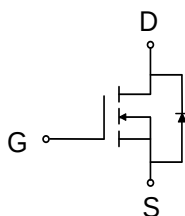
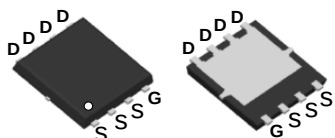


SGT N-Channel Power MOSFET

MTR1R4N03SD

PDFN5x6



Features

- Low on-resistance($R_{DS(on)}$)
- Low C_{rss}
- Fast switching
- Pb-free lead plating; RoHS compliant

Applications

- Synchronous Rectification for AC-DC Quick Charger
- DC/DC in Telecoms and Industrial
- Hard Switching and High Speed Circuit

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°C	178	A
		T _C =100°C	110	A
I _{DM}	Pulse drain current tested ①	T _C =25°C	485	A
E _{AS}	Avalanche energy, single pulsed ②		101	mJ
P _D	Maximum power dissipation	T _C =25°C	78	W
T _{STG} , T _J	Storage and Junction Temperature Range		-55 to 150	°C

NOTE: ① This single-pulse measurement was taken under $T_{J_Max} = 150^\circ\text{C}$

② This Single-pulse measurement was taken under the following condition [$L = 100\mu\text{H}$, $V_{GS} = 10\text{V}$, $V_{DS} = 30\text{V}$] while its value is limited by $T_{J_Max} = 150^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Rating	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	1.2	°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	--	--	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	1.2	--	2.5	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A	--	1.1	1.4	mΩ
		V _{GS} =4.5V, I _D =15A	--	2.1	2.8	mΩ

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

C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0 V , f=1MHz	--	2975	--	pF
C _{oss}	Output Capacitance		--	2650	--	pF
C _{rss}	Reverse Transfer Capacitance		--	117	--	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =20A , V _{GS} =10V	--	39	--	nC
Q _{gs}	Gate-Source Charge		--	8.6	--	nC
Q _{gd}	Gate-Drain Charge		--	5.0	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V _{DS} =15V, V _{GS} =10V R _L =0.75Ω, R _G =3Ω	--	6	--	ns
Tr	Turn-on Rise Time		--	9	--	ns
Td(off)	Turn-Off Delay Time		--	26	--	ns
Tf	Turn-Off Fall Time		--	10	--	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	--	--	--	78	A
T _{RR}	Body Diode Reverse Recovery Time	I _F =20A, dI _F /dt =100A/μs	--	51	--	ns
T _{RR}	Body Diode Reverse Recovery Charge		--	57	--	nC

