switch

Maximum ratings, at $T_A = 25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		30	V
V_{GS}	Gate-Source voltage		± 20	V
I_D	Continuous drain current	$T_C = 25^\circ\text{C}$	80	A
		$T_C = 100^\circ\text{C}$	55	A
I_{DM}	Pulse drain current tested		300	A
E_{AS}	Avalanche energy, single pulsed ^①		96	mJ
P_D	Power dissipation	$T_C = 25^\circ\text{C}$	50	W
T_{STG}, T_J	Storage and Junction Temperature Range		-55 to 150	$^\circ\text{C}$

①: E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 30\text{V}$, $V_G = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 0.5\text{mH}$, $I_{AS} = 20\text{A}$, $V_{DD} = 0\text{V}$ during time in avalanche.

Thermal Characteristics

Symbol	Parameter	Rating	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	1.8	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
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Static Electrical Characteristics @T_j=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} =20V, V _{GS} =0V	--	--	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	1.5	2.0	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A	--	4.2	6.0	mΩ
		V _{GS} =4.5V, I _D =15A	--	5.5	8.0	mΩ

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

C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	--	2045	--	pF
C _{oss}	Output Capacitance		--	481	--	pF
C _{rss}	Reverse Transfer Capacitance		--	270	--	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =20A, V _{GS} =10V	--	33	--	nC
Q _{gs}	Gate-Source Charge		--	15	--	nC
Q _{gd}	Gate-Drain Charge		--	5	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V _{DS} =15V, V _{GS} =10V R _L =0.68Ω, R _G =3Ω	--	7.4	--	ns
Tr	Turn-on Rise Time		--	11	--	ns
Td(off)	Turn-Off Delay Time		--	26	--	ns
Tf	Turn-Off Fall Time		--	7	--	ns

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

VSD	Forward on voltage	I _{SD} =1A, V _{GS} =0V	--	--	1.0	V
I _S	Body Diode Forward Current	--	--	--	80	A
T _{rr}	Body Diode Reverse Recovery Time	I _{SD} =20A, d _i /d _t =100A/μs	--	30	--	ns
Q _{rr}	Body Diode Reverse Recovery Charge		--	18	--	nC

