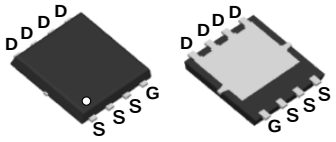
MTR5R2N10SD

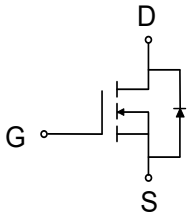
10-Jun-2024

SGT N-Channel Power MOSFET

MTR5R2N10SD

PDFN5x6





Features

- Low on-resistance
- Low Crss, Fast switching
- Pb-free lead plating; RoHS compliant

Applications

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

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		100	V
V_{GS}	Gate-Source voltage		±20	V
I_D	Continuous drain current	T_C =25°C	109	A
		T_C =100°C	69	A
I_{DM}	Pulse drain current tested	T_C =25°C	437	A
EAS	Avalanche energy, single pulsed[1]		166	mJ
P_D	Maximum power dissipation	T_C =25°C	125	W
T_{STG},T_J	Storage and Junction Temperature Range		-55 to 150	°C

Notes:1.V_{DS}=50V,V_{GS}=10V,L=0.3mH

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.0	°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	100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V,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	1.3	--	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=40A	--	4.5	5.2	mΩ
g_{fs}	Transconductance	V_{DS}=5V, I_D=40A	--	88	--	S

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

C_{iss}	Input Capacitance	V_{DS}=50V,V_{GS}=0 V , f=1MHz	--	2600	--	pF
C_{oss}	Output Capacitance		--	430	--	pF
C_{rss}	Reverse Transfer Capacitance		--	19	--	pF
Q_g	Total Gate Charge	V_{DS}=50V, I_D=40A , V_{GS}=10V	--	60	--	nC
Q_{gs}	Gate-Source Charge		--	10	--	nC
Q_{gd}	Gate-Drain Charge		--	17	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DD}=50V, V_{GS}=10V I_D=40A, R_G=3.0Ω	--	14	--	ns
Tr	Turn-on Rise Time		--	74.3	--	ns
Td(off)	Turn-Off Delay Time		--	42	--	ns
Tf	Turn-Off Fall Time		--	110	--	ns

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

V_{SD}	Forward on voltage	I_F=40A,V_{GS}=0V	--	--	1.1	V
t_{rr}	Body Diode Reverse Recovery Time	IF=40A, dI/dt=100A/us	--	52	--	ns
Q_{rr}	Body Diode Reverse Recovery Charge	IF=40A, dI/dt=100A/us	--	21	--	nC

