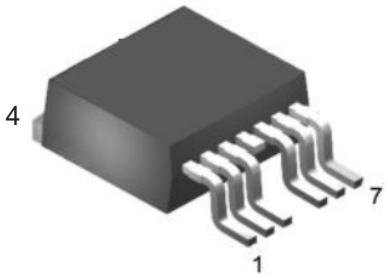
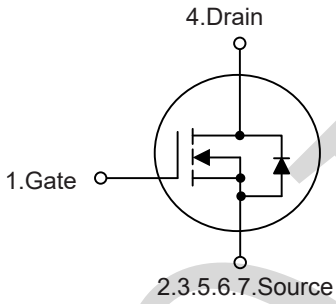
SGT N-channel Power MOSFET

MTR1R2N04CTG

TO-263-7





V_{DS}	40	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	0.9	mΩ
I_D	250	A

Features

1、Low on – resistance

2、Package TO-263-7

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		40	V
V_{GS}	Gate-Source voltage		±20	V
I_D	Continuous drain current @VGS=10V	T_C = 25°C	250	A
		T_C = 100°C	175	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	1000	A
E_{AS}	Avalanche energy, single pulsed ②		1056	mJ
P_D	Maximum power dissipation	T_C =25°C	300	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	0.55	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	48	°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	40	47	--	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	2.4	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=30A	--	0.9	1.2	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=25V,V_{GS}=0V , f=1MHz	--	8300	--	pF
C_{oss}	Output Capacitance		--	1510	--	pF
C_{rss}	Reverse Transfer Capacitance		--	130	--	pF
R_g	Gate Resistance	V_{GS}=0V,V_{DS}=0V, f=1MHz	--	2.3	--	Ω
Q_g (10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=32V, I_D=25A	--	92	--	nC
Q_{gs}	Gate-Source Charge		--	44	--	nC
Q_{gd}	Gate-Drain Charge		--	22	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DS}=20V, VGS=10V, R_L=2.0Ω, Tj=25°C	--	22	--	ns
Tr	Turn-on Rise Time		--	7	--	ns
Td(off)	Turn-Off Delay Time		--	80	--	ns
Tf	Turn-Off Fall Time		--	26	--	ns

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

V_{SD}	Forward on voltage	I_{SD}=50A,V_{GS}=0V	--	0.75	1.2	V
Trr	Reverse Recovery Time	IF=30A, di/dt=500A/μs	--	100	--	ns
Qrr	Reverse Recovery Charge	IF=30A, di/dt=500A/μs	--	163	--	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

