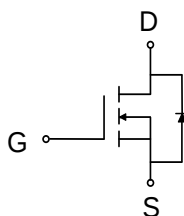
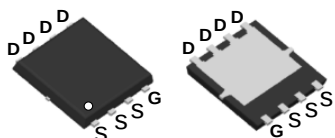


N-Channel Advanced Trench MOSFET

MSR005N04SD

PDFN5x6



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		40	V
V_{GS}	Gate-Source voltage		± 20	V
I_D	Continuous drain current	$T_C = 25^\circ\text{C}$	80	A
		$T_C = 100^\circ\text{C}$	50	A
I_{DM}	Pulse drain current tested ①		320	A
E_{AS}	Avalanche energy, single pulsed ②		156	mJ
P_D	Power dissipation	$T_C = 25^\circ\text{C}$	56	W
T_{STG}, T_J	Storage and Junction Temperature Range		-55 to 150	$^\circ\text{C}$

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

② EAS condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 20\text{V}$, $V_G = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 0.5\text{mH}$, $I_{AS} = 25\text{A}$

Thermal Characteristics

Symbol	Parameter	Rating	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	2.5	°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	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	1.1	1.6	2.1	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A	--	4.0	5.0	mΩ
		V _{GS} =4.5V, I _D =15A	--	5.8	6.8	mΩ

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

C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0 V , f=1MHz	--	3775	--	pF
C _{oss}	Output Capacitance		--	264	--	pF
C _{rss}	Reverse Transfer Capacitance		--	221	--	pF
Q _g	Total Gate Charge	V _{DS} =20V, I _D =30A , V _{GS} =0 to 10V	--	72	--	nC
Q _{gs}	Gate-Source Charge		--	16	--	nC
Q _{gd}	Gate-Drain Charge		--	17	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V _{DS} =20V, V _{GS} =10V I _D =30A, R _G =3Ω	--	13	--	ns
Tr	Turn-on Rise Time		--	28	--	ns
Td(off)	Turn-Off Delay Time		--	61	--	ns
Tf	Turn-Off Fall Time		--	15	--	ns

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

VSD	Forward on voltage	I _{SD} =30A, V _{GS} =0V	--	--	1.2	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	--	16	--	ns
Q _{rr}	Body Diode Reverse Recovery Charge		--	10	--	nC

