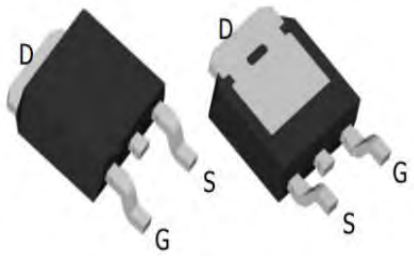
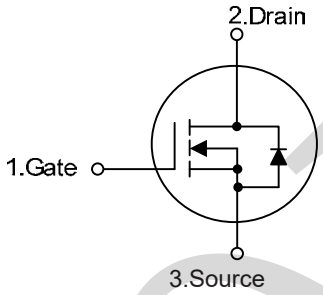
SGT N-channel Power MOSFET

MTR130N10D

TO-252





V_{DS}	100	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	130	mΩ
I_D	10	A

Features

1、Low on – resistance

2、Package TO-252

3、SGT Power MOSFET

Applications

1、Load Switch for Portable Devices

2、DC/DC Converter

Maximum ratings, at TA =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_{AS}	Avalanche Current		1.8	A
I_D	Continuous drain current @VGS=10V	T_C =25°C	10	A
		T_C =100°C	7	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	51	A
EAS	Avalanche energy, single pulsed ②		5	mJ
P_D	Maximum power dissipation	T_C =25°C	39	W
		T_C =100°C	16	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	3.2	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	58	°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}=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	1.2	1.7	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=4A	--	110	130	mΩ
		V_{GS}=4.5V, I_D=3A	--	140	160	mΩ
gfs	Forward Transconductance	VDS =5V,ID = 10A	--	5.8	--	S

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

C_{iss}	Input Capacitance	V_{DS}=50V,V_{GS}=0V , f=1MHz	--	96	--	pF
C_{oss}	Output Capacitance		--	32	--	pF
C_{rss}	Reverse Transfer Capacitance		--	3.6	--	pF
R_g	Gate Resistance	V_{DS}=0V,V_{GS}=0V , f=1MHz	--	2.9	--	Ω
Q_g (10V)	Total Gate Charge	V_{DS}=50V,I_D=10 A , V_{GS}=10V	--	2.5	--	nC
Q_{gs}	Gate-Source Charge		--	0.4	--	nC
Q_{gd}	Gate-Drain Charge		--	0.7	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DS}=50V, ID=2A, R_L=5Ω, RG=6Ω,	--	2.2	--	ns
Tr	Turn-on Rise Time		--	4.8	--	ns
Td(off)	Turn-Off Delay Time		--	7.3	--	ns
Tf	Turn-Off Fall Time		--	3.5	--	ns

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

V_{SD}	Forward on voltage	I_S=1A,V_{GS}=0V	--	0.7	1.0	V
I_S	Diode Forward Current	T_C = 25°C	--	--	39	A
Trr	Reverse Recovery Time (Note1)	I_F=20A , di/dt=100A/μs	--	30	--	ns
Qrr	Reverse Recovery Charge (Note1)		--	23	--	nC

NOTE: ① Computed continuous current assumes the condition of TJ_Max while the actual continuous current depends on the thermal & electro-mechanical application board design.

② This single-pulse measurement was taken under TJMax = 150°C.

③ This single-pulse measurement was taken under the following condition [L = 3mH, VGS = 10V, VDS = 50V] while its value is limited by TJMax = 150°C.

④ The power dissipation PD is based on TJ_Max = 150°C.