Typical Characteristics

Fig 1: Output Characteristics

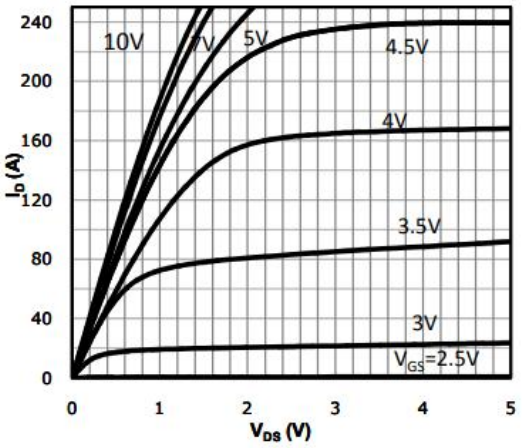


Fig 2: Transfer Characteristics

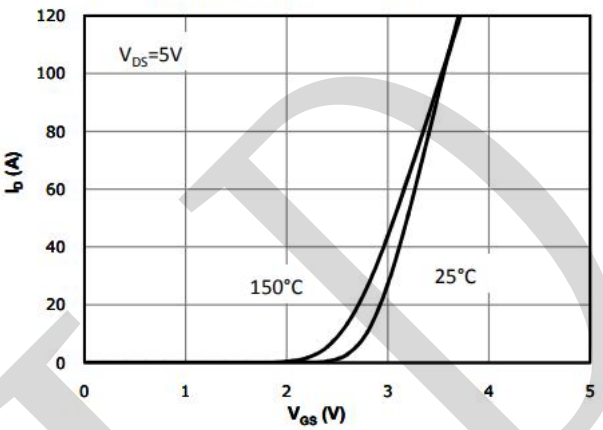


Fig 3: Rds(on) vs Drain Current and Gate Voltage

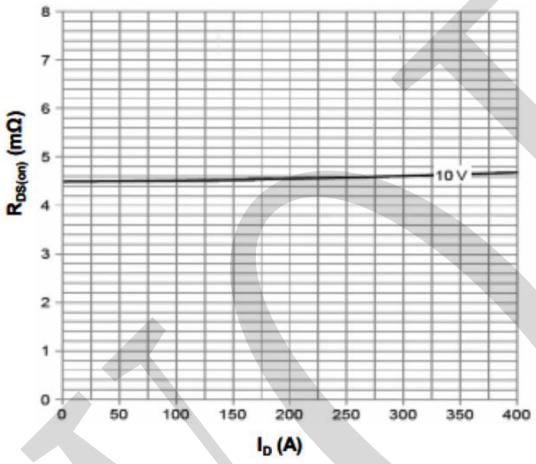


Fig 4: Rds(on) vs Gate Voltage

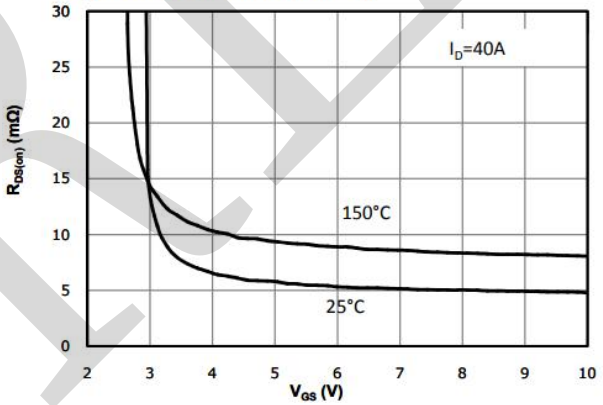


Fig 5: Rds(on) vs. Temperature

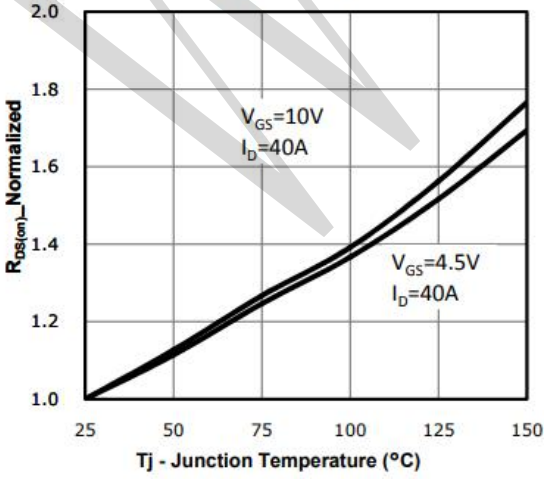
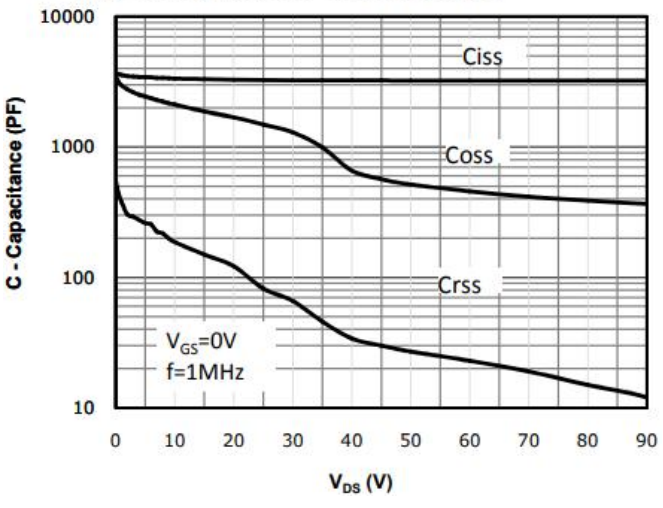


