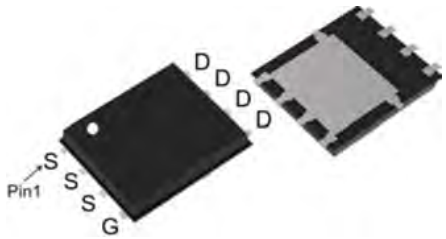
MSR2R2N04SD

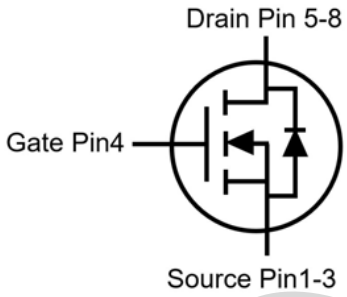
10-JUN-2019

Trench N-channel Power MOSFET

MSR2R2N04SD

PDFN5x6





V_{DS}	40	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	1.8	mΩ
I_D	130	A

Features

1、Low on – resistance

2、High power package (PDFN5X6)

3、Trench N-channel Power MOSFET

Applications

1、Load Switch for Portable Devices

2、DC/DC Converter

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		40	V
V_{GS}	Gate-Source voltage		±20	V
I_D	Continuous drain current @VGS=10V	T_C =25°C	130	A
		T_C =100°C	100	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	400	A
EAS	Avalanche energy, single pulsed ②		1190	mJ
P_D	Maximum power dissipation	T_C =25°C	130	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	0.96	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	60	°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	40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V,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	2.0	3.0	4.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=40A	--	1.8	2.2	mΩ

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

C_{iss}	Input Capacitance	V_{DS}=0V,V_{GS}=20V , f=1MHz	--	5688	--	pF
C_{oss}	Output Capacitance		--	868	--	pF
C_{rss}	Reverse Transfer Capacitance		--	503	--	pF
Rg	Gate Resistance	V_{DS}=0V,V_{GS}=0V , f=1MHz	--	4.0	--	Ω
Q_g (10V)	Total Gate Charge	V_{DS}=20V, I_D=65A , V_{GS}=10V	--	28	--	nC
Q_{gs}	Gate-Source Charge		--	8	--	nC
Q_{gd}	Gate-Drain Charge		--	4	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DD}=20V, I_D=65A, R_G=1.6Ω, V_{GS}=10V	--	8.0	--	ns
Tr	Turn-on Rise Time		--	3	--	ns
Td(off)	Turn-Off Delay Time		--	26	--	ns
Tf	Turn-Off Fall Time		--	4	--	ns

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

I_{SD}	Continuous Source Current (Body Diode)		--	--	130	A
V_{SD}	Forward on voltage	I_{SD}=65A,V_{GS}=0V	--	--	1.2	V
Trr	Reverse Recovery Time	I_F=Is, di/dt=100A/μs	--	--	23	ns
Qrr	Reverse Recovery Charge		--	--	62	nC

