

N-channel SGT Power MOSFET

Features

- Low $R_{DS(on)}$ SGT technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

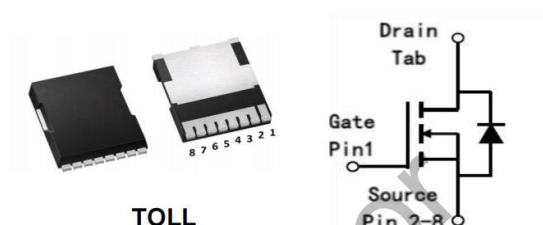
- DC/DC conversion
- Power switch
- Motor drives

100% Avalanche Tested



Product Summary

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on),MAX}$	1.8	mΩ
$I_D^{(1)}$	259	A



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Continuous Drain Current	I_D	-	A
$T_C = 25^\circ\text{C}^{(1)}$		259	
$T_C = 100^\circ\text{C}^{(1)}$		152	
$T_A = 25^\circ\text{C}^{(4)}$		28	
Pulsed Drain Current ⁽²⁾	$I_{D \text{ pulse}}$	1036	A
Avalanche Energy, Single Pulse ⁽³⁾	EAS	430	mJ
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	250	W
		3.1	
Operating Junction Temperature	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
Thermal Resistance, Junction – Case	R_{thJC}	0.5	$^\circ\text{C/W}$
Thermal Resistance, Junction – Ambient ⁽⁴⁾	R_{thJA}	40	

Notes:

- 1.Limited by maximum junction temperature.
- 2.Pulse width limited by maximum junction temperature.
3. $V_{DS} = 50 \text{ V}$, $V_{GS} = 10 \text{ V}$, $L = 0.1 \text{ mH}$.
4. R_{thJA} is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.

Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristic						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1\text{ mA}$	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.2	3	3.8	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100V, V_{GS} = 0V$	-	-	1	μA
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 100A$	-	1.5	1.8	m Ω
Forward Transconductance ⁽⁵⁾	g_{fs}	$V_{DS} = 5V, I_D = 100A$	-	238	-	S
Gate Resistance	R_g	$f = 1\text{ MHz}$	-	1.2	-	Ω
Dynamic ⁽⁵⁾						
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 50V, f = 1MHz$	-	10133	-	pF
Output Capacitance	C_{oss}		-	1326	-	pF
Reverse Transfer Capacitance	C_{rss}		-	51	-	pF
Gate Total Charge	Q_G	$V_{GS} = 10V, V_{DS} = 50V, I_D = 100A$	-	176	-	nC
Gate-Source charge	Q_{gs}		-	46	-	nC
Gate-Drain charge	Q_{gd}		-	53	-	nC
Turn-On DelayTime	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 50V, I_D = 100A, R_{GEN} = 6\Omega$	-	86	-	ns
Turn-On Rise Time	t_r		-	137	-	ns
Turn-Off DelayTime	$t_{d(off)}$		-	93	-	ns
Turn-Off Fall Time	t_f		-	97	-	ns
Reverse Diode Characteristics ⁽⁵⁾						
Body Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_F = 100A$	-	0.9	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 50A, V_{DS} = 50V, di/dt = 100A/\mu s$	-	79	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	180	-	nC

Notes:

5. Guaranteed by design, not subject to production testing.

Typical Electrical & Thermal Characteristics

Fig.1 Typ. transfer characteristics

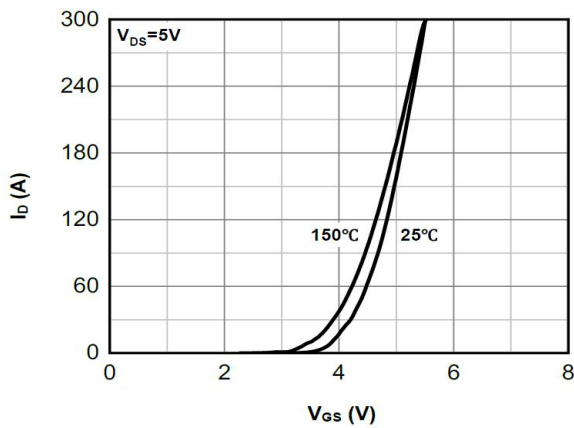


Fig.2 Typ. output characteristics

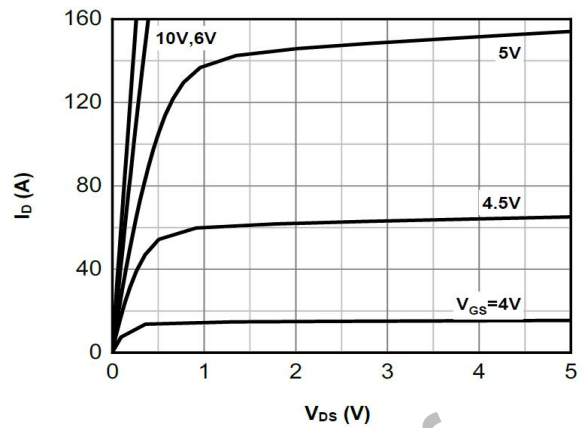


Fig.3 Normalized on-resistance vs drain current

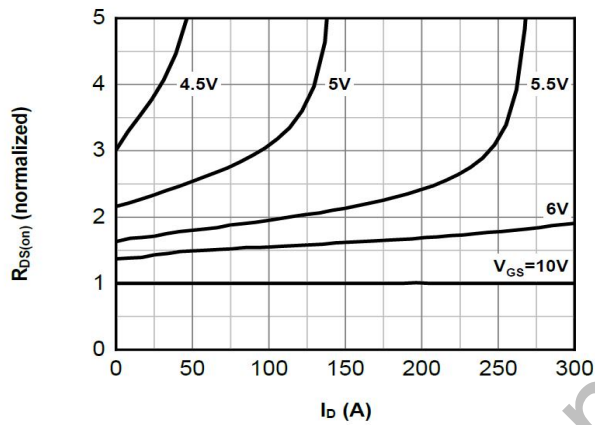


Fig.4 Typ. on-resistance vs gate-source voltage

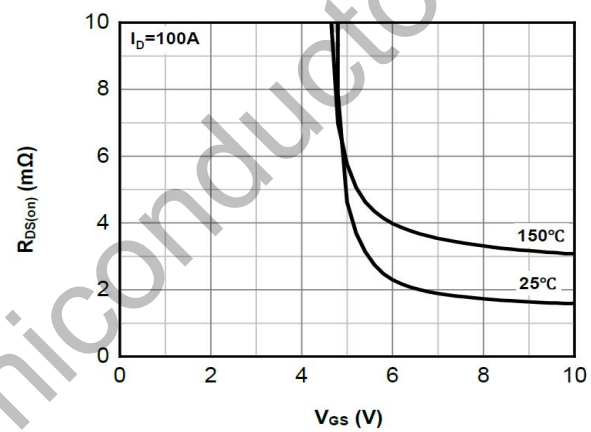


Fig.5 Normalized on-resistance vs junction temperature

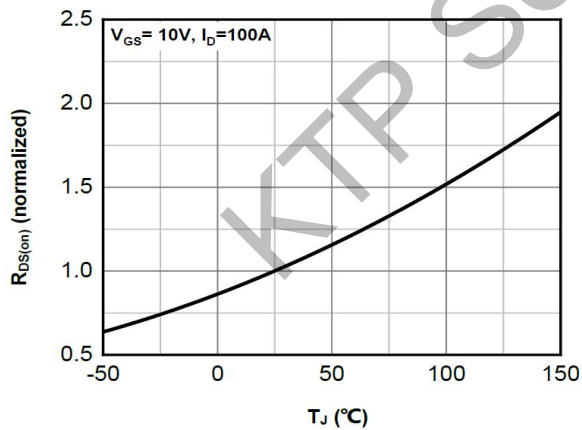
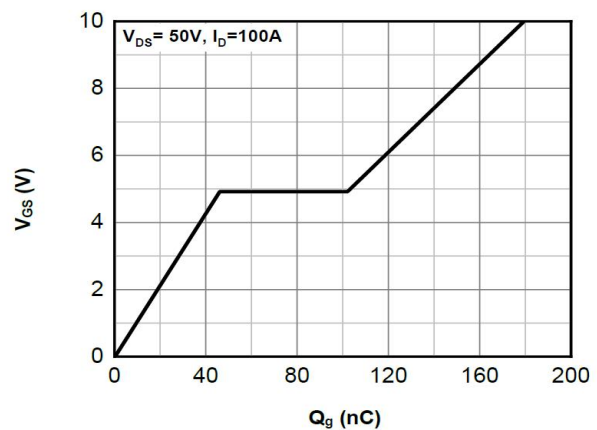


