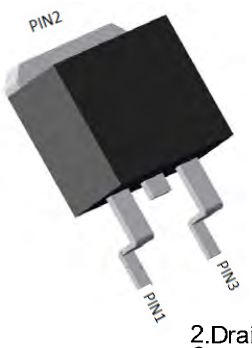
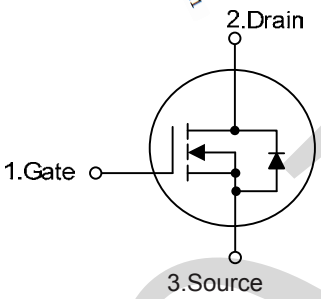
SGT N-channel Power MOSFET

MTR7R2N10CTB

TO-263





V_{DS}	100	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	6.4	mΩ
I_D	80	A

Features

1、Low on – resistance

2、Package TO-263

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	--	A
I_D	Continuous drain current @VGS=10V	T_C =25°C (Package limit)	80	A
		T_C =100°C (Silicon limit)	70	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	320	A
EAS	Avalanche energy, single pulsed ②		441	mJ
P_D	Maximum power dissipation	T_C =25°C	150	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	1	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	°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}=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	2.0	3.0	4.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=50A	--	6.4	7.2	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=40V,V_{GS}=0V, f=1MHz	--	3646	--	pF
C_{oss}	Output Capacitance		--	387	--	pF
C_{rss}	Reverse Transfer Capacitance		--	19	--	pF
R_g	Gate Resistance	V_{DS}=0V,V_{GS}=0V, f=1MHz	--	2.6	--	Ω
Q_g (10V)	Total Gate Charge	V_{DS}=40V,I_D=40A , V_{GS}=10V,f=1MHz	--	15	--	nC
Q_{gs}	Gate-Source Charge		--	8	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DS}=40V, VGS=10V, R_L=3.0Ω, Tj=25°C	--	19	--	ns
Tr	Turn-on Rise Time		--	42	--	ns
Td(off)	Turn-Off Delay Time		--	31	--	ns
Tf	Turn-Off Fall Time		--	8	--	ns

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

VSD	Forward on voltage	I_{SD}=50A,V_{GS}=0V	--	--	1.2	V
Trr	Reverse Recovery Time	IF=20A, di/dt=500A/μs	--	73	--	ns
Qrr	Reverse Recovery Charge	IF=20A, di/dt=100A/μs	--	139	--	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, I_{AS} = 9A, V_{GS} =10V. Part not recommended for use above this value

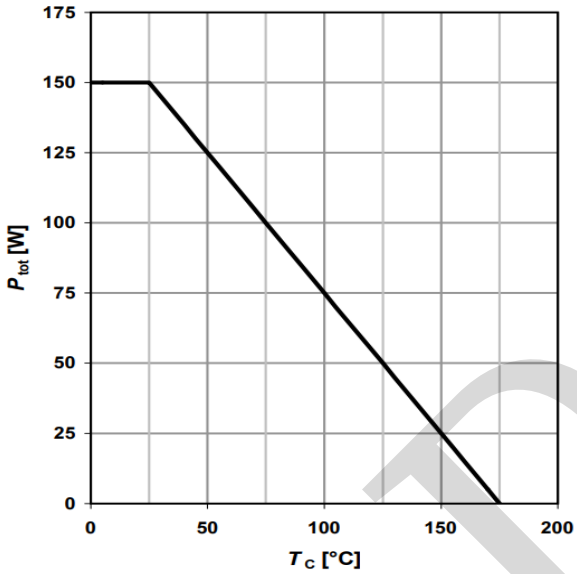
③ The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

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

Typical Characteristics

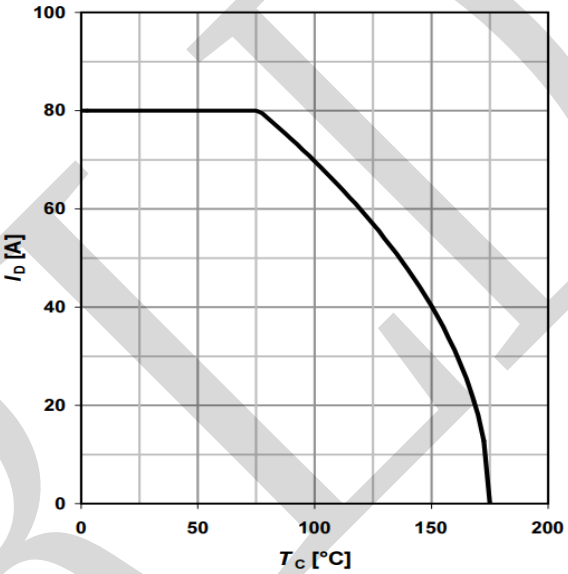
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