Typical Electrical & Thermal Characteristics

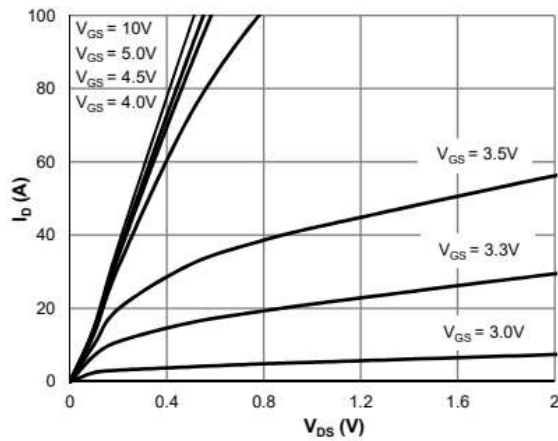


Figure 1: Saturation Characteristics

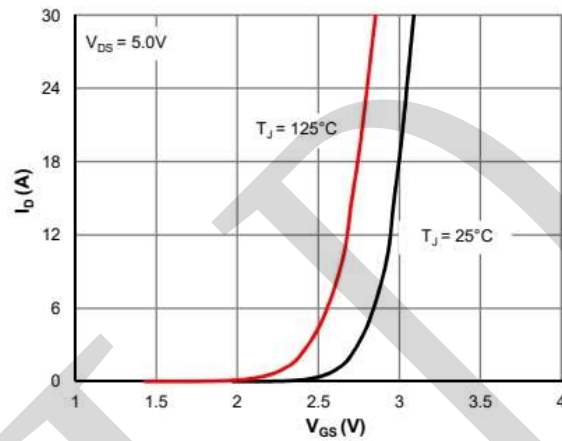


Figure 2: Transfer Characteristics

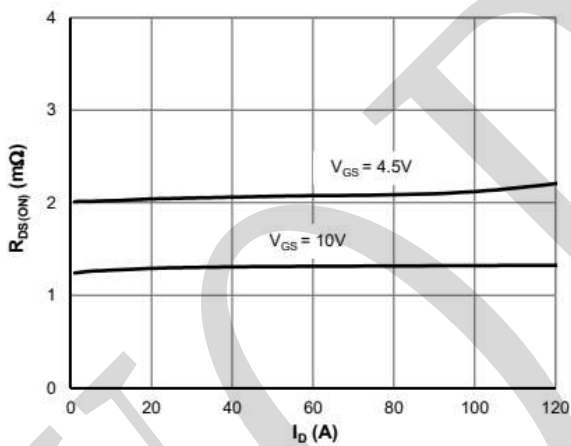


Figure 3: $R_{DS(ON)}$ vs. Drain Current

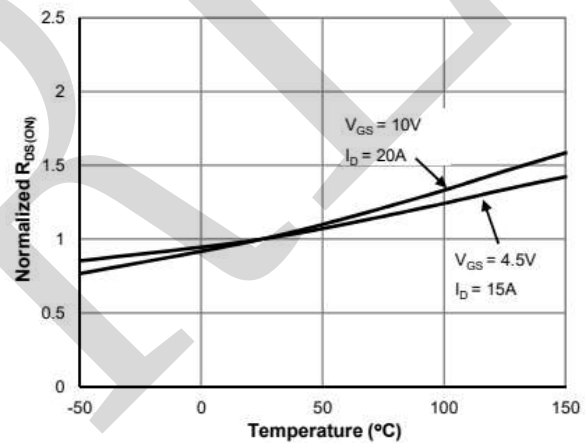


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

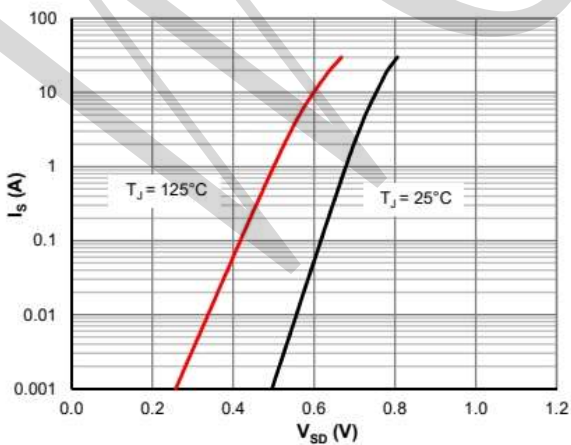


Figure 5: Body-Diode Characteristics