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

② EAS condition : TJ=25℃, VDD=24V, VG=10V, L=0.5mH, Rg=25Ω, IAS=46A

③ Guaranteed by design, not subject to production

Typical Characteristics

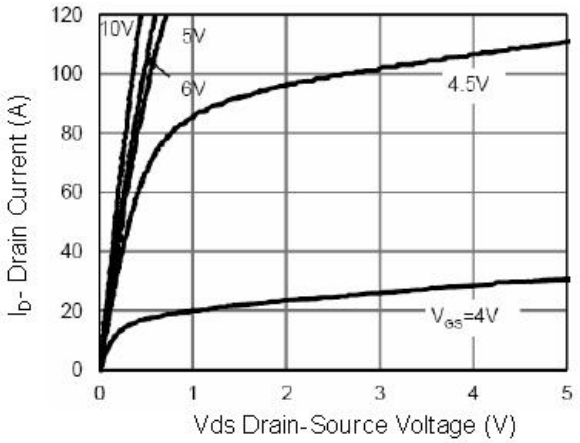


Figure 1 Output Characteristics

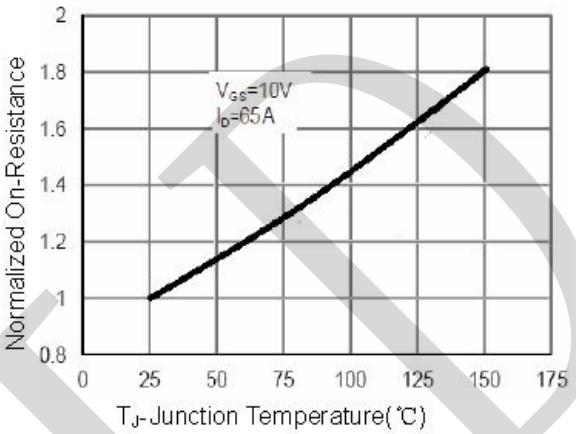


Figure 4 Rdson-JunctionTemperature

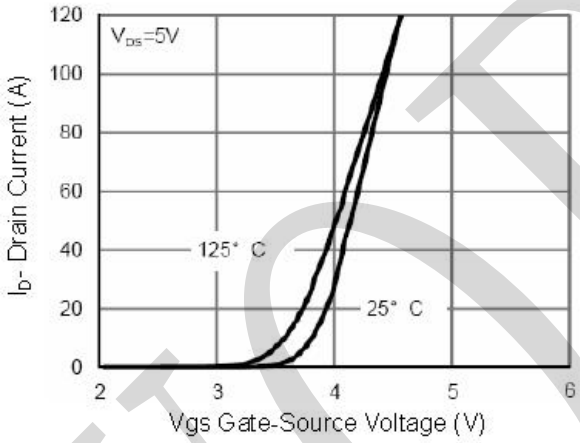


Figure 2 Transfer Characteristics