Fig.6 Typ. gate charge



Typical Electrical & Thermal Characteristics

Fig.7 Typ. forward characteristics of body diode

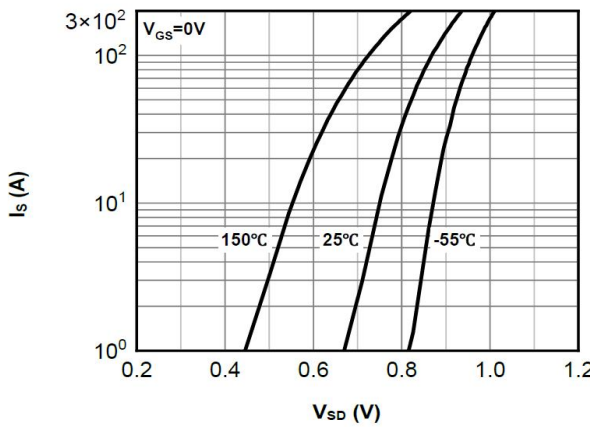


Fig.8 Safe operating area

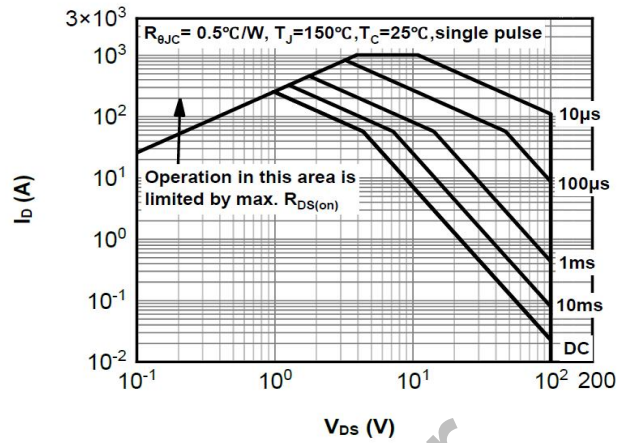


Fig.9 Typ. Capacitance