Typical Characteristics

Figure 1: Output Characteristics

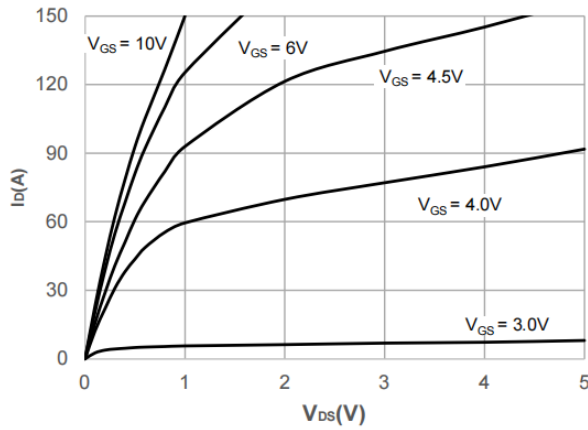


Figure 2: Typical Transfer Characteristics

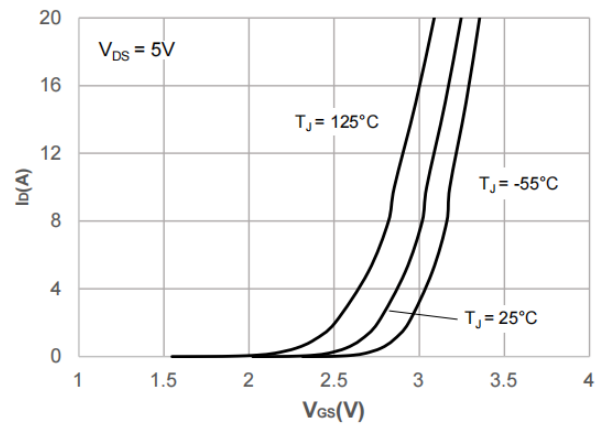


Figure 3: On-resistance vs. Drain Current

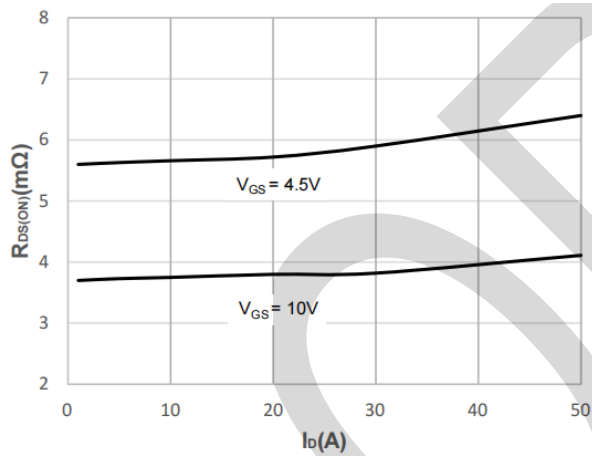


Figure 4: Body Diode Characteristics

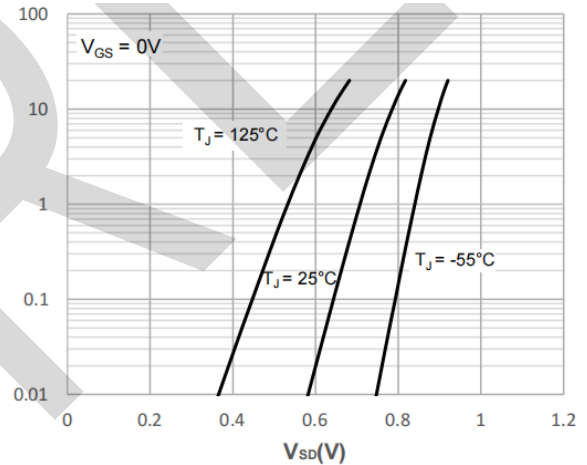


Figure 5: Gate Charge Characteristics

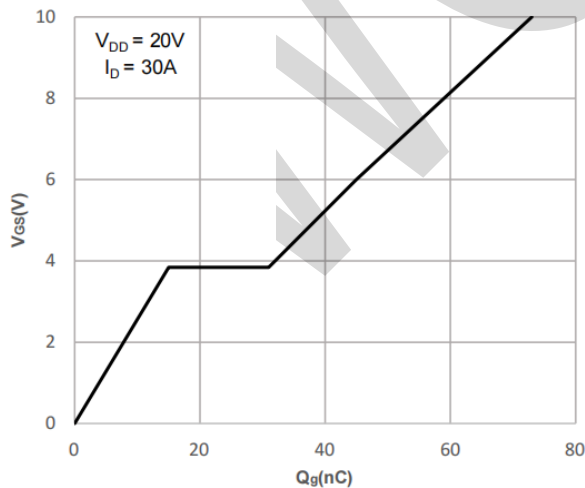
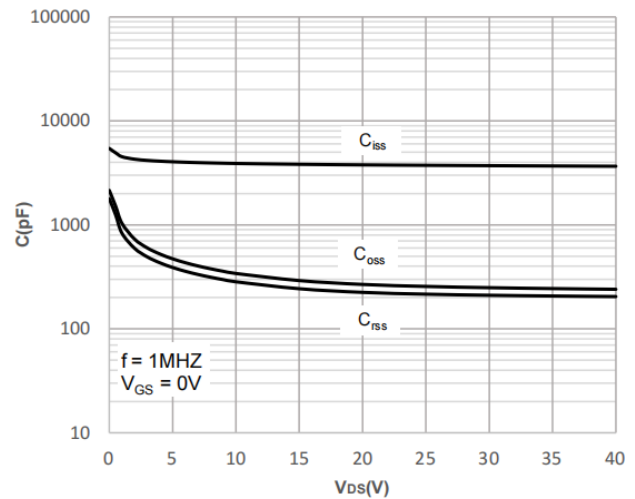