Typical Characteristics

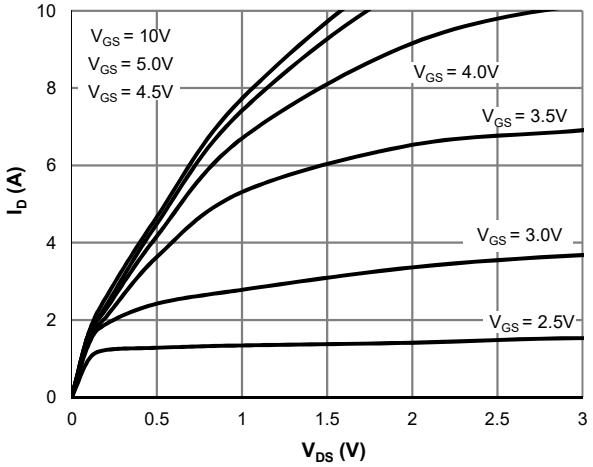


Figure 1: Saturation Characteristics

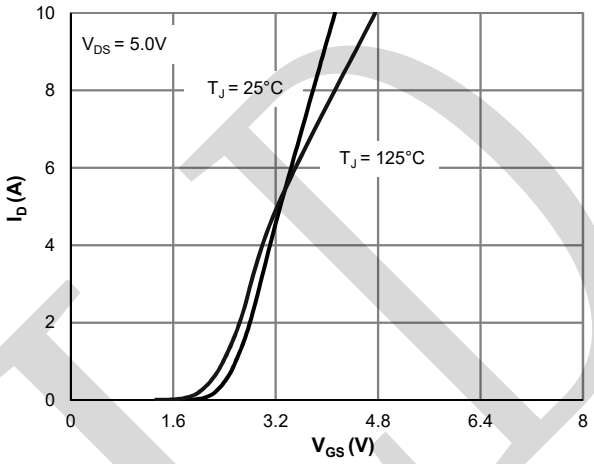


Figure 2: Transfer Characteristics

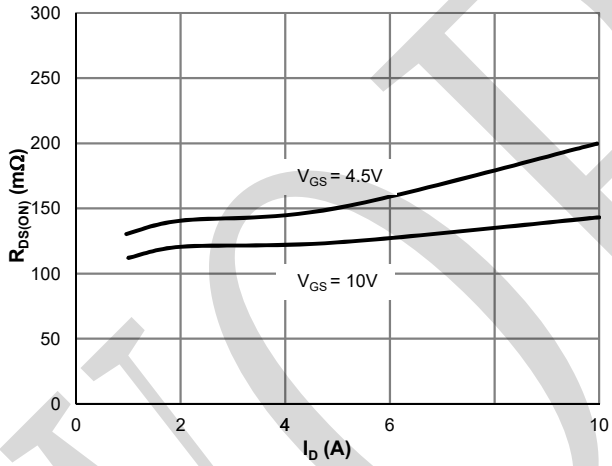


Figure 3: $R_{DS(ON)}$ vs. Drain Current

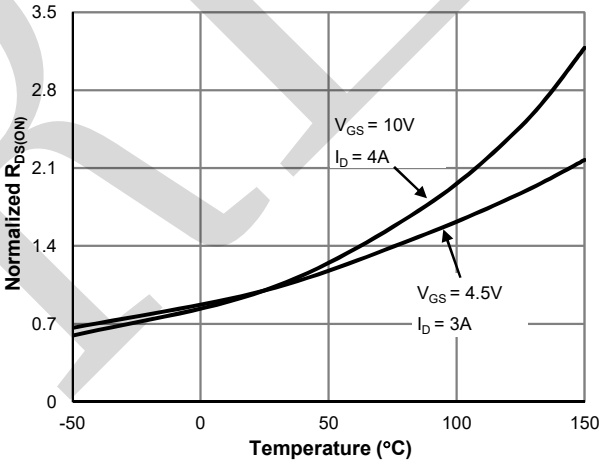


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