Fig 6: Capacitance Characteristics



Typical Characteristics

Fig 7: Gate Charge Characteristics

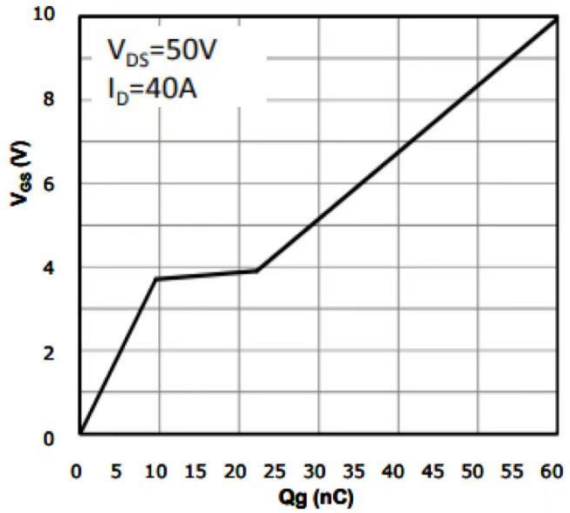


Fig 8: Body-diode Forward Characteristics

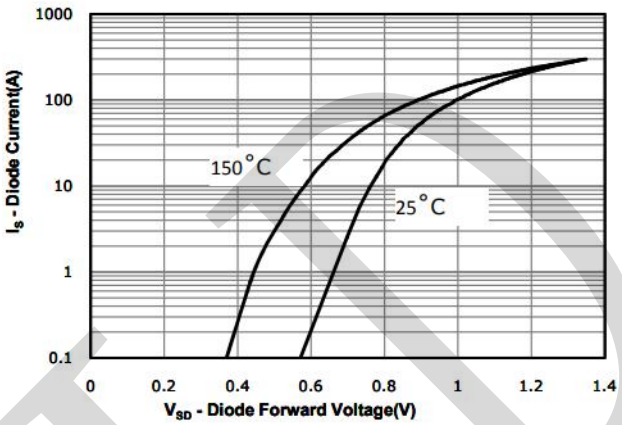