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

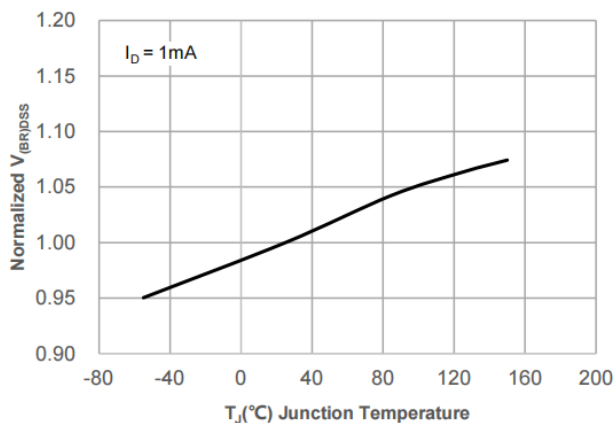


Figure 8: Normalized on Resistance vs. Junction Temperature

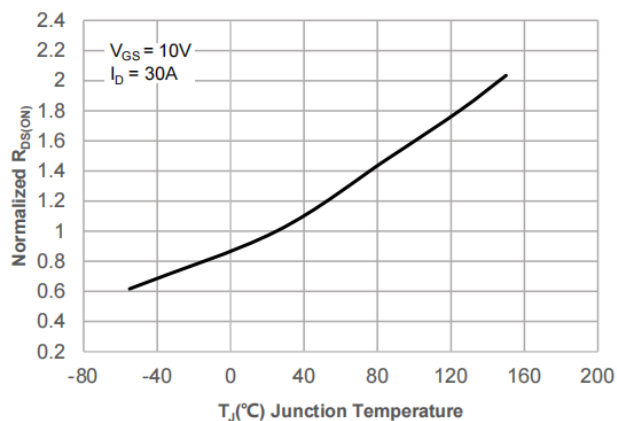


Figure 9: Maximum Safe Operating Area

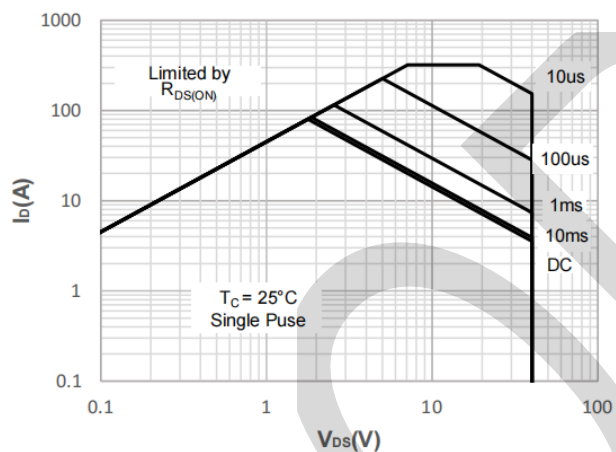


Figure 10: Maximum Continuous Driian Current vs. Case Temperature

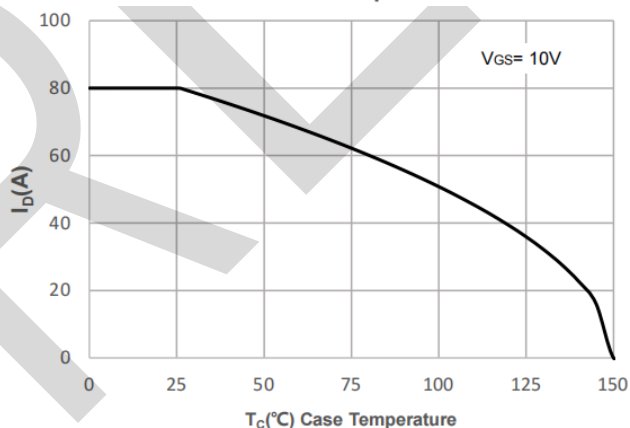


Figure 11: Normalized Maximum Transient Thermal Impedance

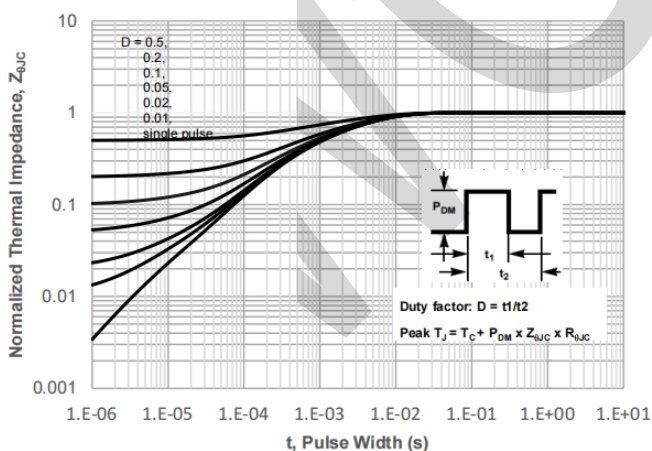
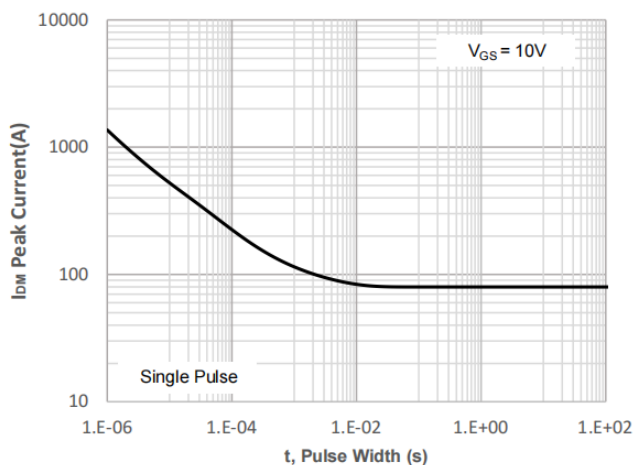
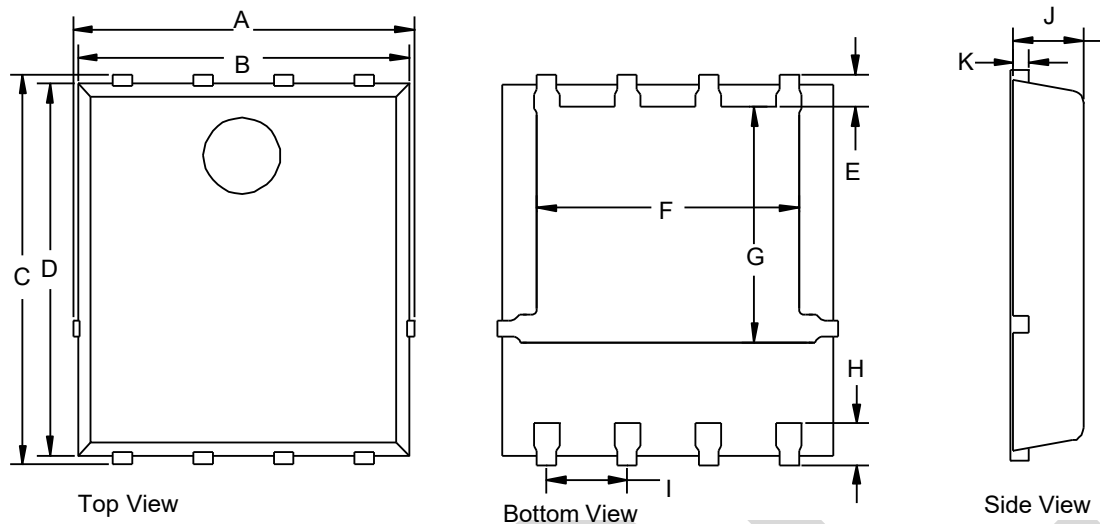