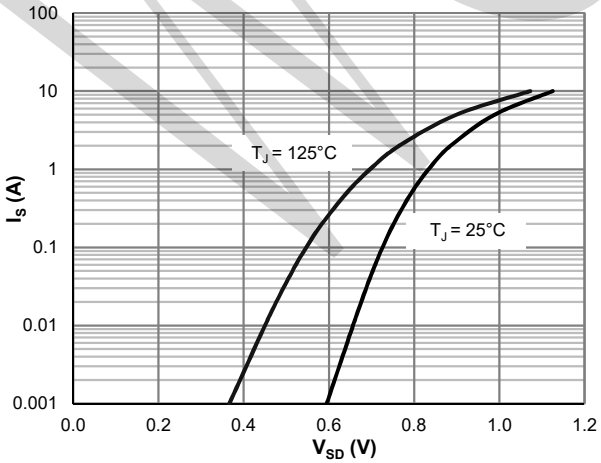


Figure 5: Body-Diode Characteristics

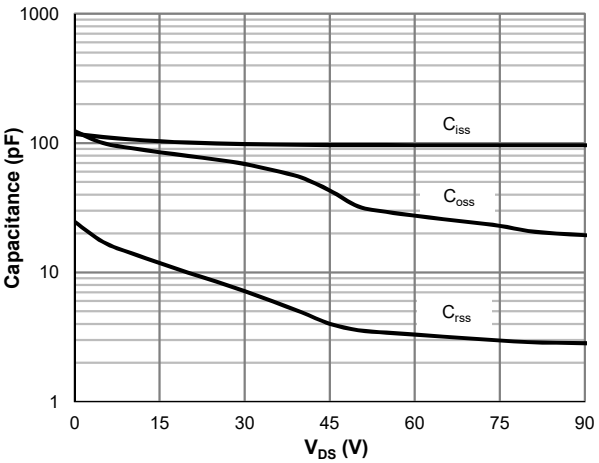


Figure 6: Capacitance Characteristics

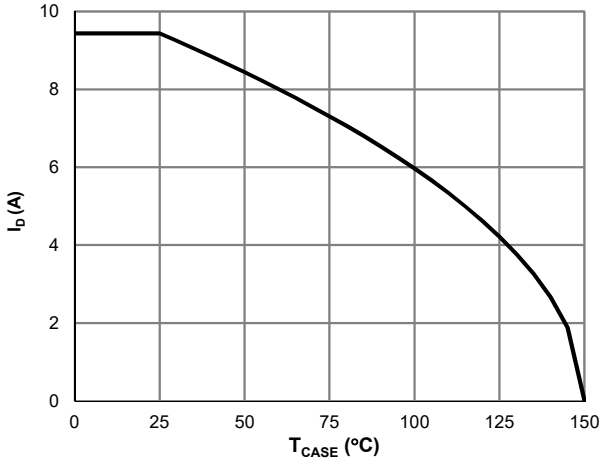


Figure 7: Current De-rating

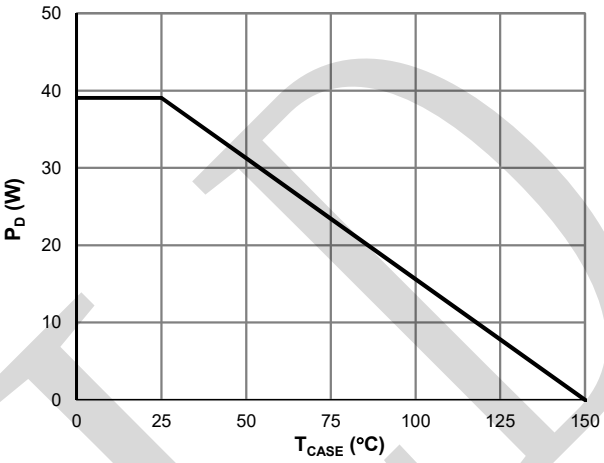


Figure 8: Power De-rating

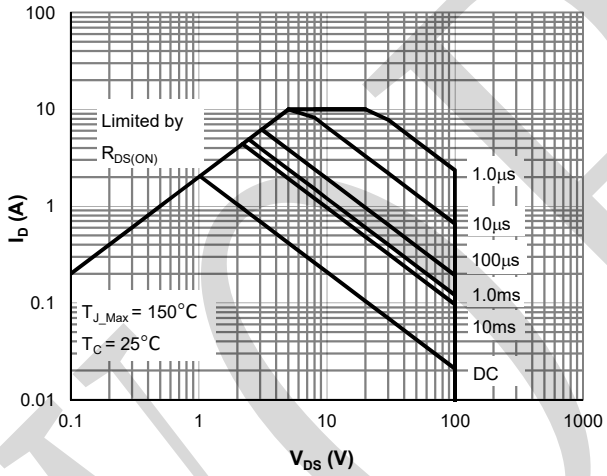


