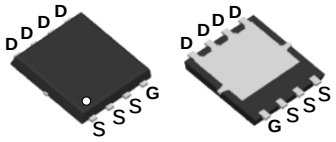
MSR3R1N03SD

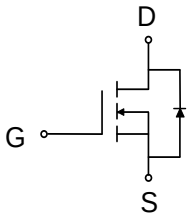
10-JUN-2023

N-Channel Advanced Trench MOSFET

MSR3R1N03SD

PDFN5x6





V_{DS}	30	V
$R_{DS(on),Typ}$@ V_{GS}=10 V	2.1	mΩ
I_D	120	A

Features

1、Low on – resistance

2、High power package (PDFN5X6)

3、Halogen free

Applications

1、Power Management Switches

2、PWM Application

3、Load Switch

Maximum ratings, at T_A =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_D	Continuous drain current ③	T_C =25°C	120	A
		T_C =100°C	78	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	360	A
EAS	Avalanche energy, single pulsed ②		342	mJ
P_D	Maximum power dissipation	T_C =25°C	68	W
T_{STG},T_J	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.83	°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,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	1.5	2.2	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=20A	--	2.1	3.1	mΩ
		V_{GS}=4.5V, I_D=15A	--	3.7	5.5	mΩ

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

C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0 V , f=1MHz	--	3833	--	pF
C_{oss}	Output Capacitance		--	437	--	pF
C_{rss}	Reverse Transfer Capacitance		--	350	--	pF
Q_g	Total Gate Charge	V_{DS}=15V, I_D=30A , V_{GS}=10V	--	72	--	nC
Q_{gs}	Gate-Source Charge		--	46	--	nC
Q_{gd}	Gate-Drain Charge		--	13	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DD}=15V, V_{GS}=10V I_D=30A, R_G=3Ω,	--	14	--	ns
Tr	Turn-on Rise Time		--	18	--	ns
Td(off)	Turn-Off Delay Time		--	40	--	ns
Tf	Turn-Off Fall Time		--	12	--	ns

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

V_{SD}	Forward on voltage	I_S=30A,V_{GS}=0V	--	--	1.2	V
I_S	Body Diode Forward Current	--	--	--	120	A
I_{SM}	Max Pulsed Drain-source diode forward current		--	--	360	A

NOTE: ① Repetitive Rating: Pulse width limited by maximum junction temperature.

