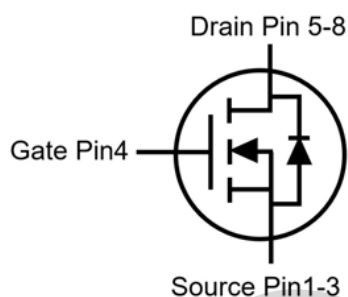
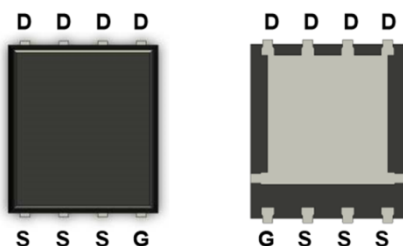


Trench N-channel Power MOSFET

MSR2R4N03SD PDFN5x6



V_{DS}	30	V
$R_{DS(on),TYP@ V_{GS}=10V}$	1.95	mΩ
I_D	180	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 $T_A = 25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter		Rating	Unit
V(BR)DSS	Drain-Source breakdown voltage		30	V
VGS	Gate-Source voltage		±20	V
ID	Continuous drain current @VGS=10V	T _C =25°C	180	A
		T _C =100°C	117	A
IDM	Pulse drain current tested ①	T _C =25°C	720	A
EAS	Avalanche energy, single pulsed ②		324	mJ
PD	Maximum power dissipation	T _C =25°C	130	W
TSTG,TJ	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Rating	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	1.15	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	65	°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} =30V, V _{GS} =0V T _j =25°C T _j =125°C	-- --	-- --	1 500	μA 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	2.5	V
R _{DS(on)}	Drain-Source On-State Resistance ④	V _{GS} =10V, I _D =30A	--	1.95	2.4	mΩ
g _{fs}	Forward Transconductance	V _{DS} = 5V, I _D = 30A	--	80	--	S

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

C _{iss}	Input Capacitance	V _{DS} =0V, V _{GS} =15V , f=1MHz	--	4930	--	pF
C _{oss}	Output Capacitance		--	682	--	pF
C _{rss}	Reverse Transfer Capacitance		--	566	--	pF
R _G	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	1.5	-	Ω
Q _g (10V)	Total Gate Charge	V _{DS} =15V, I _D =30A , V _{GS} =10V	--	70	--	nC
Q _{gs}	Gate-Source Charge		--	10	--	nC
Q _{gd}	Gate-Drain Charge		--	15	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	T _J =25°C, V _{DS} =15V, V _{GS} =10V, R _L =3.0Ω	--	10	--	ns
Tr	Turn-on Rise Time		--	6.5	--	ns
Td(off)	Turn-Off Delay Time		--	75	--	ns
Tf	Turn-Off Fall Time		--	18	--	ns

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

VSD	Forward on voltage	I _{SD} =50A, V _{GS} =0V	--	--	1.2	V
Trr	Reverse Recovery Time	I _F =20A, di/dt=500A/μs	--	30	--	ns
Qrr	Reverse Recovery Charge		--	15	--	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_{θJA} and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 380μs; duty cycle ≤ 2%.