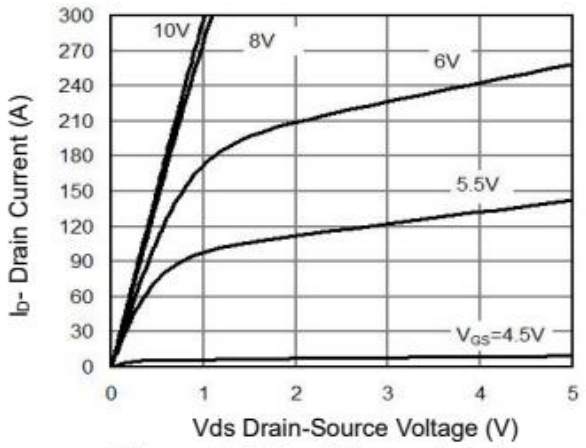


Figure 1 Output Characteristics

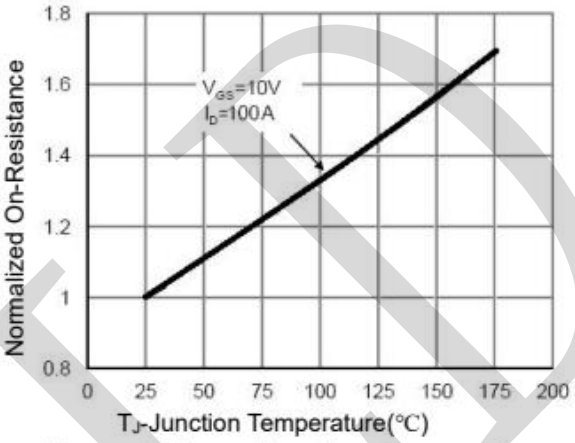


Figure 4 Rdson-Junction Temperature

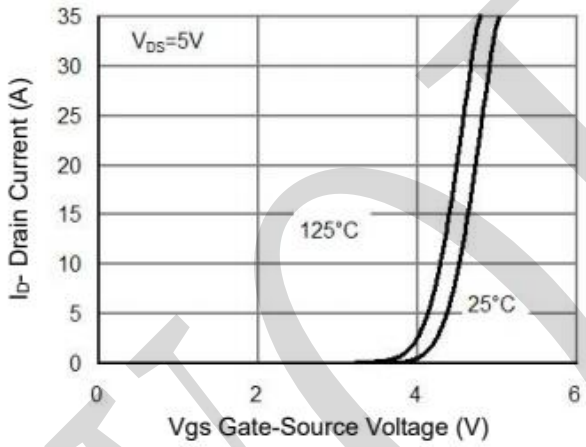


Figure 2 Transfer Characteristics

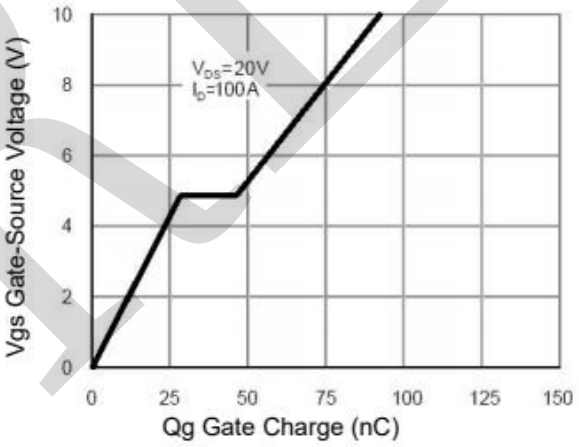


Figure 5 Gate Charge

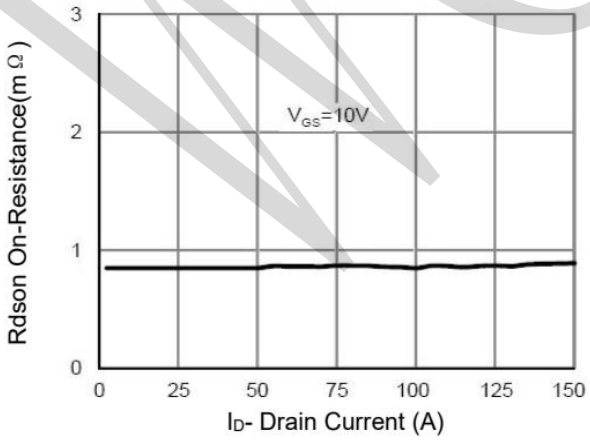