② EAS Condition: L=0.5mH, VDD=30V,VG=10V Start TJ=25℃,IAS=25A

③ Pulse test: Width≤300us, Duty Cycle≤0.5%

Typical Characteristics

N- Channel Typical Characteristics

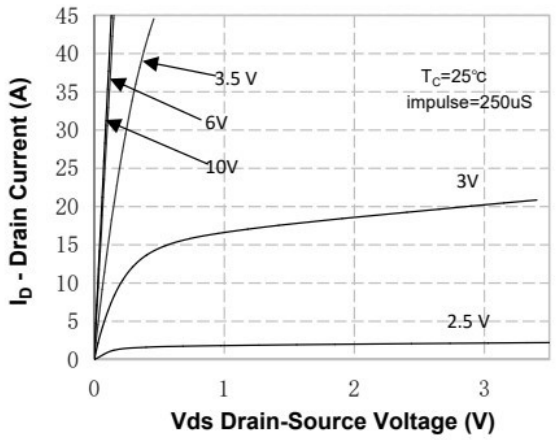


Figure 1. On-Region Characteristics

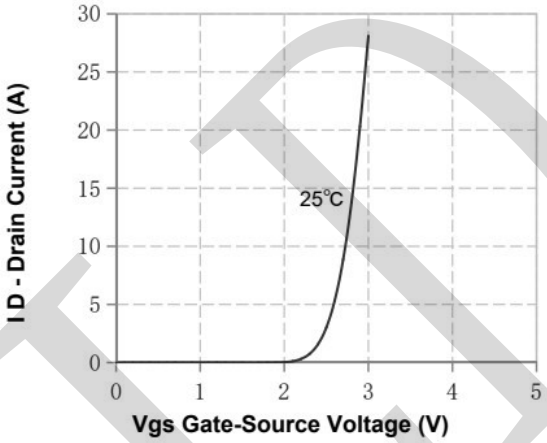


Figure 2. Transfer Characteristics

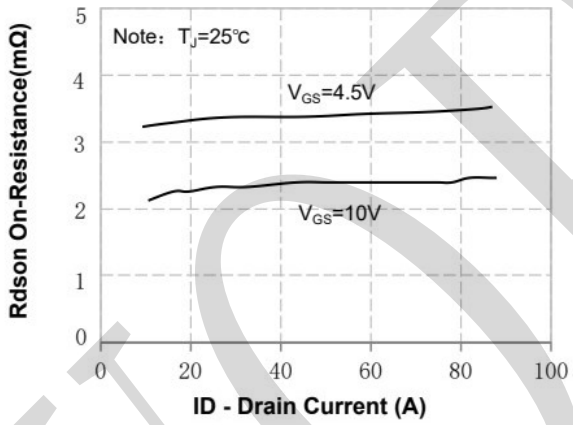


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

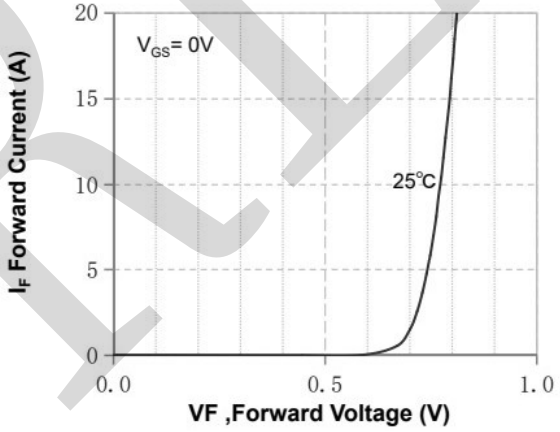


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

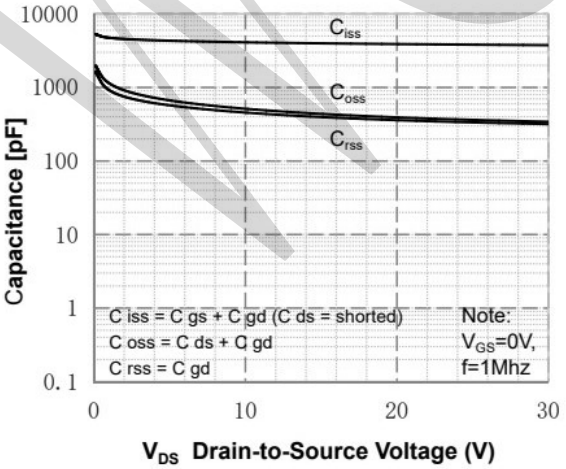


Figure 5. Capacitance Characteristics

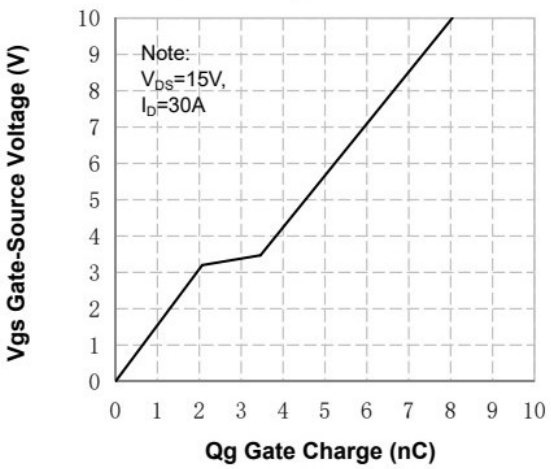


Figure 6. Gate Charge Characteristics

Typical Characteristics

N- Channel Typical Characteristics (Continued)