Fig 9: Power Dissipation

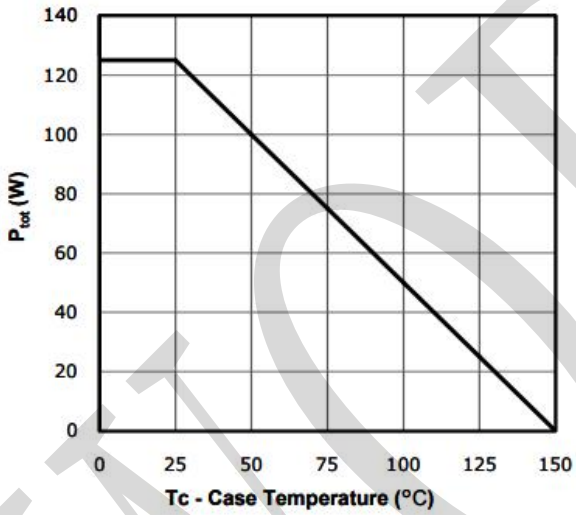


Fig 10: Drain Current Derating

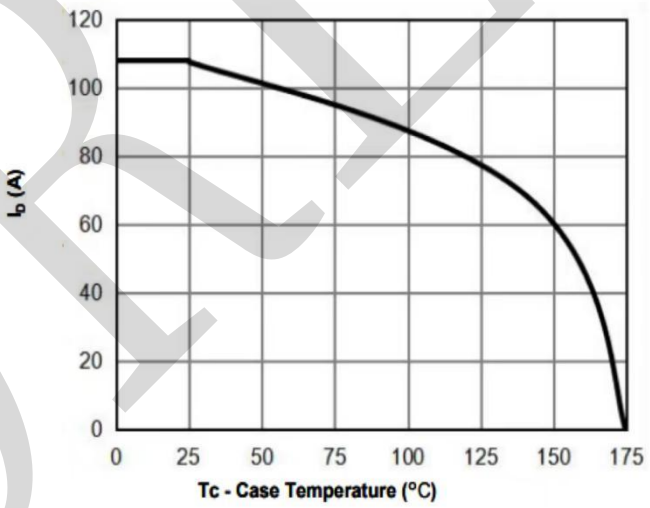
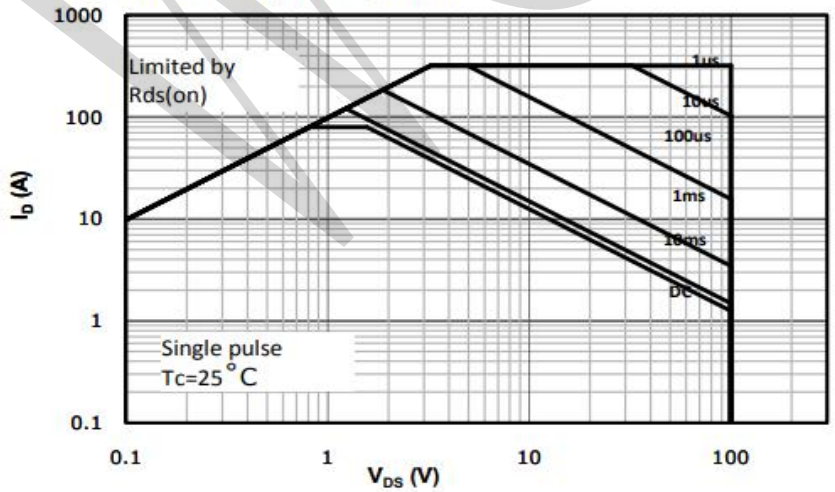
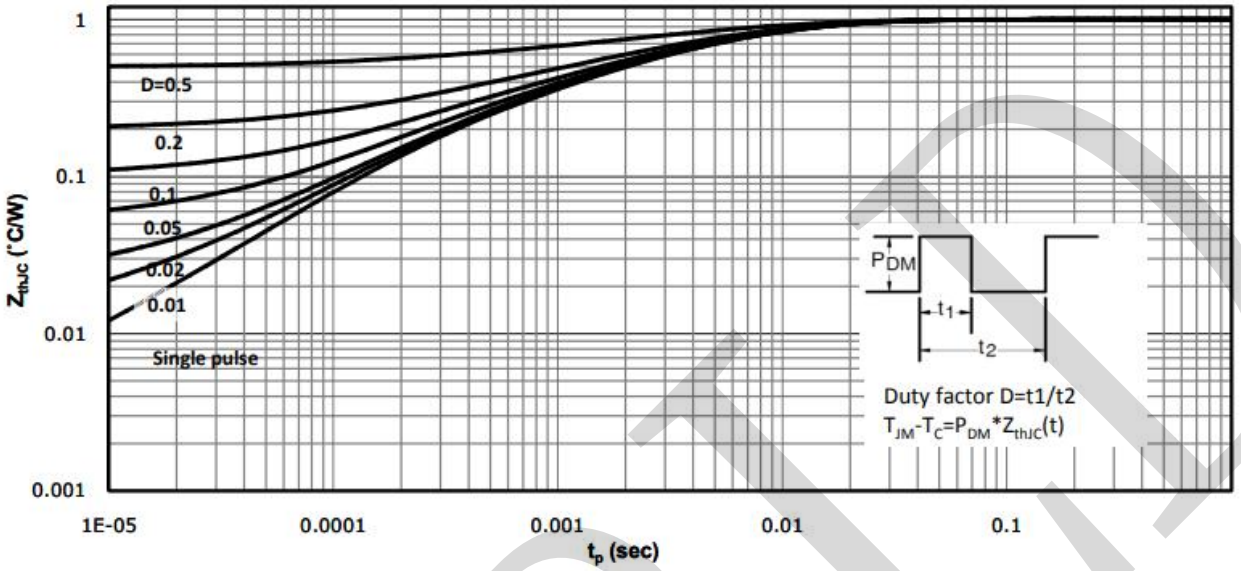