Typical Characteristics

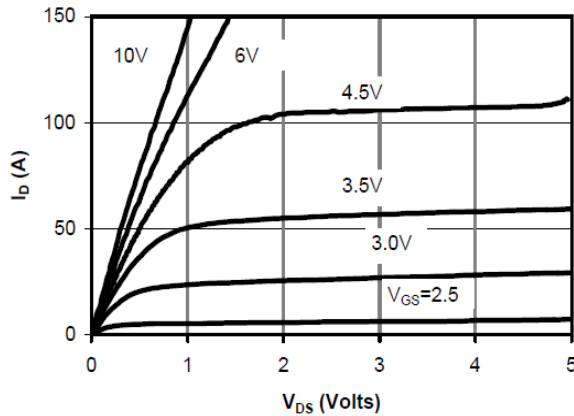


Fig 1: On-Region Characteristics

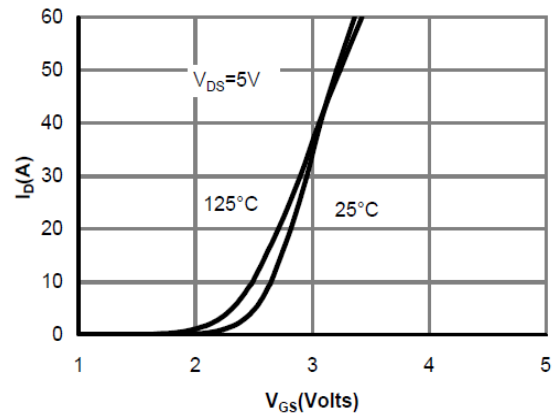


Figure 2: Transfer Characteristics

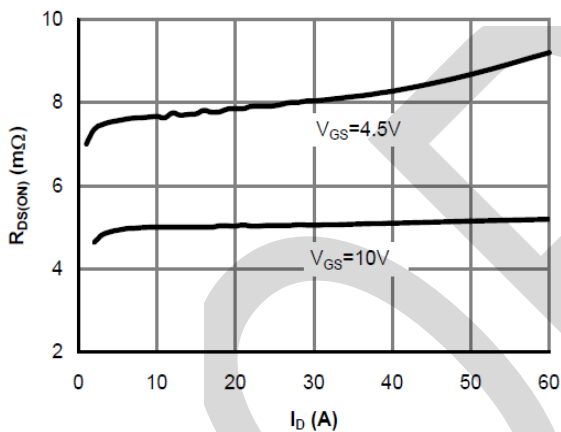


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

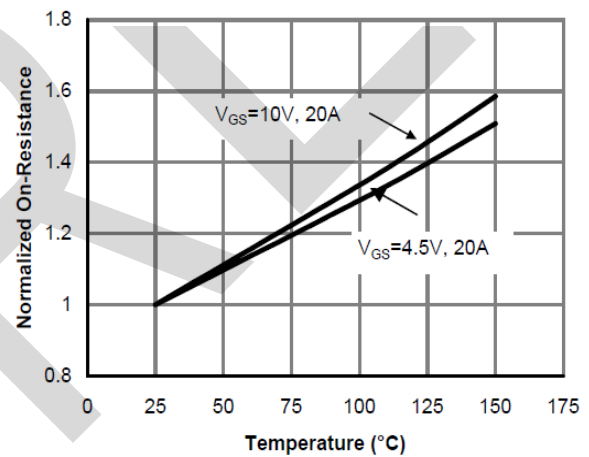


Figure 4: On-Resistance vs. Junction Temperature

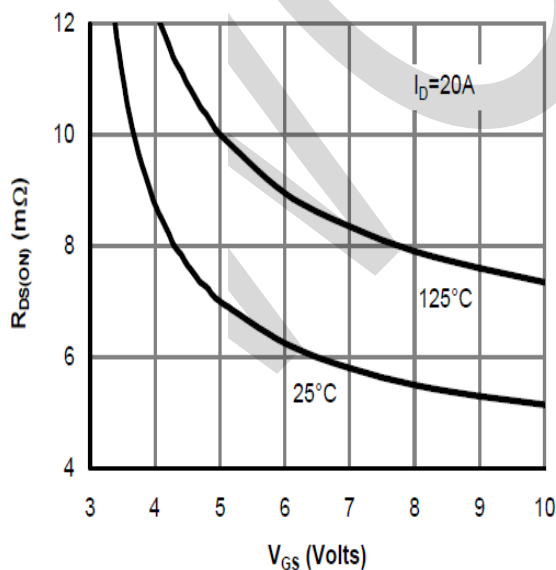