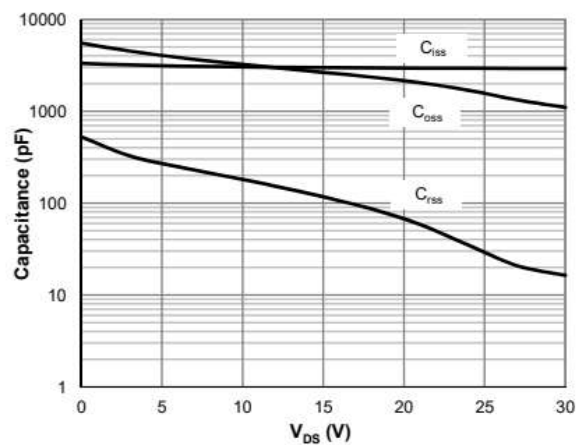


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

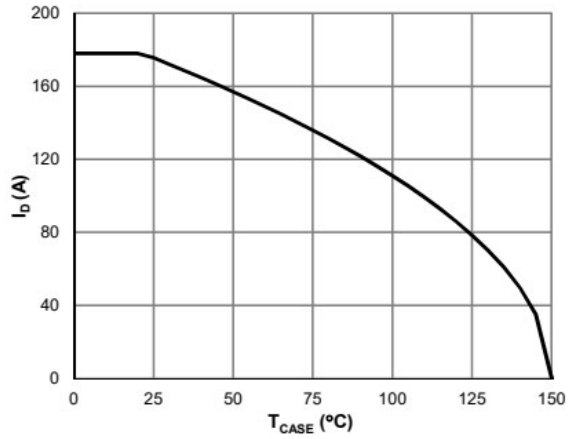


Figure 7: Current De-rating

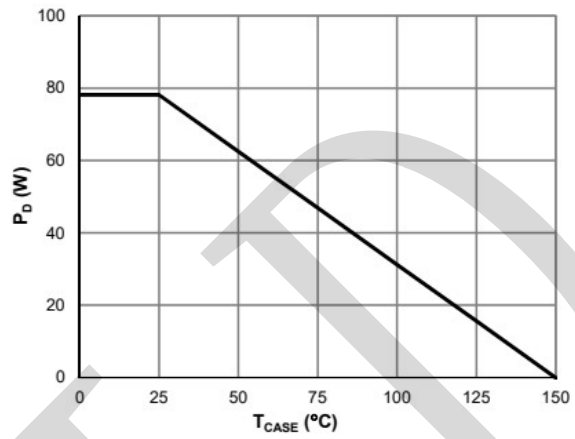


Figure 8: Power De-rating

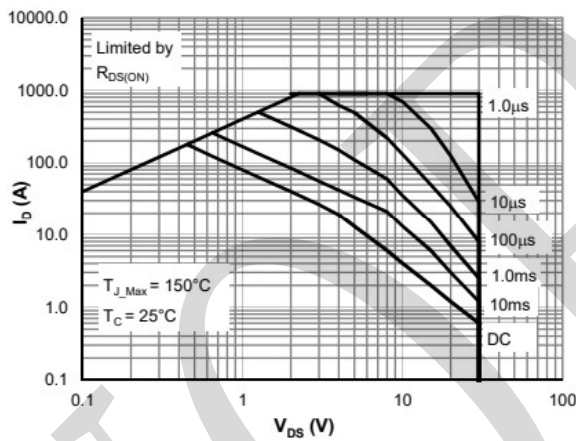


Figure 9: Maximum Safe Operating Area

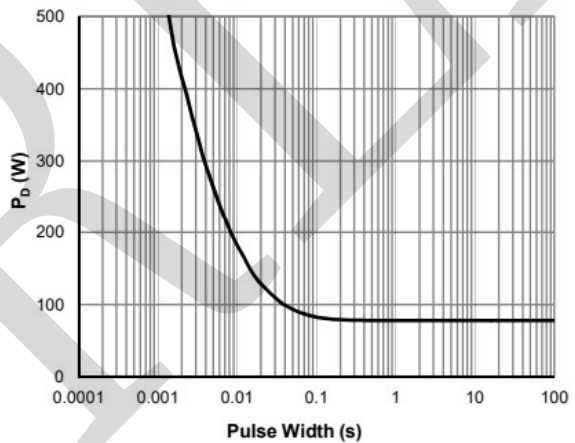


Figure 10: Single Pulse Power Rating, Junction-to-Case

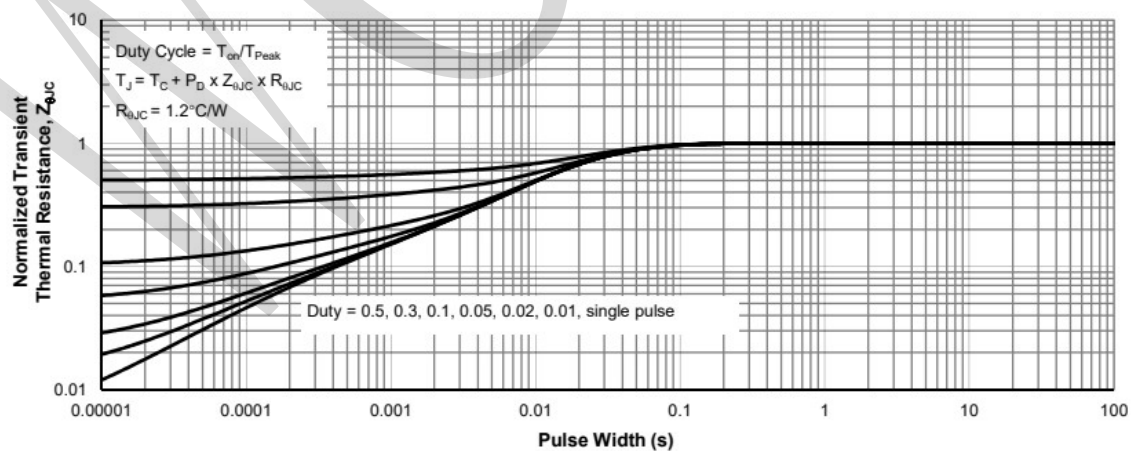
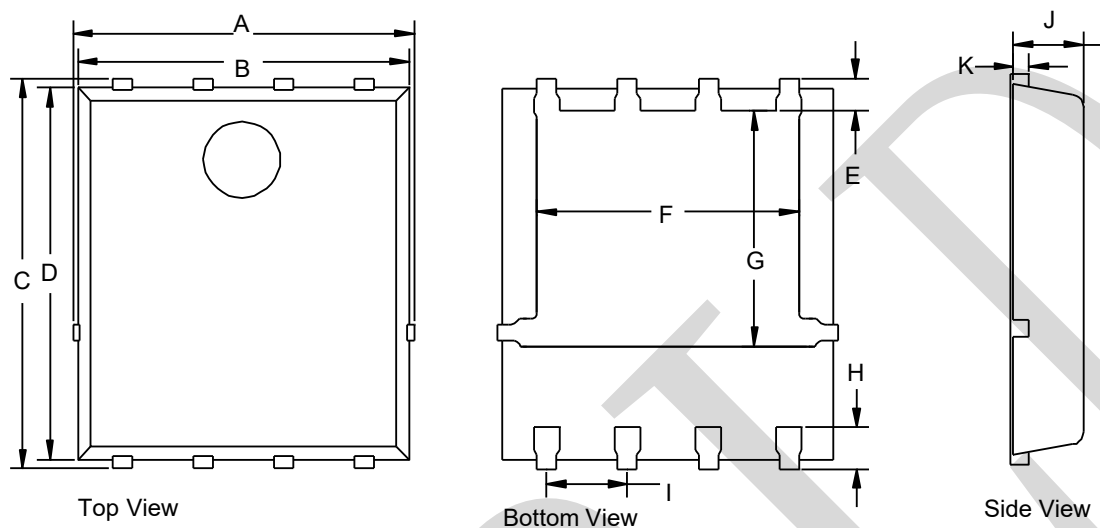