Fig 11: Safe Operating Area

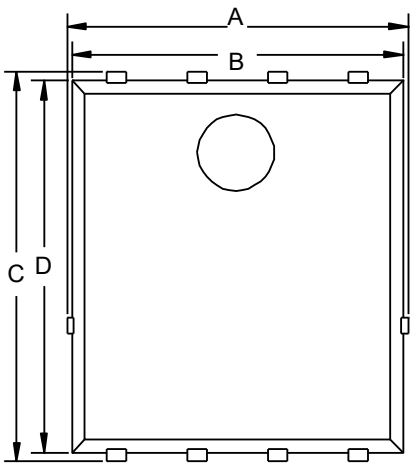


Typical Characteristics

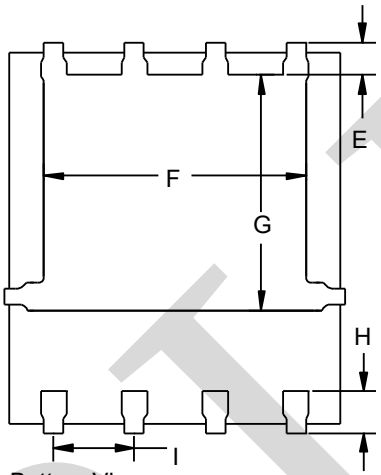
Fig 12: Max. Transient Thermal Impedance



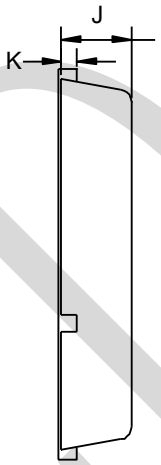
PACKAGE OUTLINE DIMENSIONS



Top View



Bottom View

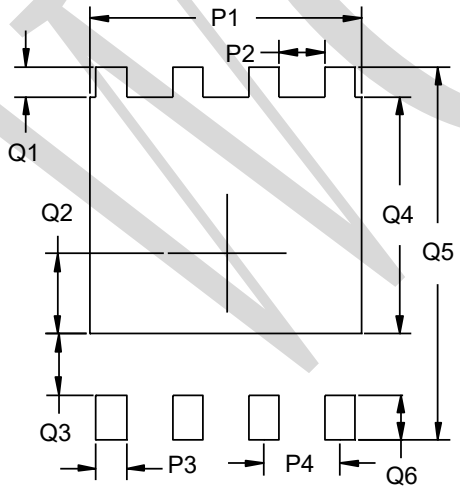


Side View

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

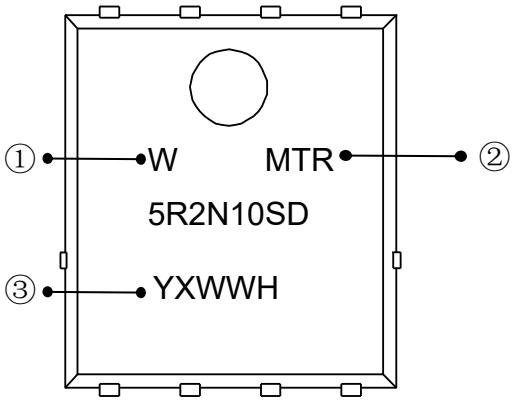


UNIT		P1	P2	P3	P4	Q1
mm	min	4.52	0.76	0.51	1.27	0.50
mil	min	177.9	29.9	20.07	50.0	20.0

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

PACKAGE OUTLINE DIMENSIONS

Marking Information



①W : Company's trademark
②Product model : MTR5R2N10SD
③PDC information：