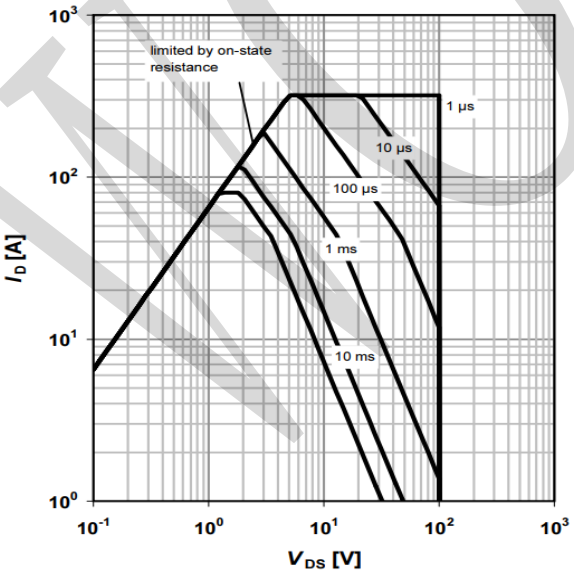
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

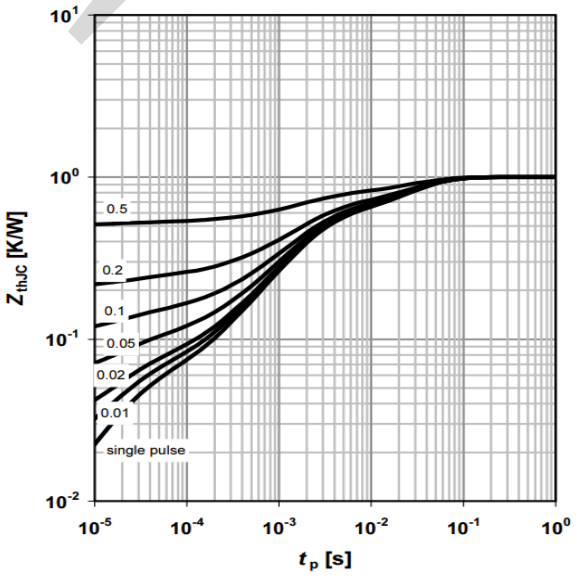
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

parameter: $D=t_p/T$

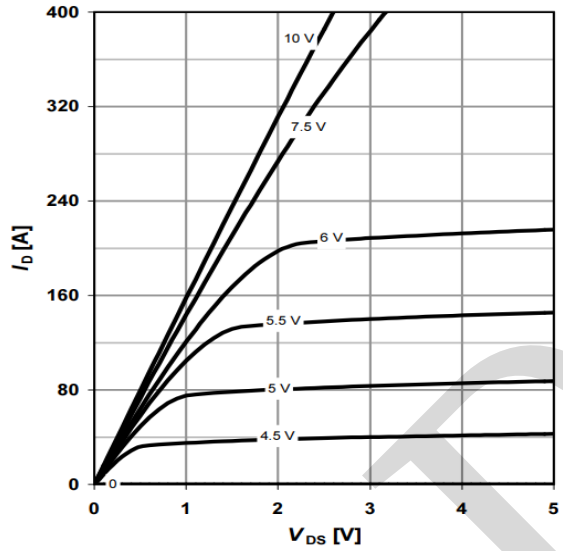


Typical Characteristics

5 Typ. output characteristics

$I_D=f(V_{DS})$; T_j=25 °C

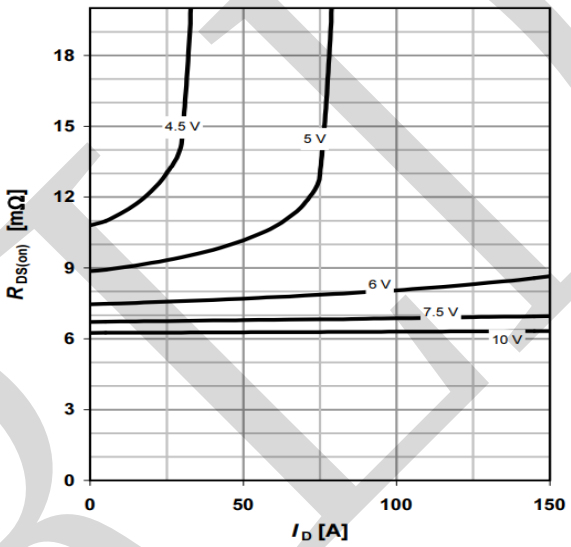
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$; T_j=25 °C