Figure 3 Rdson- Drain Current

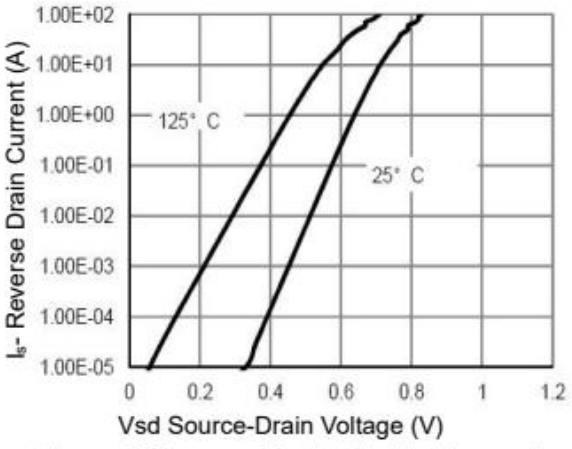


Figure 6 Source- Drain Diode Forward

Typical Characteristics

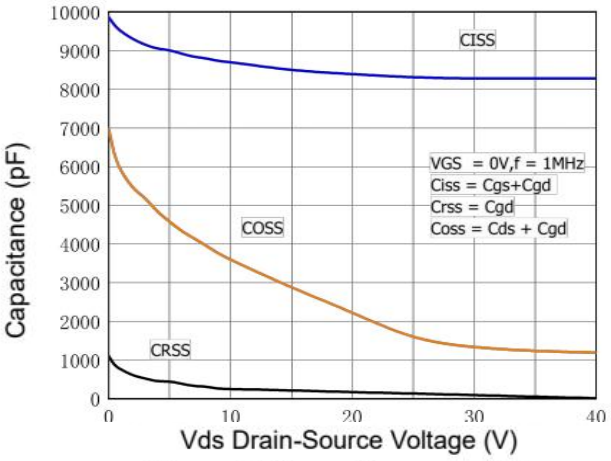


Figure 7 Capacitance vs Vds

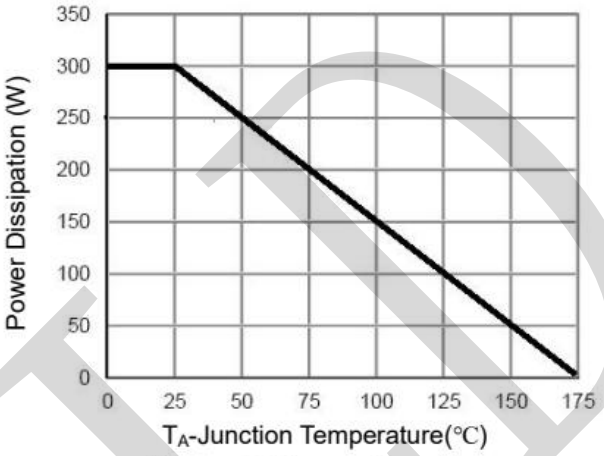


Figure 9 Power De-rating

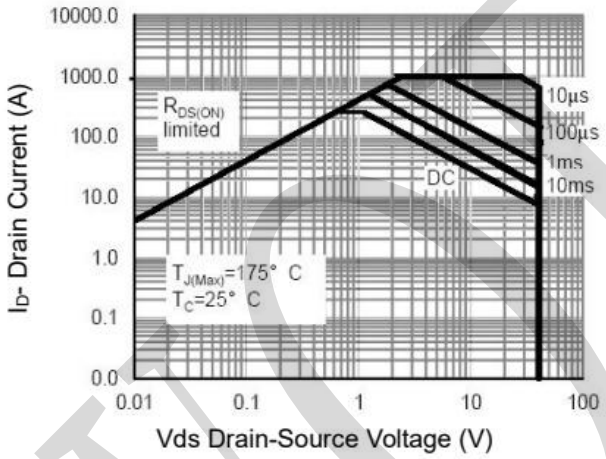


Figure 8 Safe Operation Area (Note3)

