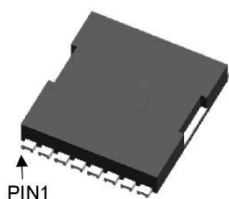


SGT N-channel Power MOSFET

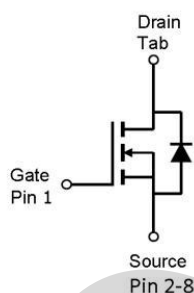
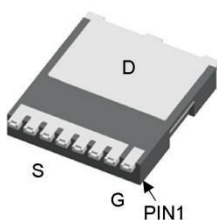
MSR1R2N04TL

TOLL

TOLL Top View



TOLL Bottom View



V_{DS}	40	V
$R_{DS(on),TYP@ V_{GS}=10V}$	1.0	m Ω
I_D	320	A

Features

- 1、Low on – resistance
- 2、Package TOLL
- 3、SGT N-channel Power MOSFET

Applications

- 1、Load Switch for Portable Devices
- 2、DC/DC Converter

Maximum ratings, at $T_A = 25^\circ\text{C}$, 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 @ $V_{GS}=10V$	$T_C = 25^\circ\text{C}$ (Silicon limit)	--	A
		$T_C = 25^\circ\text{C}$ (Package limit)	320	A
		$T_C = 100^\circ\text{C}$ (Silicon limit)	220	A
I_{DM}	Pulse drain current tested ①	$T_C = 25^\circ\text{C}$	1200	A
E_{AS}	Avalanche energy, single pulsed ②		2970	mJ
P_D	Maximum power dissipation	$T_C = 25^\circ\text{C}$	400	W
T_{STG}, T_J	Storage and Junction Temperature Range		-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typical	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	0.4	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	45	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
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Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)

V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	--	--	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	2.0	2.7	4.0	V
R _{DS(on)}	Drain-Source On-State Resistance ④	V _{GS} =10V, I _D =50A	--	1.0	1.2	mΩ

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

C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V , f=1MHz	--	11483	--	pF
C _{oss}	Output Capacitance		--	1706	--	pF
C _{rss}	Reverse Transfer Capacitance		--	1015	--	pF
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	--	1.8	--	Ω
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =50A	--	92	--	nC
Q _{gs}	Gate-Source Charge		--	44	--	nC
Q _{gd}	Gate-Drain Charge		--	22	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	VGS=10V, VDS=20V, RL=3.0Ω, Tj=25°C	--	40	--	ns
Tr	Turn-on Rise Time		--	38	--	ns
Td(off)	Turn-Off Delay Time		--	145	--	ns
Tf	Turn-Off Fall Time		--	72	--	ns

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

VSD	Forward on voltage	ISD=50A, VGS=0V	--	0.75	1.2	V
Trr	Reverse Recovery Time	IF=30A, di/dt=500A/μs	--	53	--	ns
Qrr	Reverse Recovery Charge	IF=30A, di/dt=500A/μs	--	150	--	nC

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

② Limited by Tjmax, starting Tj = 25°C, L = 0.5mH, RG = 25Ω. Part not recommended for use above this value

③ The power dissipation PDSM is based on RθJA and the maximum allowed junction temperature of 150°C.

