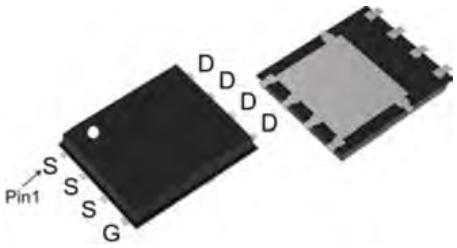
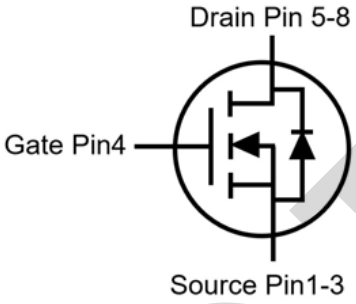
SGT N-channel Power MOSFET

MTR4R5N10SD

PDFN5*6





V_{DS}	100	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	4.0	mΩ
I_D	136	A

Features

1、Low on – resistance

2、Package PDFN5*6

3、SGT 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		100	V
V_{GS}	Gate-Source voltage		±20	V
I_S	Diode continuous forward current	T_C =25°C	136	A
I_D	Continuous drain current @VGS=10V	T_C =25°C	136	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		956	mJ
P_D	Maximum power dissipation	T_C =25°C	205	W
T_{STG},T_J	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	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 @ T_j=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}=80V,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=30A	--	4.0	4.5	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=50V,V_{GS}=0V , f=1MHz	--	6300	--	pF
C_{oss}	Output Capacitance		--	2100	--	pF
C_{rss}	Reverse Transfer Capacitance		--	300	--	pF
R_g	Gate Resistance	VGS=0V, f=1MHz, VDS=0V	--	1.6	--	Ω
Q_g (10V)	Total Gate Charge	V_{DS}=50V,I_D=50A , V_{GS}=10V	--	95	--	nC
Q_{gs}	Gate-Source Charge		--	25	--	nC
Q_{gd}	Gate-Drain Charge		--	21	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DS}=50V, VGS=10V, R_L=3.0Ω, Tj=25°C	--	32	--	ns
Tr	Turn-on Rise Time		--	45	--	ns
Td(off)	Turn-Off Delay Time		--	52	--	ns
Tf	Turn-Off Fall Time		--	31	--	ns

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

V_{SD}	Forward on voltage	I_{SD}=50A,V_{GS}=0V	--	0.9	1.2	V
Trr	Reverse Recovery Time	IF=30A, di/dt=500A/μs	--	85	--	ns
Qrr	Reverse Recovery Charge	IF=30A, di/dt=500A/μs	--	254	--	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. Part not recommended for use above this value