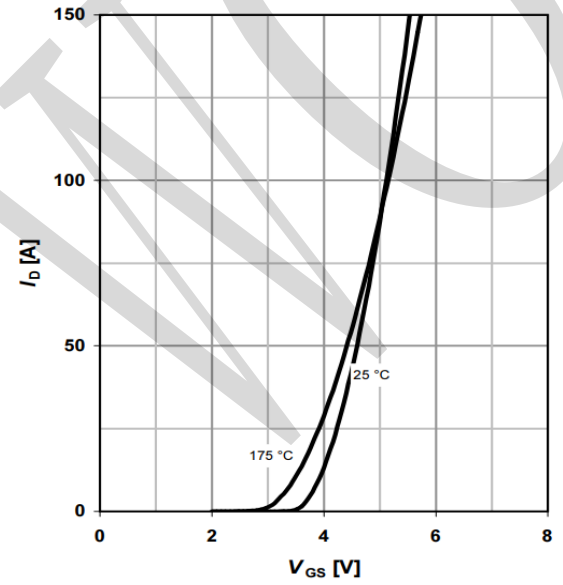
parameter: V_{GS}



7 Typ. transfer characteristics

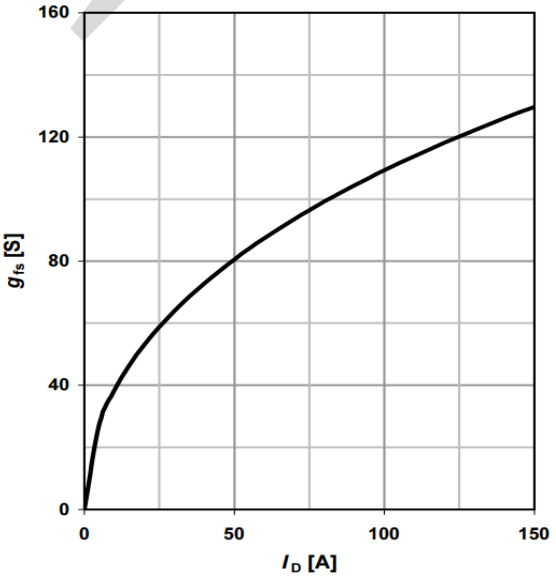
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