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

Typical Performance Characteristics

Figure 1: Power Dissipation

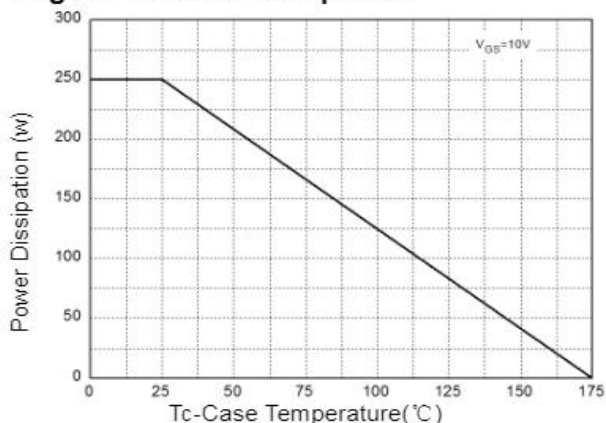


Figure 2: Drain Current

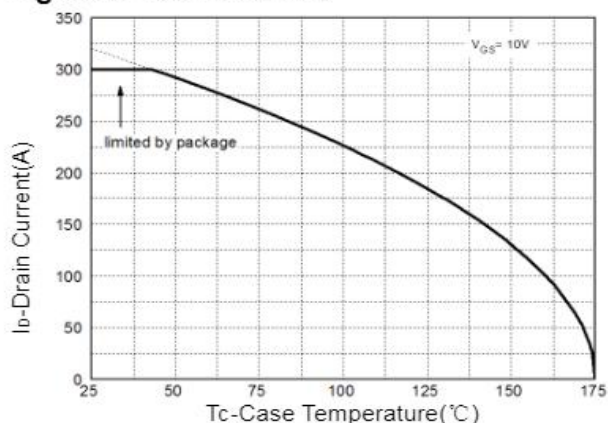


Figure 3: Safe Operation Area

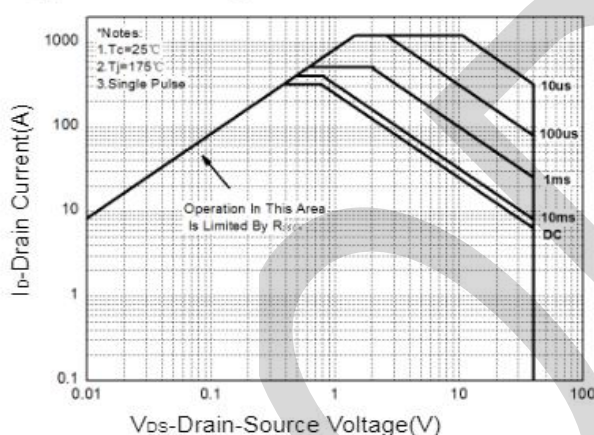


Figure 4: Thermal Transient Impedance

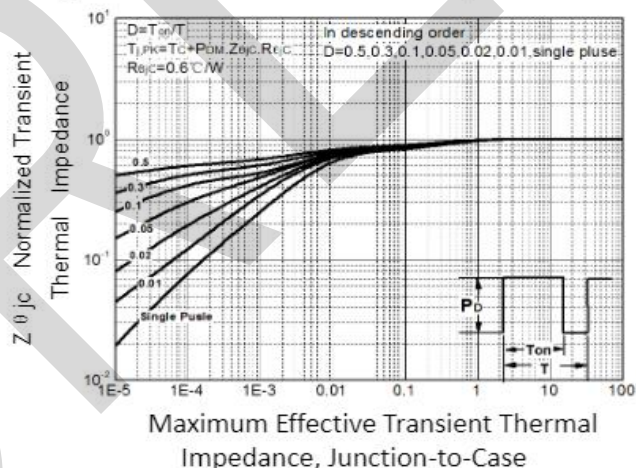


Figure 5: Output Characteristics

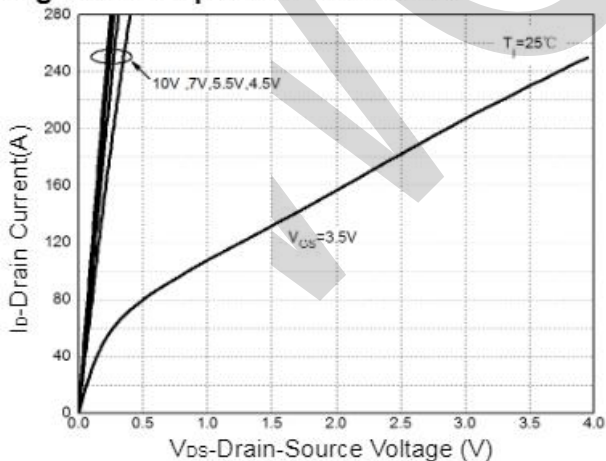
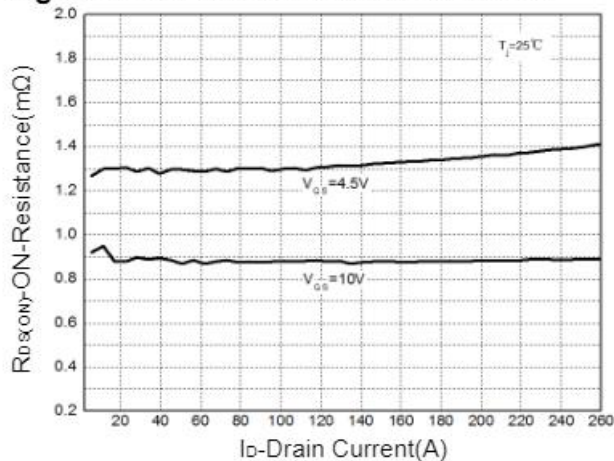