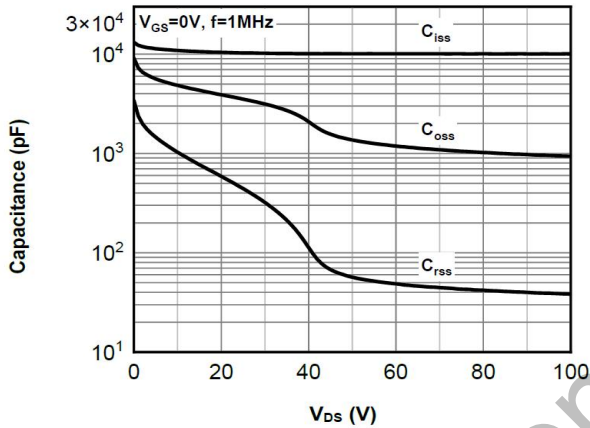


Fig.10 Single pulse maximum power dissipation

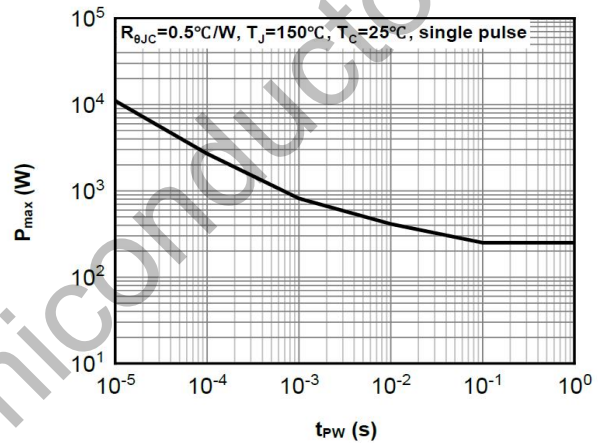


Fig.11 Max. power dissipation vs case temperature

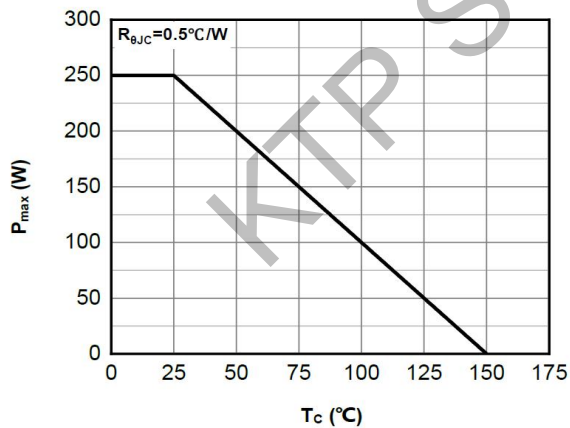
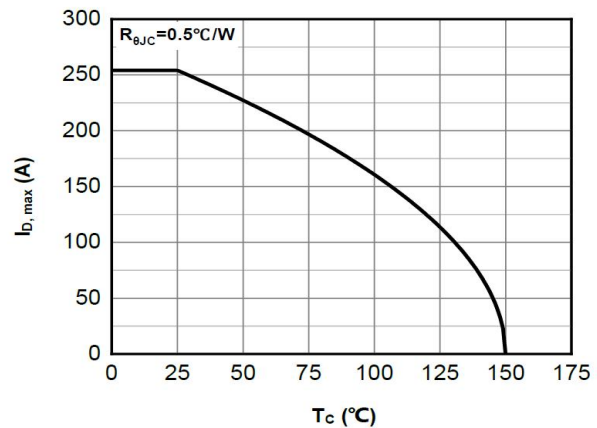