Figure 5: On-Resistance vs. Gate-Source Voltage

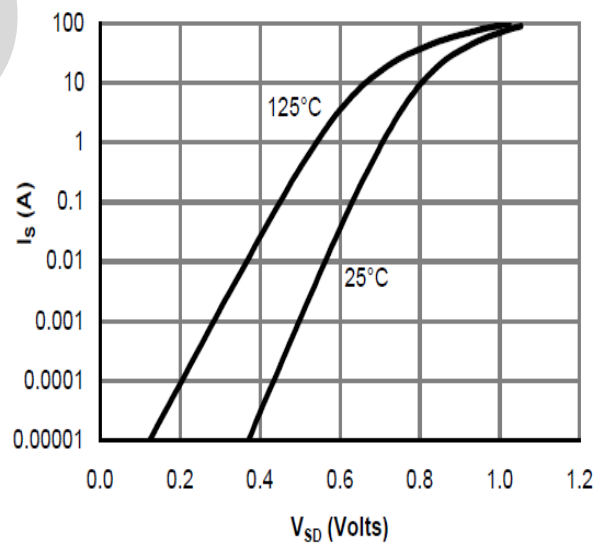


Figure 6: Body-Diode Characteristics

Typical Characteristics

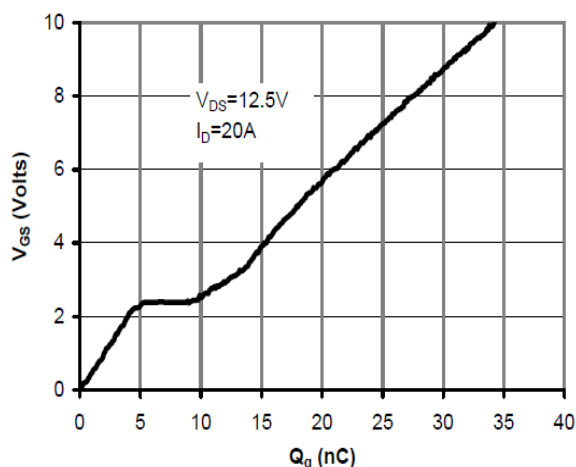


Figure 7: Gate-Charge Characteristics

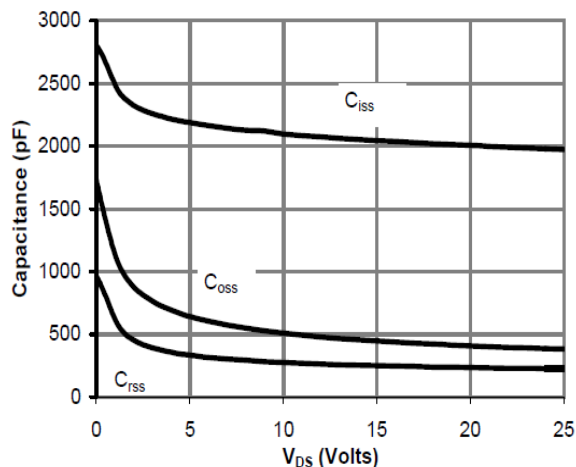


Figure 8: Capacitance Characteristics

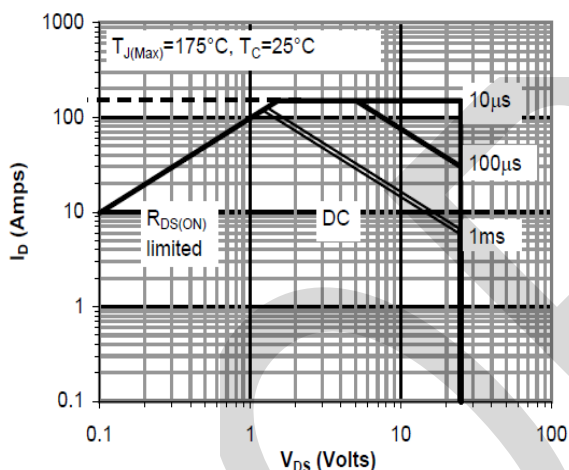


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

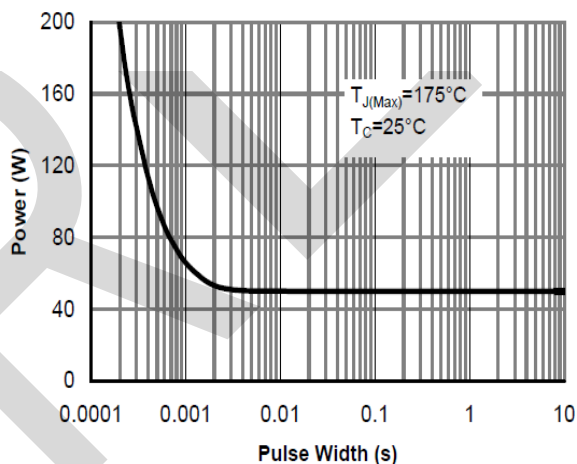