8 Typ. forward transconductance

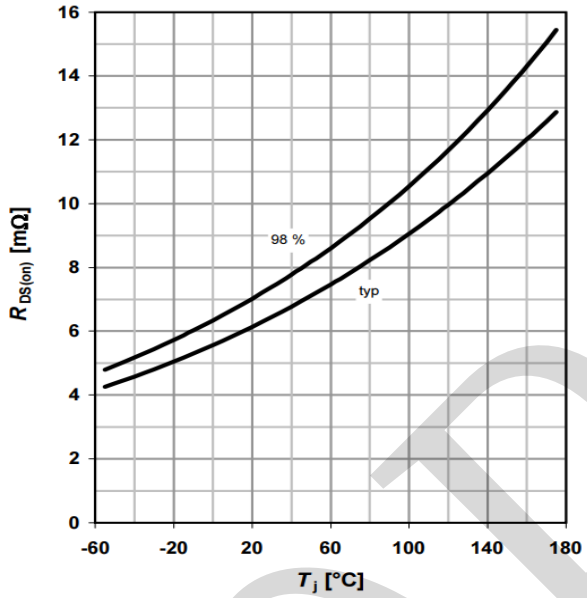
$g_{fs}=f(I_D)$; T_j=25 °C



Typical Characteristics

9 Drain-source on-state resistance

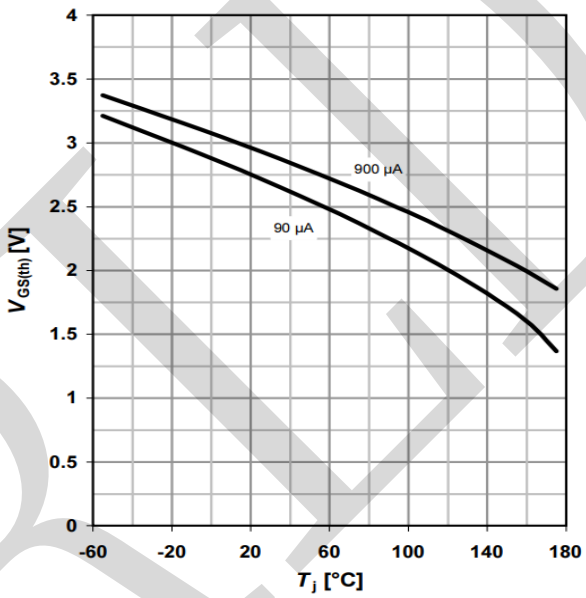
$R_{DS(on)}$=f(T_j); I_D=80 A; V_{GS}=10 V



10 Typ. gate threshold voltage

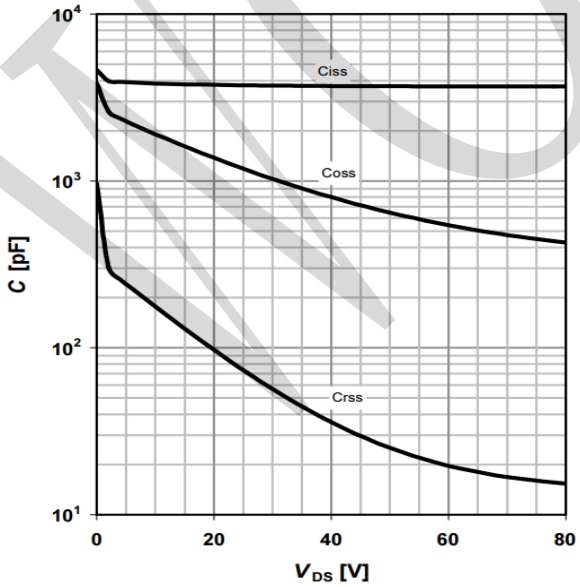
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}

parameter: I_D



11 Typ. capacitances

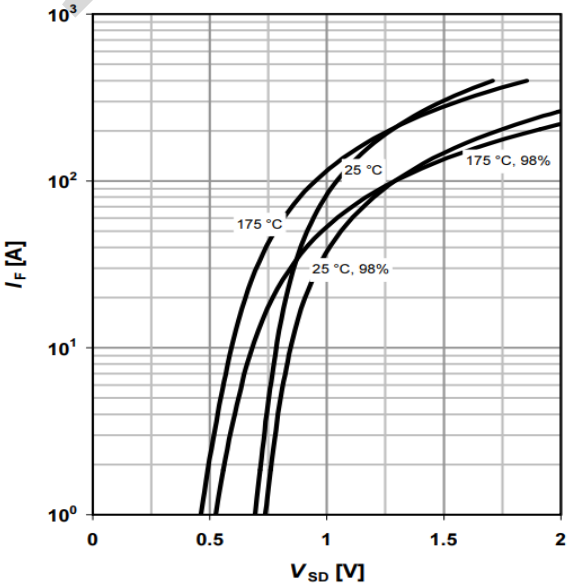
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