Fig.12 Max. continuous drain current vs case temperature



Typical Electrical & Thermal Characteristics

Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

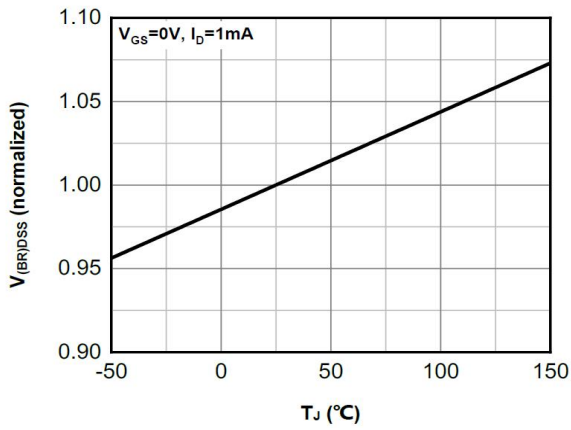


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

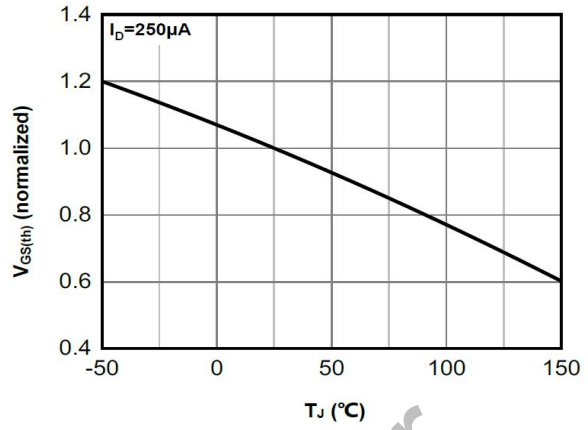
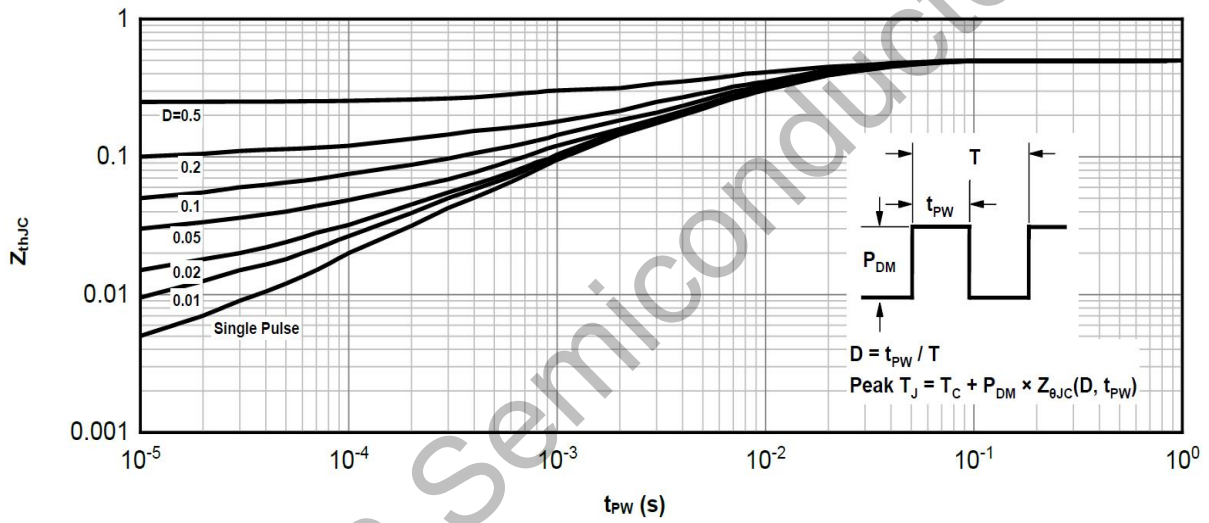
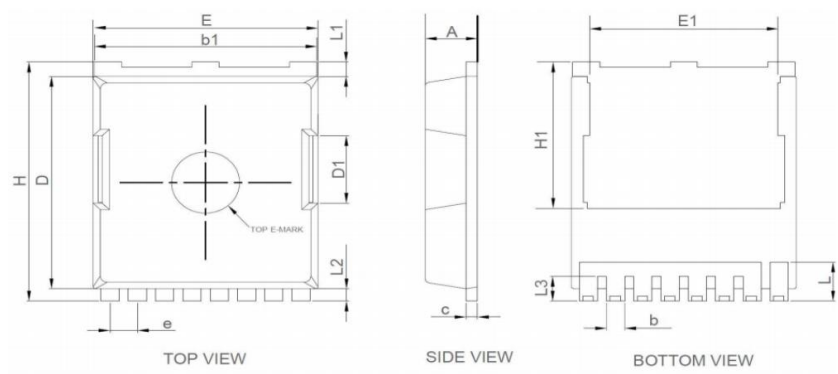


Fig.15 Transient thermal impedance from junction to case



Package Outline: TOLL



Symbol	Dimensions (Unit: mm)		
	Min.	Typ.	Max.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
b1	9.70	9.80	9.90
c	0.40	0.50	0.60
D	10.28	10.38	10.48
D1	3.20	3.30	3.40
E	9.70	9.90	10.10
E1	7.35	---	8.45
e	1.20BSC		
H	11.48	11.68	11.88
H1	6.80	---	7.40
L	1.50	---	2.10
L1	0.50	---	0.90
L2	0.50	0.60	0.70
L3	1.00	---	1.30