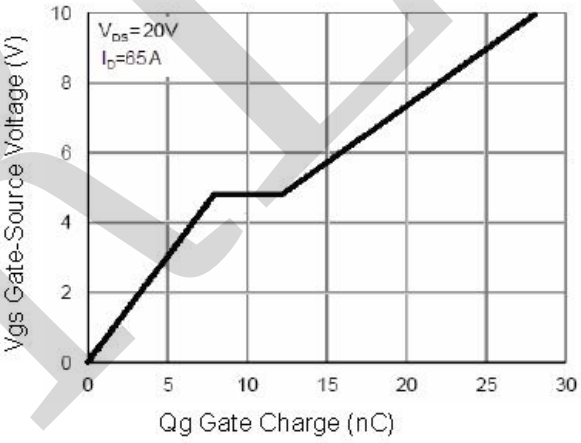


Figure 5 Gate Charge

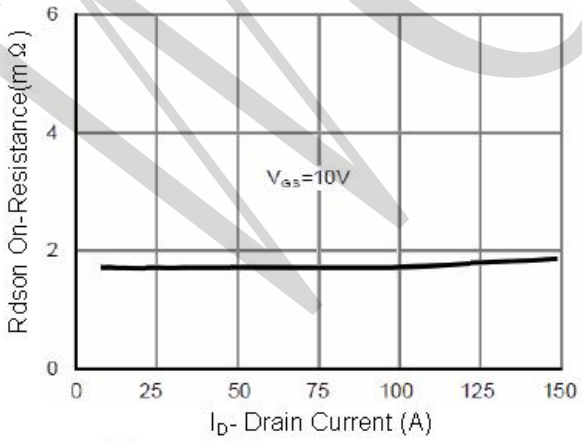


Figure 3 Rdson- Drain Current

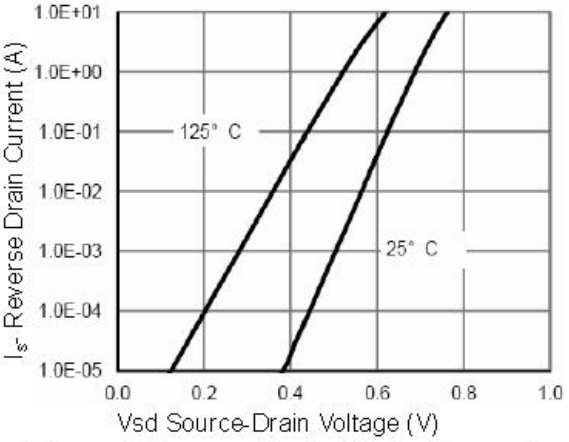


Figure 6 Source- Drain Diode Forward

Typical Characteristics

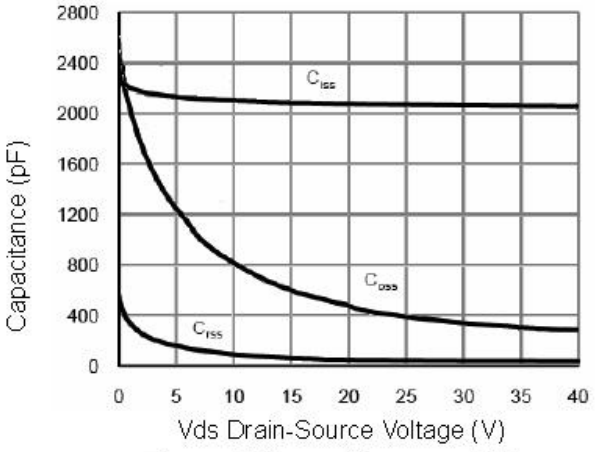


Figure 7 Capacitance vs Vds

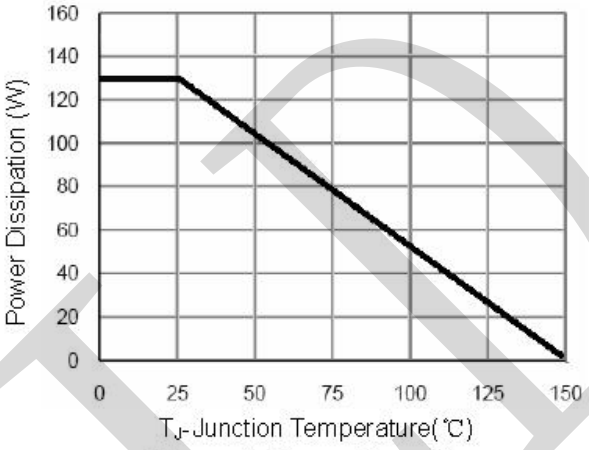


Figure 9 Power De-rating

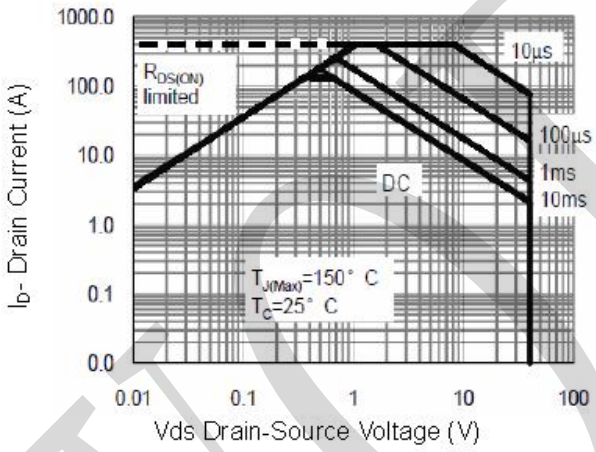


Figure 8 Safe Operation Area