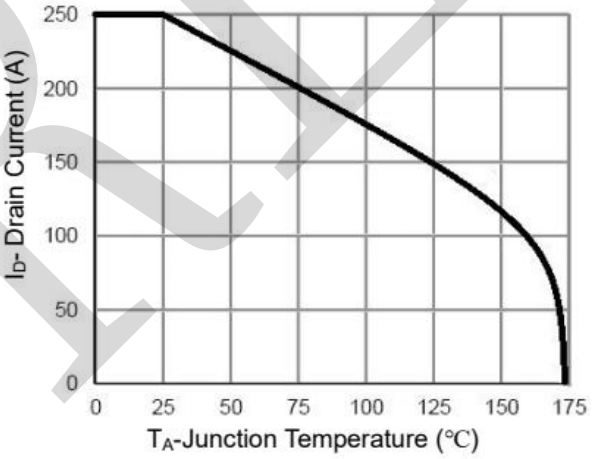


Figure 10 Current De-rating

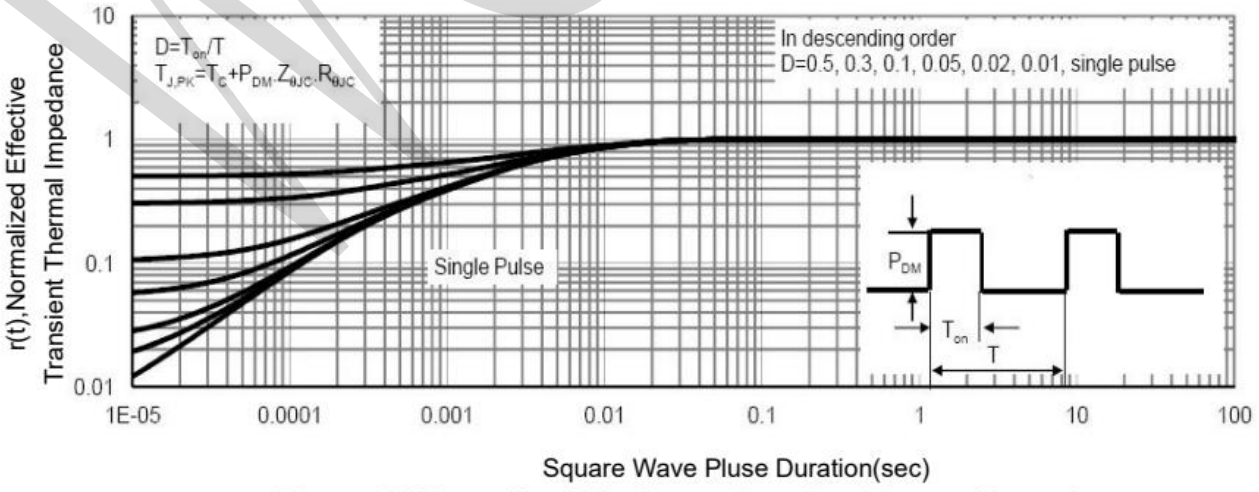
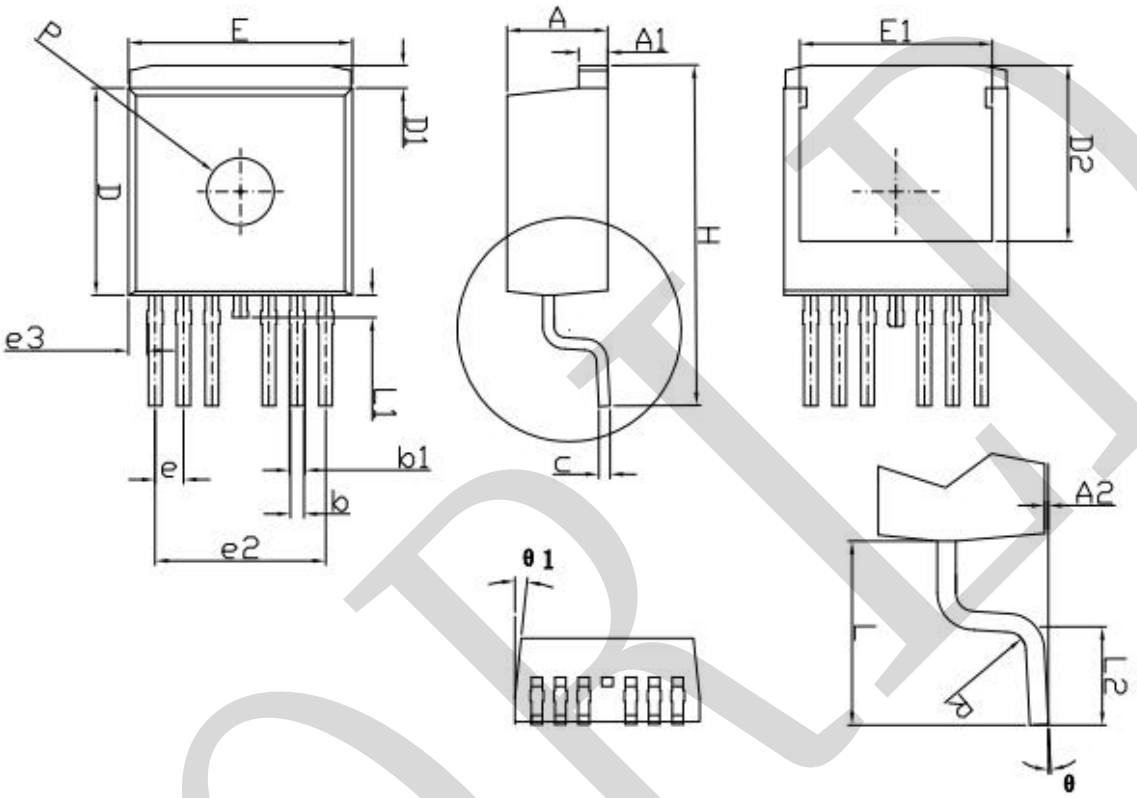
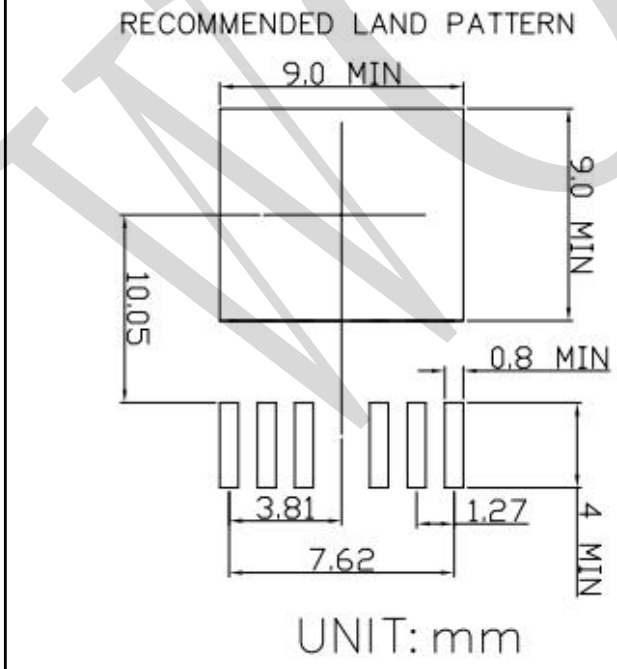


Figure 11 Normalized Maximum Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS

TO-263-7





	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	1.20	1.30	1.40
A2	0.05	0.15	0.30
b	0.50	0.60	0.70
b1	0.50	0.70	0.90
c	0.40	0.50	0.60
D	9.05	9.25	9.45
D1	0.70	1.00	1.30
D2	7.35	7.85	8.35
E	9.80	10.00	10.20
E1	8.10	8.60	9.10
e	1.07	1.27	1.47
e2	7.32	7.62	7.92
e3	0.64	0.84	1.04
H	14.65	15.15	15.65
L	4.47	4.97	5.47
L1	0.90	1.20	1.50
L2	2.20	2.50	2.80
θ	0°	3°	8°
θ1	0°	6°	10°
ΦP	2.70	3.00	3.30