Typical Characteristics

Figure1: Output Characteristics

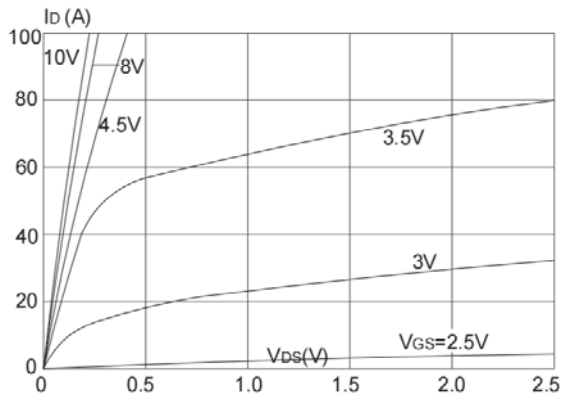


Figure 2: Typical Transfer Characteristics

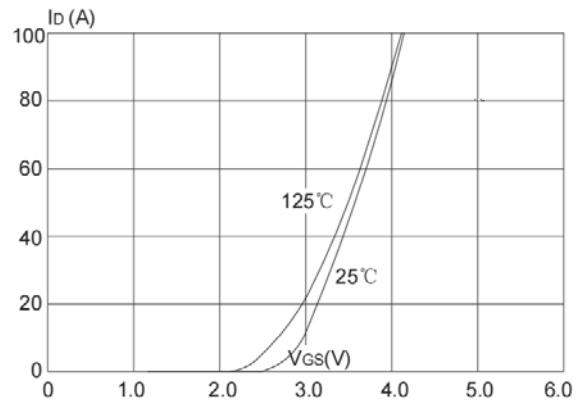


Figure 3: On-resistance vs. Drain Current

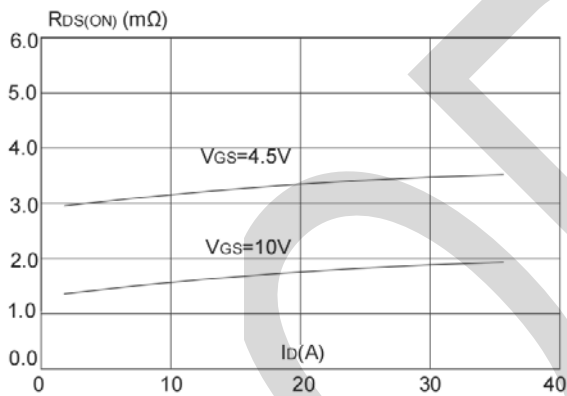


Figure 4: Body Diode Characteristics

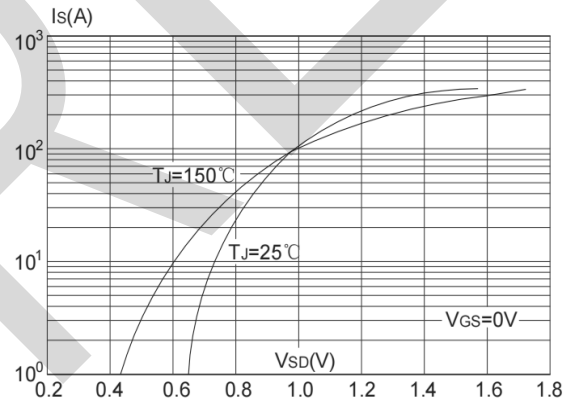


Figure 5: Gate Charge Characteristics

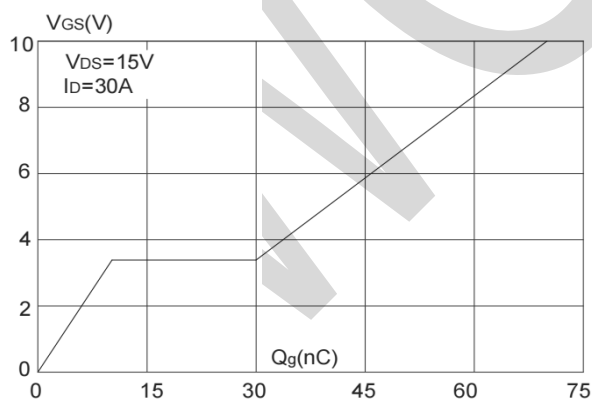
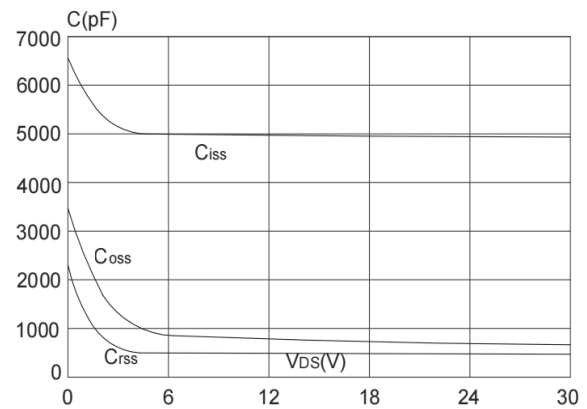