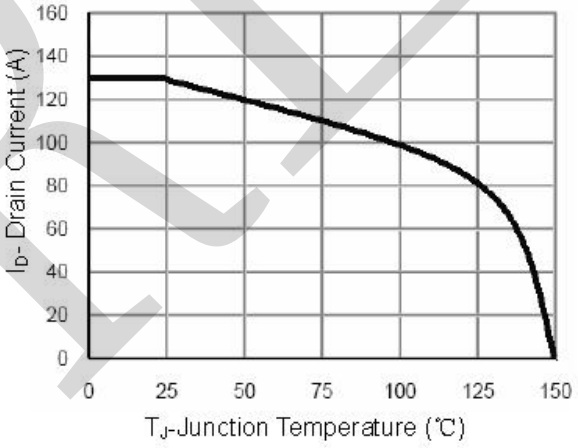


Figure 10 Current De-rating

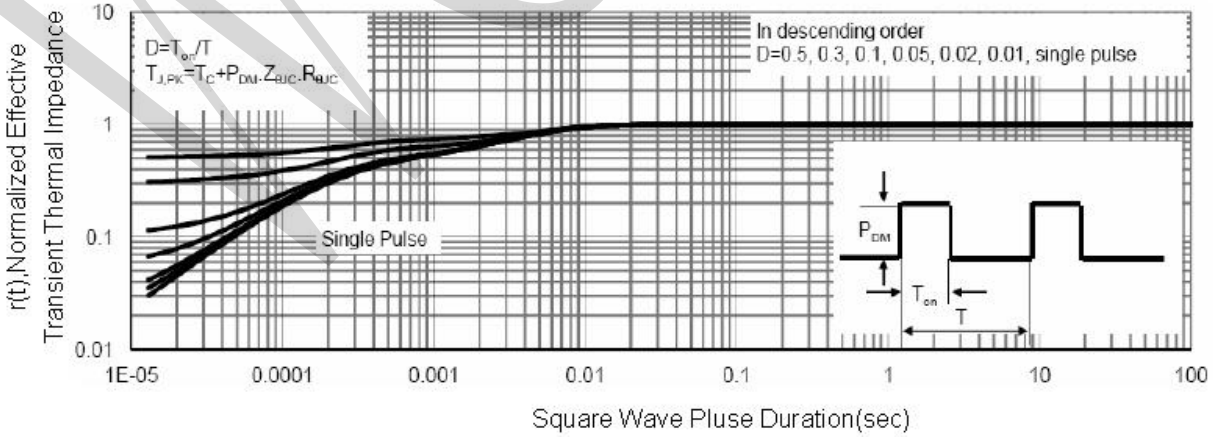
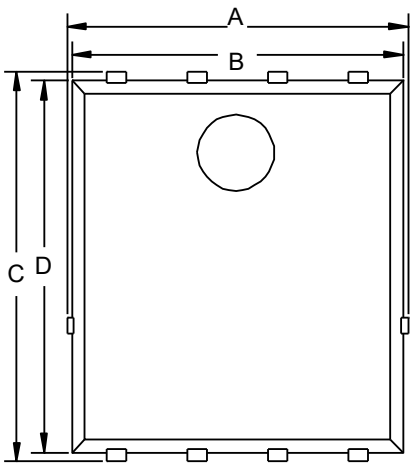
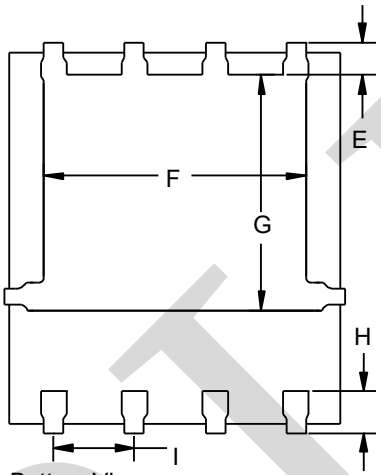


Figure 11 Normalized Maximum Transient Thermal Impedance

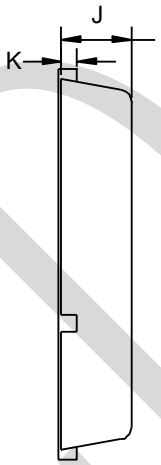
PACKAGE OUTLINE DIMENSIONS



Top View



Bottom View

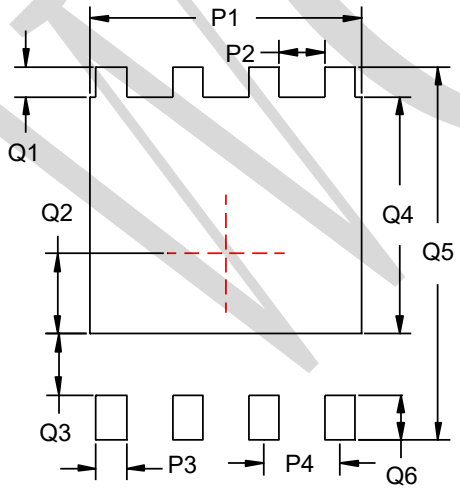


Side View

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