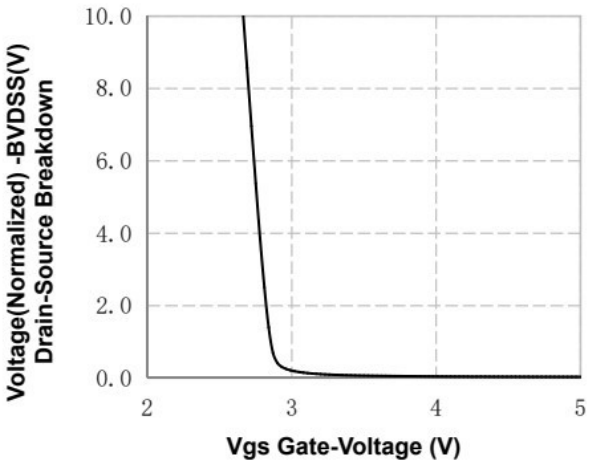


Figure 7. Breakdown Voltage Variation vs Gate-Voltage

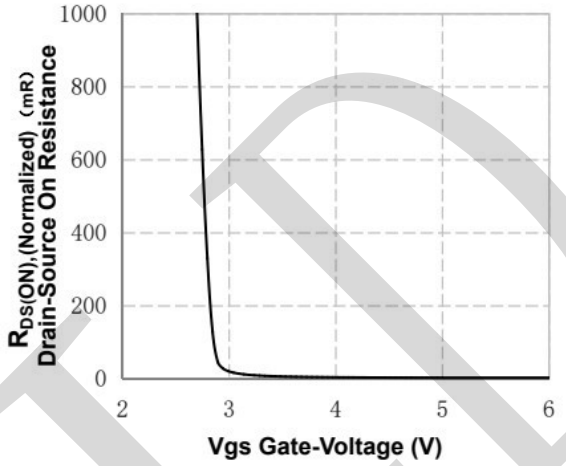


Figure 8. On-Resistance Variation vs Gate Voltage

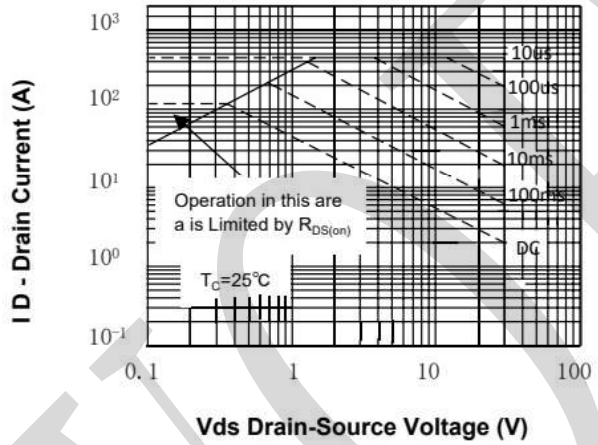


Figure 9. Maximum Safe Operating Area

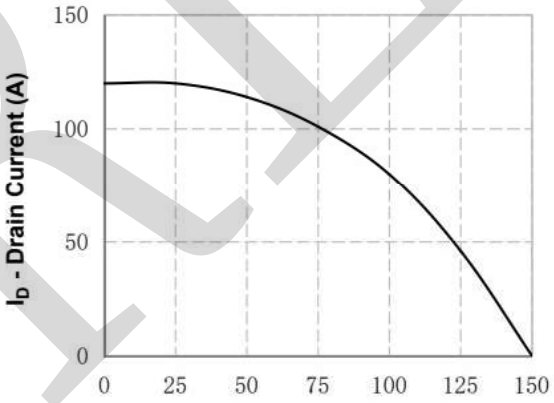


Figure 10. Maximum PContinuous Drain Currentvs Case Temperature

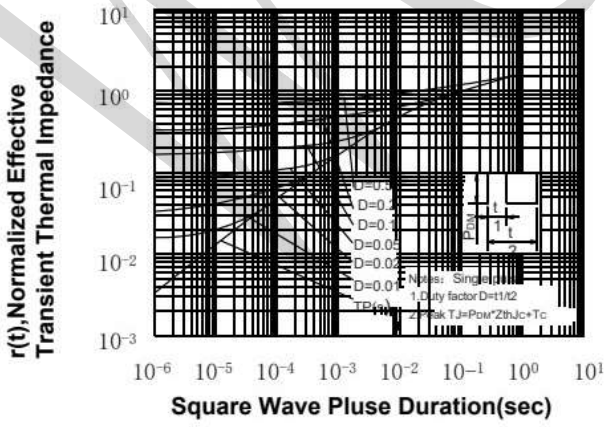
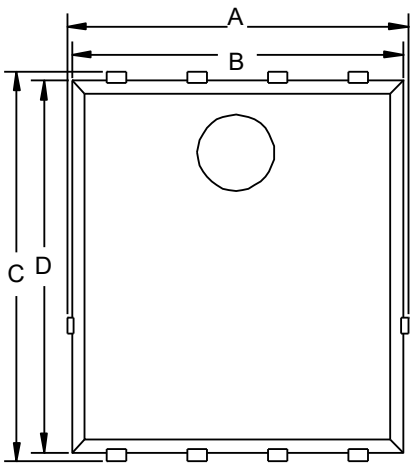
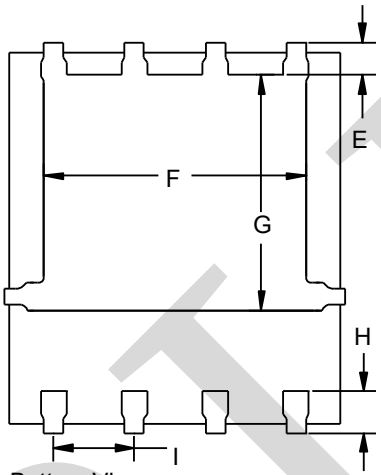


Figure 11. Transient Thermal Response Curve

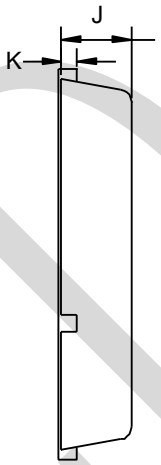
PACKAGE OUTLINE DIMENSIONS



Top View



Bottom View

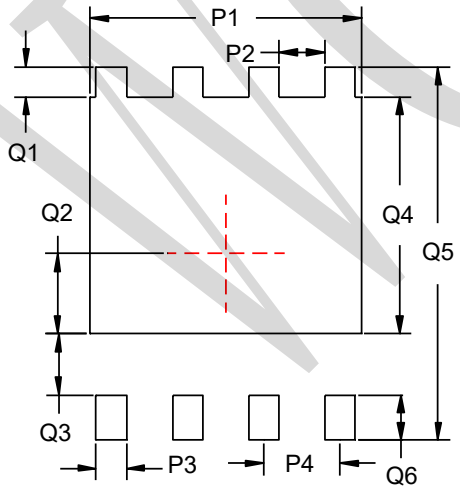


Side View

PDFN5x6 mechanical data