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

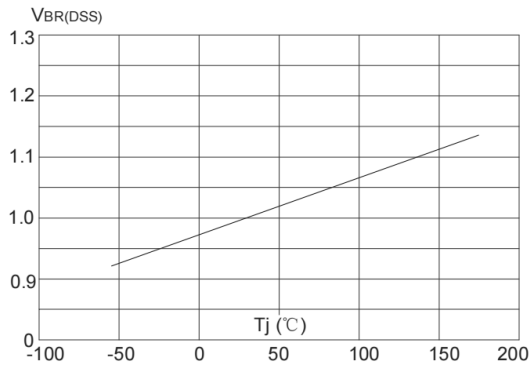


Figure 8: Normalized on Resistance vs. Junction Temperature

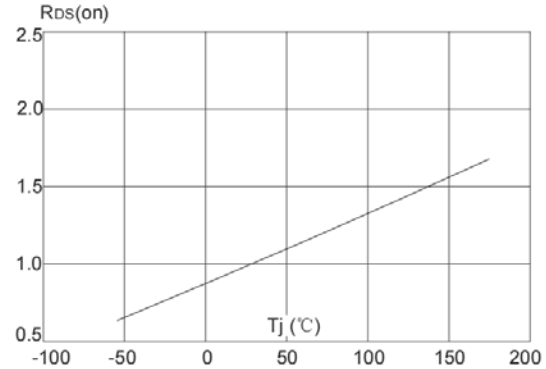


Figure 9: Maximum Safe Operating Area

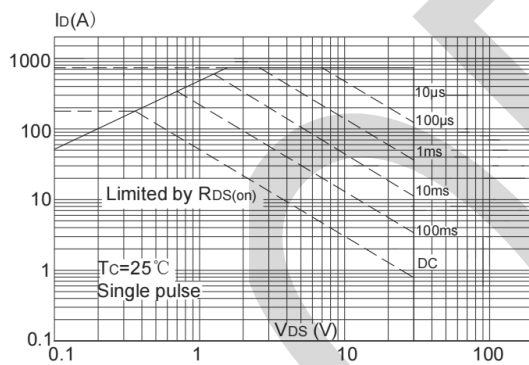


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

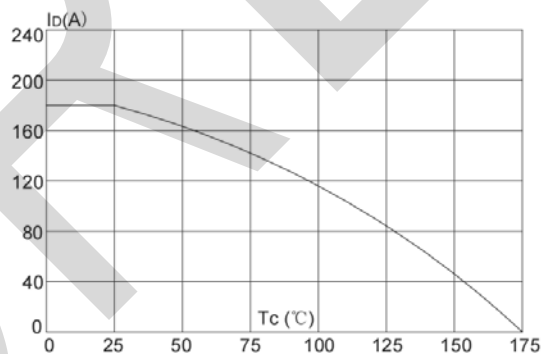
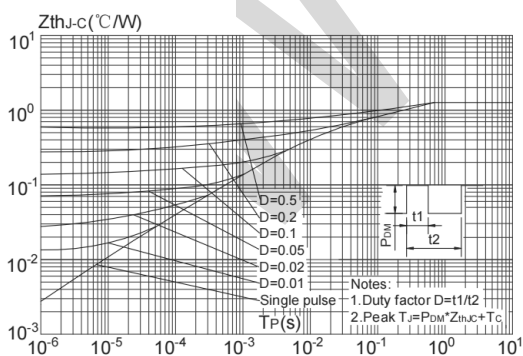
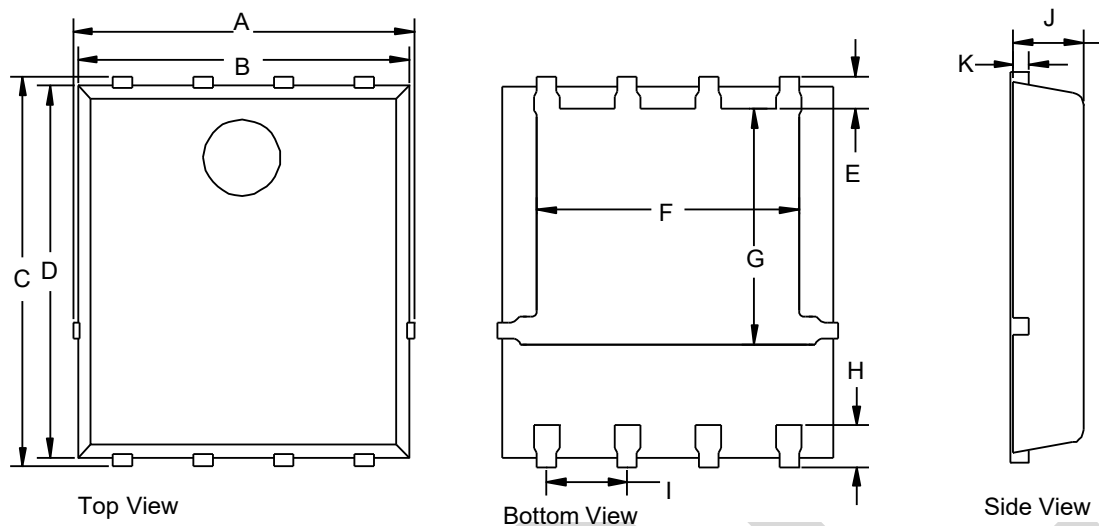


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



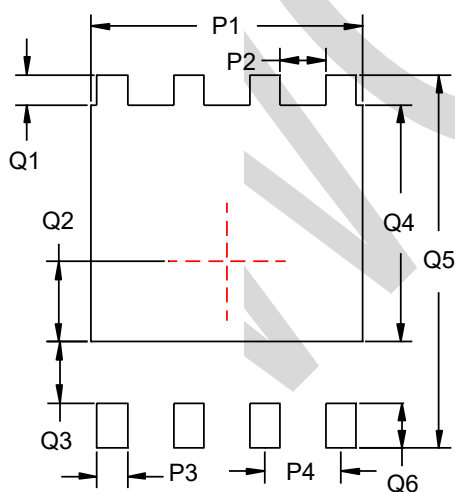
PACKAGE OUTLINE DIMENSIONS



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