Figure 6: Drain-Source On Resistance



Typical Performance Characteristics

Figure 7: On-Resistance vs. Temperature

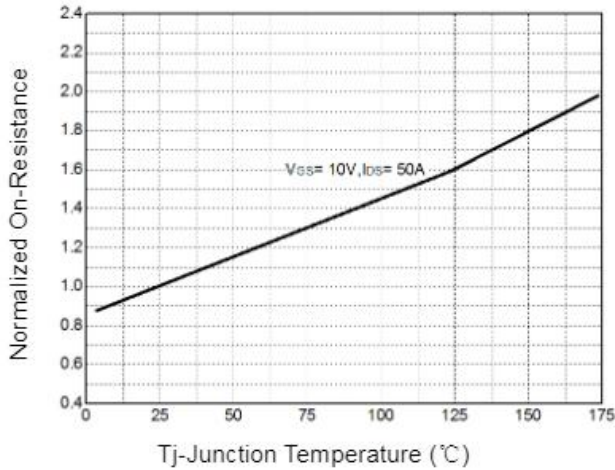


Figure 8: Source-Drain Diode Forward

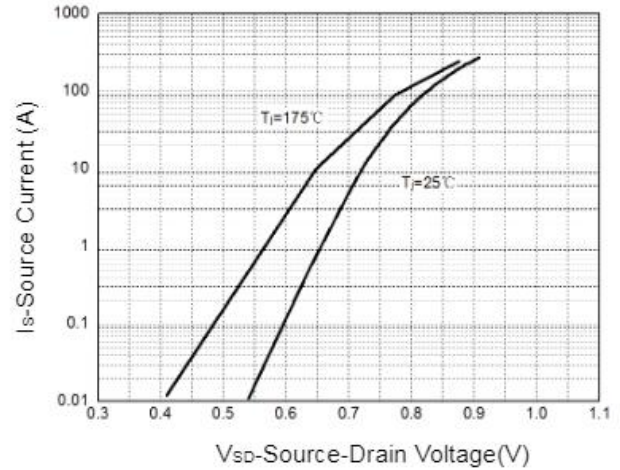


Figure 9: Capacitance Characteristics

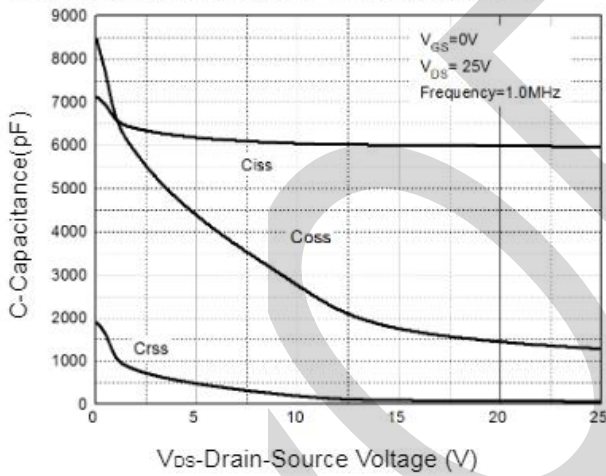


Figure 10: Gate Charge Characteristics