③ The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

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

Typical Characteristics

Fig 1: Output Characteristics

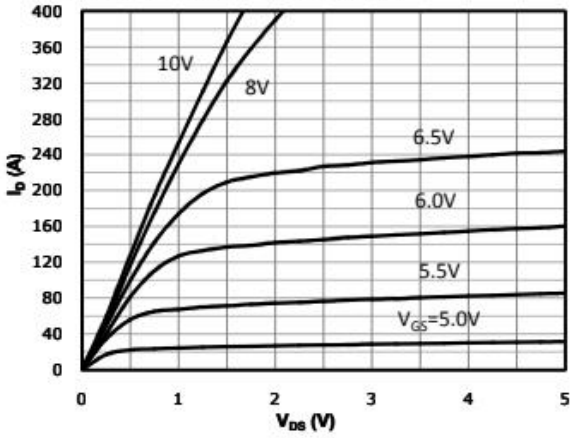


Fig 2: Transfer Characteristics

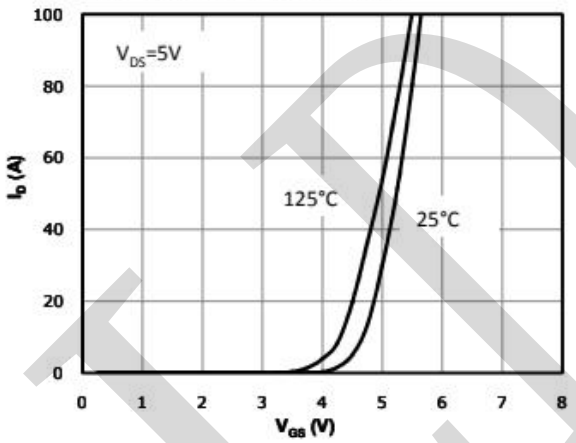


Fig 3: Rds(on) vs Drain Current and Gate Voltage

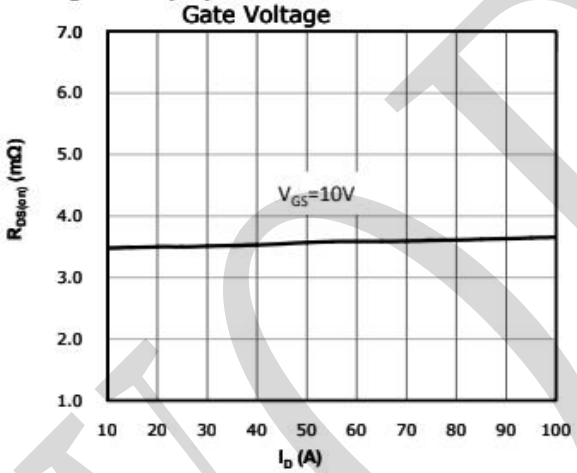


Fig 4: Rds(on) vs Gate Voltage

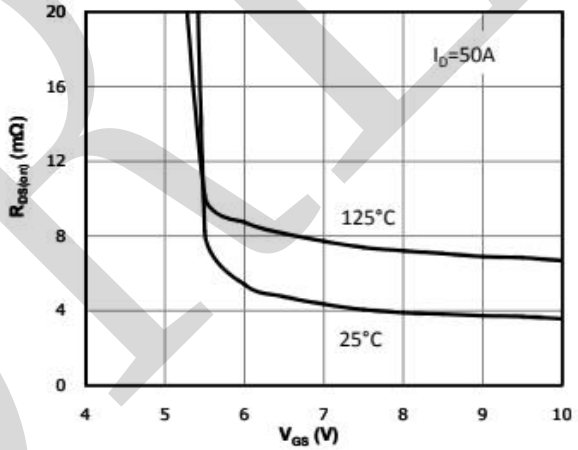


Fig 5: Rds(on) vs. Temperature

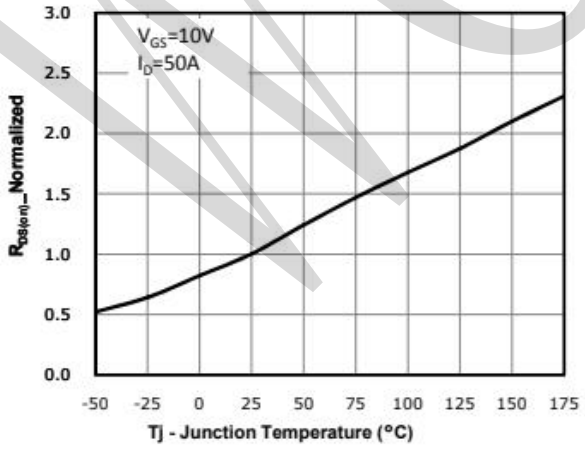
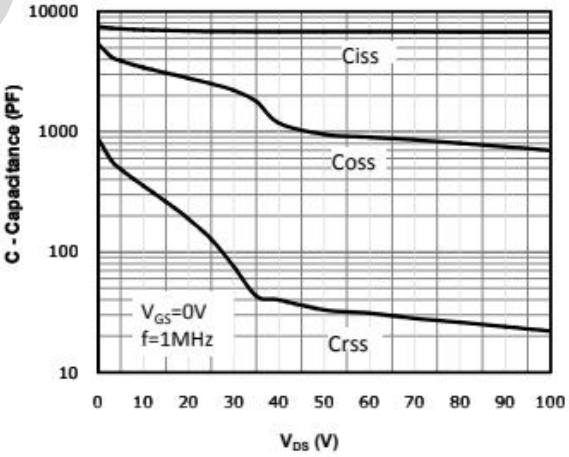