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

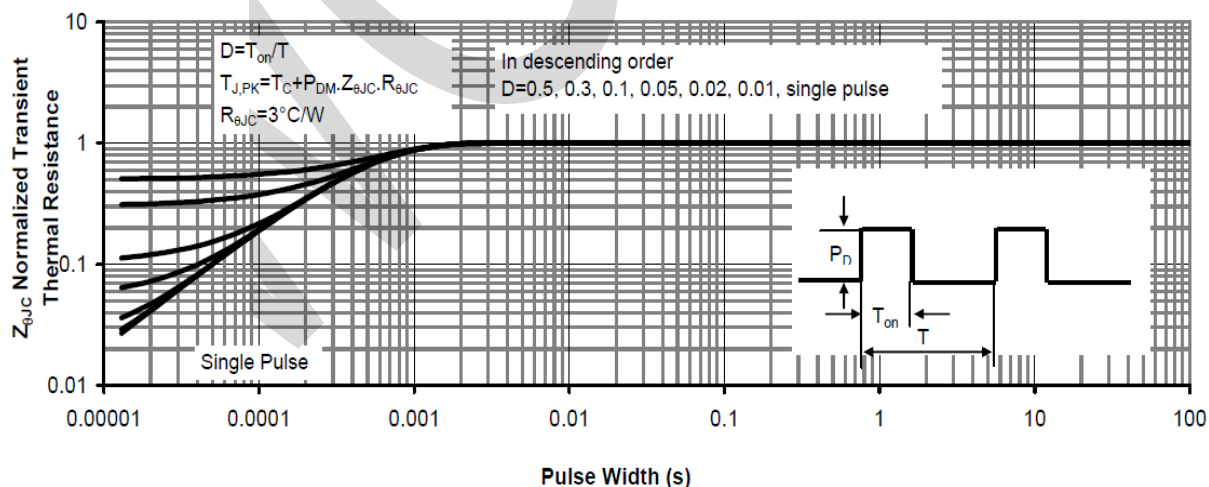


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Typical Characteristics

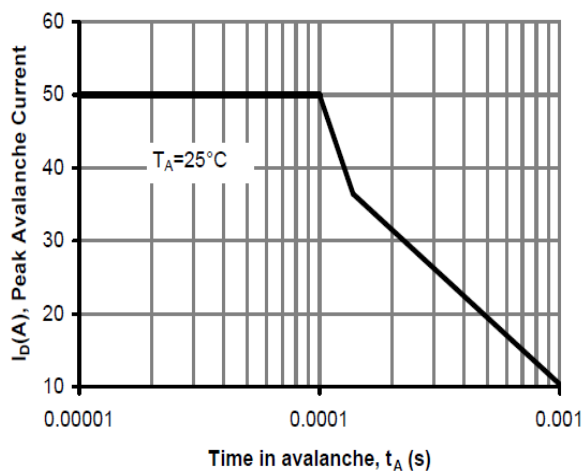


Figure 12: Single Pulse Avalanche capability

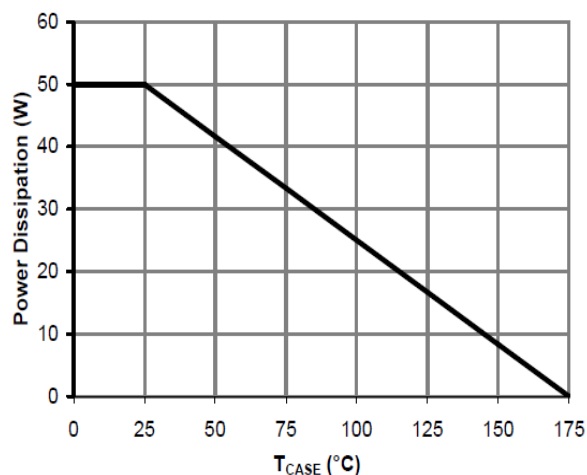


Figure 13: Power De-rating (Note B)

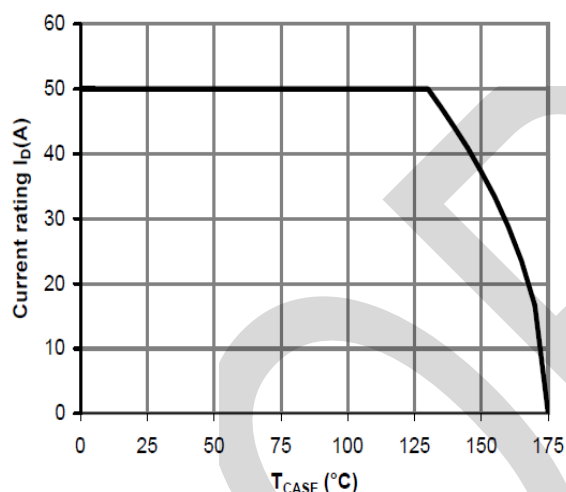


Figure 14: Current De-rating (Note B)