parameter: T_j

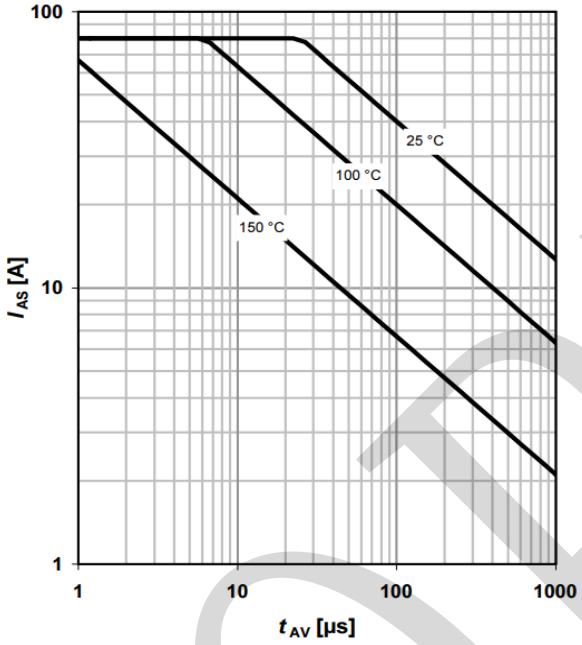


Typical Characteristics

13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

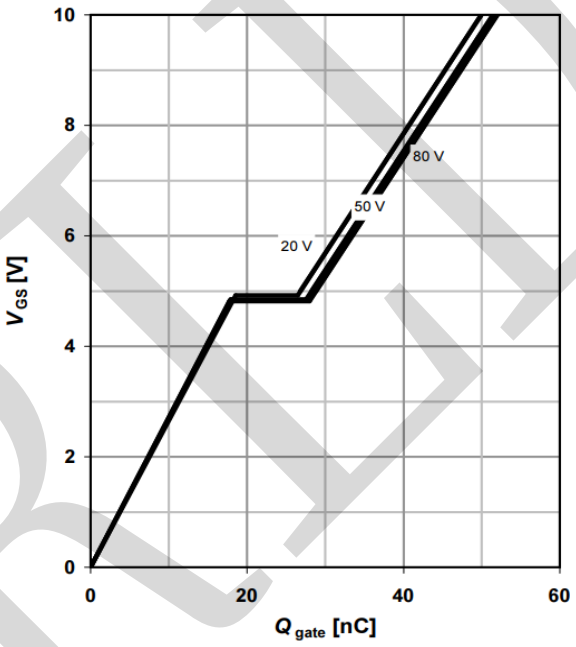
parameter: $T_{j(start)}$



14 Typ. gate charge

V_{GS}=f(Q_{gate}); I_D=80 A pulsed

parameter: V_{DD}



PACKAGE OUTLINE DIMENSIONS

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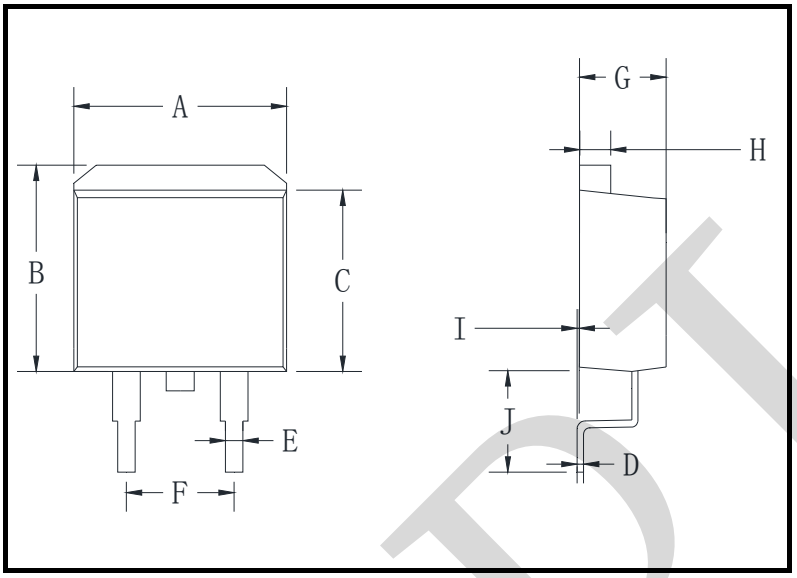
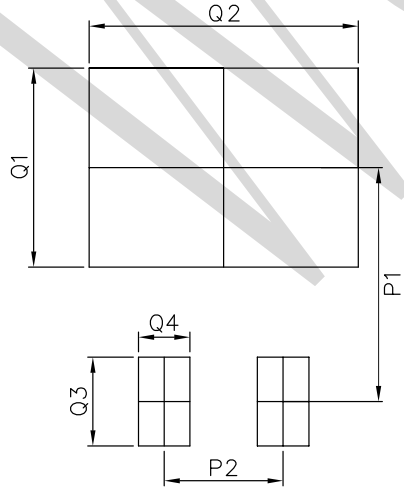


TO-263 mechanical data

UNIT		A	B	C	D	E	F	G	H	I	J
mm	max	11.5	10.5	9.0	0.64	0.94	5.6	5.1	1.4	0.6	6.1
	min	9.5	9.7	8.4	0.28	0.68	4.5	4.0	1.1	0	4.9
mil	max	452.7	413.3	354.3	25.2	37.0	220.5	200.8	55.1	23.6	240.1
	min	374.0	381.8	330.7	11.0	26.7	177.2	157.5	43.3	0.6	192.9

TO-263 Suggested Pad Layout



UNIT		P1	P2	Q1	Q2	Q3	Q4
mm	min	10.0	4.00	8.5	11.5	3.8	2.1
mil	min	393.3	157.5	39.37	334.6	149.6	82.7