Fig 6: Capacitance Characteristics



Typical Characteristics

Fig 7: Gate Charge Characteristics

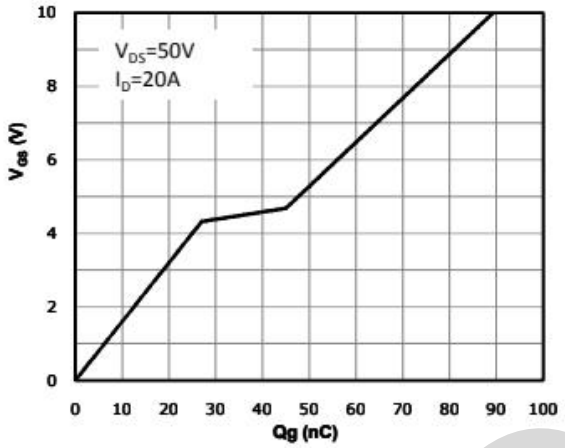


Fig 8: Body-diode Forward Characteristics

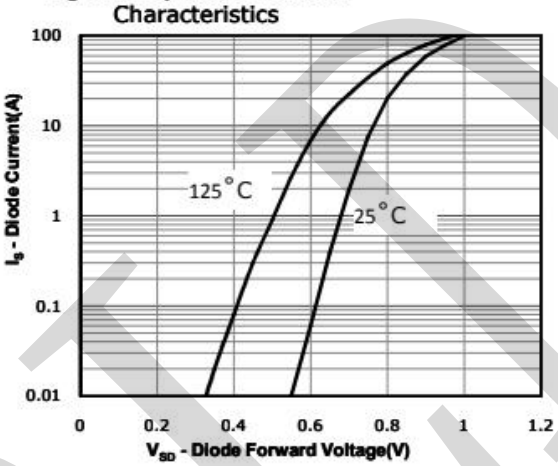


Fig 9: Power Dissipation

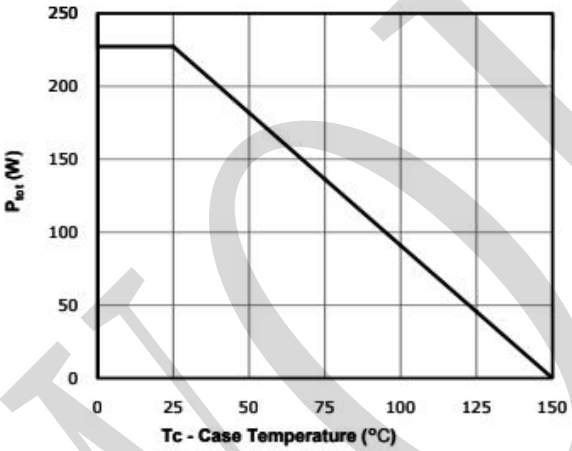


Fig 10: Drain Current Derating

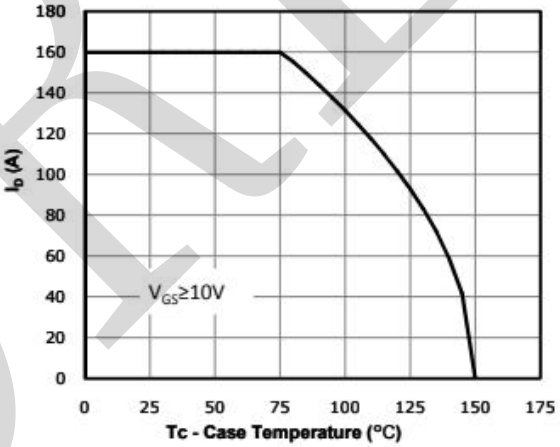
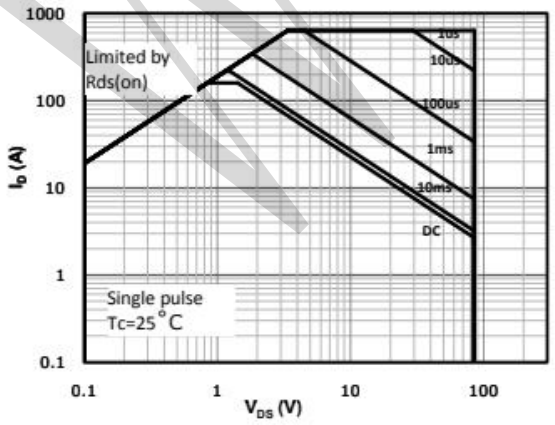
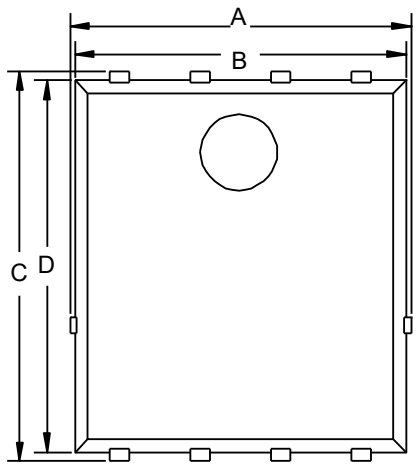


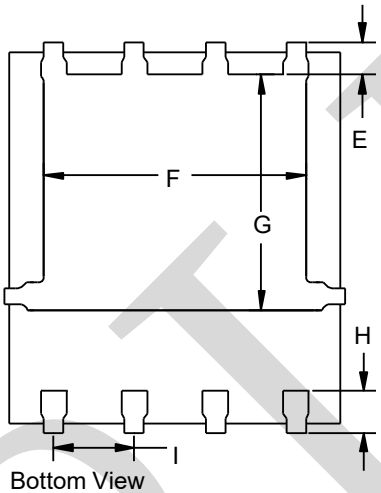
Fig 11: Safe Operating Area



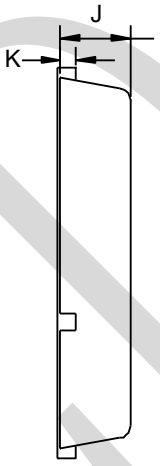
PACKAGE OUTLINE DIMENSIONS



Top View



Bottom View

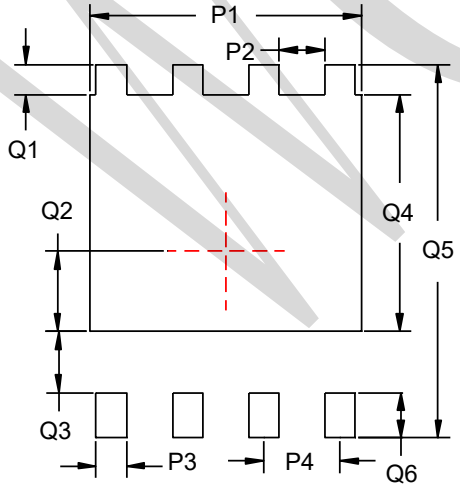


Side View

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