Figure 11: Normalized Maximum Transient Thermal Impedance

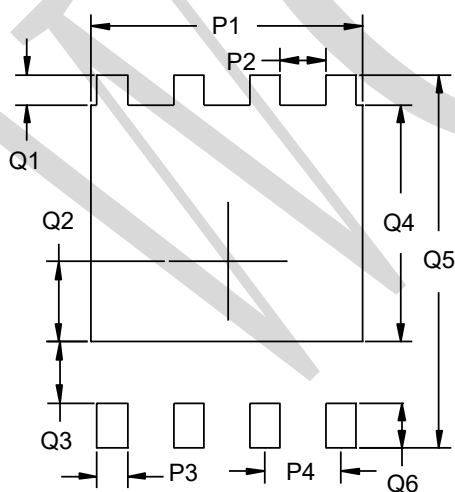
PACKAGE OUTLINE DIMENSIONS



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

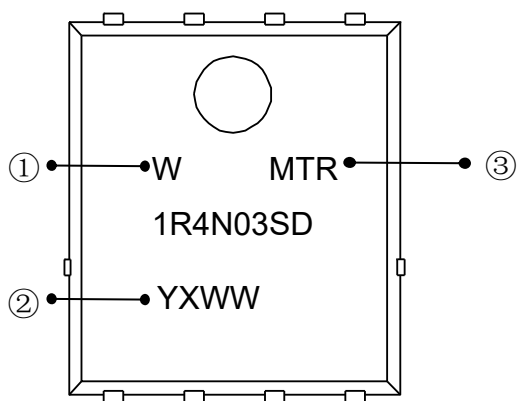


UNIT		P1	P2	P3	P4	Q1
mm	min	4.52	0.76	0.51	1.27	0.50
mil	min	177.9	29.9	20.07	50.0	20.0

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 : MTR1R4N03SD

③PDC information:

Y X WW

WW:Week code(01 to 53)

X:Internal identification code

Y:Year code(ex:0=2020)