UNIT		A	B	C	D	E	F	G	H	I	J	K
mm	min	4.90	4.8	5.90	5.66	0.60	3.90	3.30	0.53	1.27	0.9	0.254
	max	5.55	5.4	6.35	6.06		4.32	3.92	0.76		1.2	
mil	min	192.9	188.9	232.3	222.8	23.6	153.5	129.9	20.8	50.0	35.4	10.0
	max	218.5	212.6	250.0	238.6		170.1	154.3	29.9		47.2	

PDFN5x6 Suggested Pad Layout

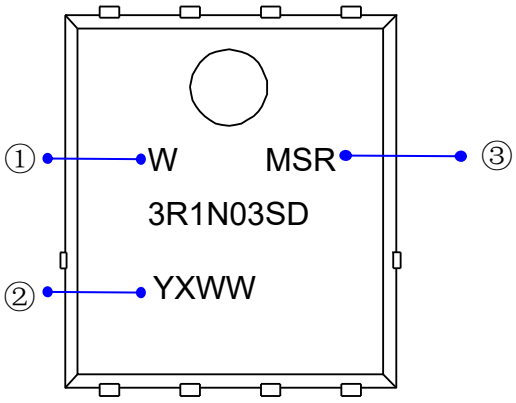


UNIT		P1	P2	P3	P4	Q1
mm	min	4.52	0.76	0.51	1.27	0.50
mil	min	177.9	29.9	20.07	50.0	20.0

UNIT		Q2	Q3	Q4	Q5	Q6
mm	min	1.34	1.02	3.97	6.25	0.76
mil	min	52.75	40.15	156.30	246.06	29.92

PACKAGE OUTLINE DIMENSIONS

Marking Information



①W : Company's trademark
②Product model : MSR3R1N03SD
③PDC information：

Y X WW

WW:Week code(01 to 53)
X:Internal identification code
Y:Year code(ex:0=2020)