Figure 12: Peak Current Capacity



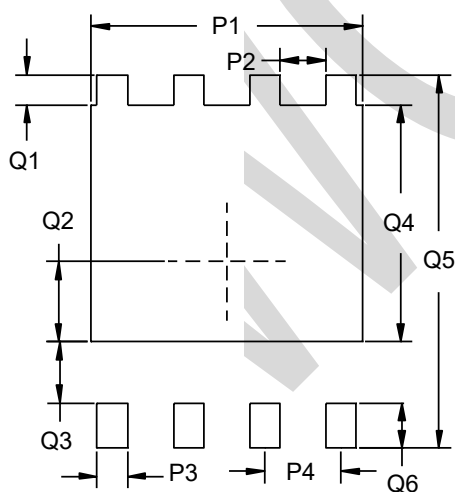
PACKAGE OUTLINE DIMENSIONS



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

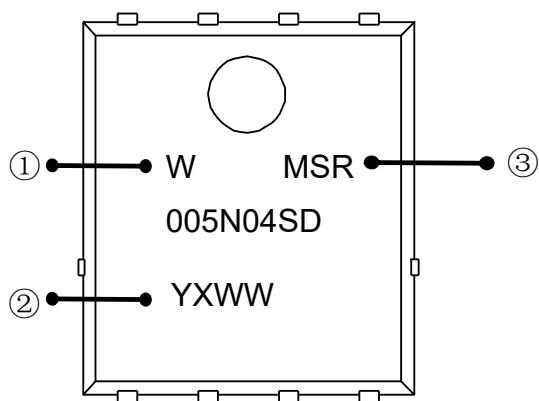


UNIT		P1	P2	P3	P4	Q1
mm	min	4.52	0.76	0.51	1.27	0.50
mil	min	177.9	29.9	20.07	50.0	20.0

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

PACKAGE OUTLINE DIMENSIONS

Marking Information



①W : Company's trademark

②Product model : MSR005N04SD

③PDC information:

Y X WW

WW:Week code(01 to 53)

X:Internal identification code

Y:Year code(ex:0=2020)