Figure 9: Maximum Safe Operating Area

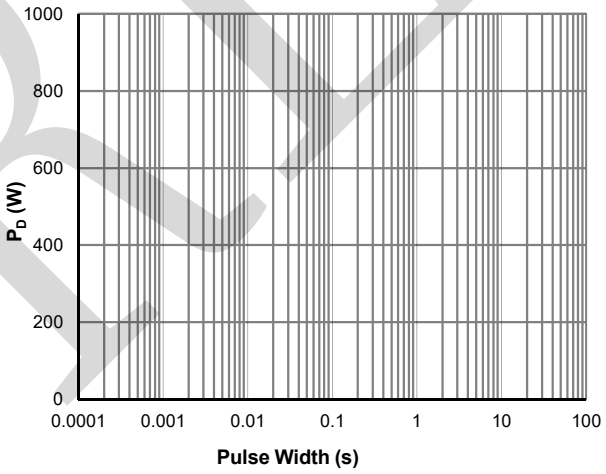


Figure 10: Single Pulse Power Rating, Junction-to-Case

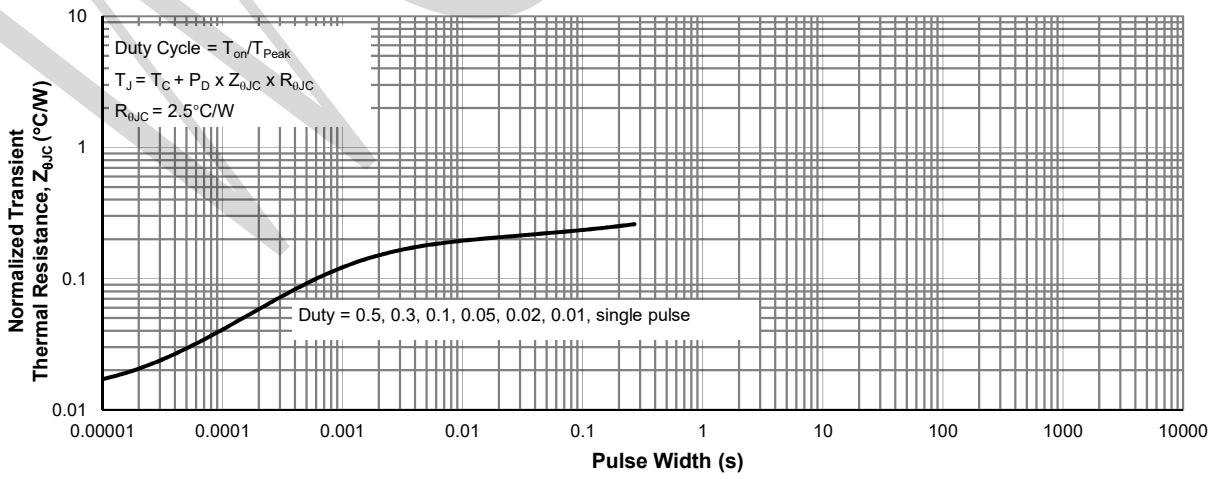
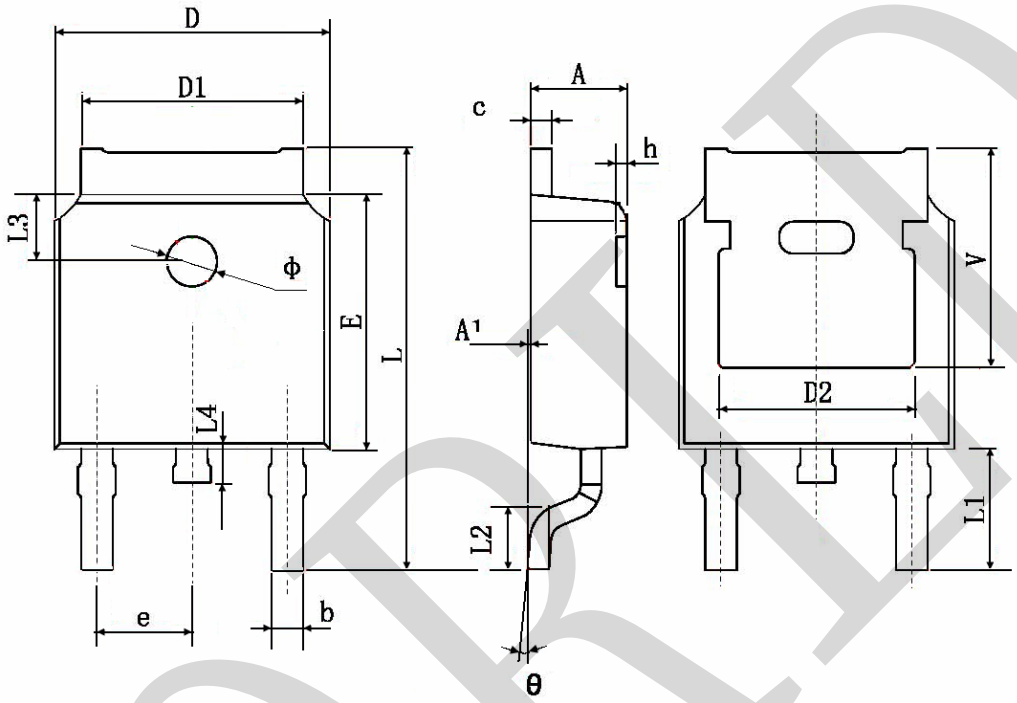


Figure 11: Normalized Maximum Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS

Note:unit mm

TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	