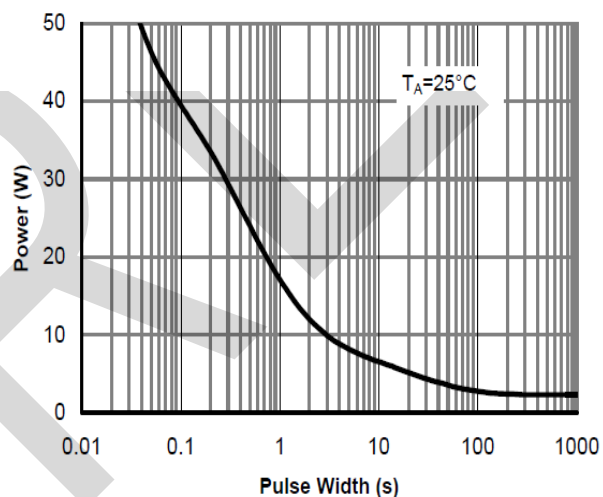
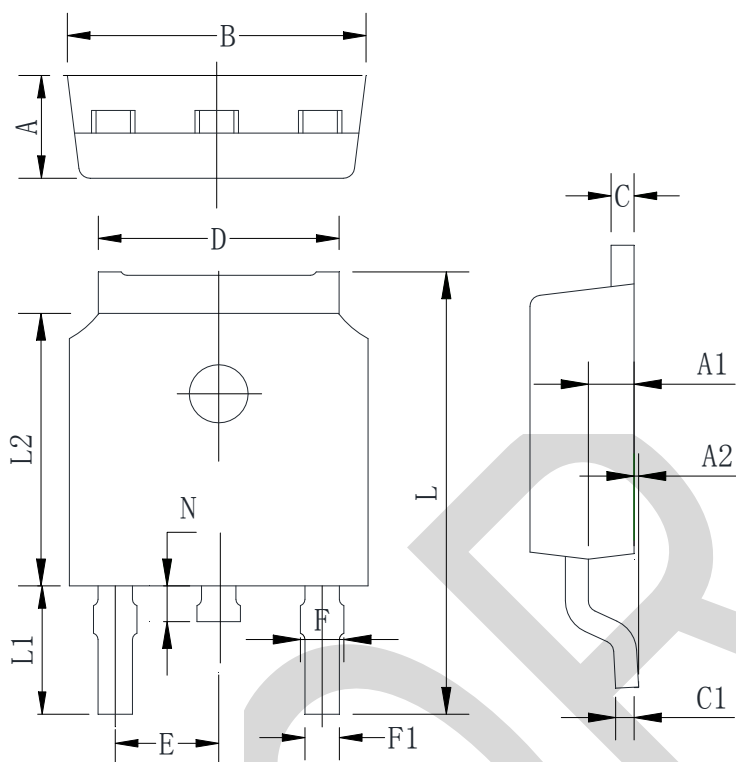


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

PACKAGE OUTLINE DIMENSIONS

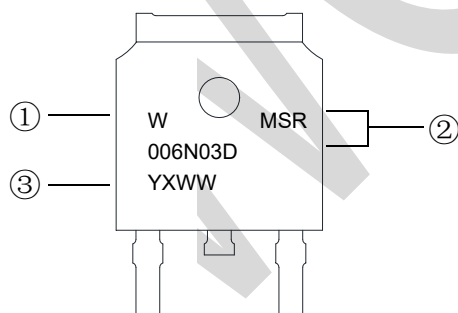
Note:unit mm

TO-252



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.910	1.010	1.110
A2	0.050	0.150	0.250
B	6.500	6.600	6.700
C	0.460	0.500	0.580
C1	0.460	0.500	0.580
D	5.120	5.320	5.520
E	2.286 TYP		
F	0.780	0.860	1.020
F1	0.660	0.760	0.860
L	9.600	10.00	10.20
L1	2.600	2.800	3.000
L2	6.000	6.100	6.200
N	0.600	6.800	1.000

Marking Information



① W : Company's trademark

② Product model : MSR006N03D

③ PDC information :

Y X WW

WW:Week code(01 to 53)

X:Internal identification code

Y:Year code(ex:0=2020)