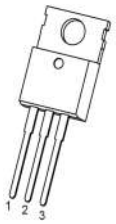
85V N-Channel SGT Power MOSFET

Product Summary

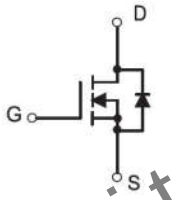
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
85V	2.5mΩ@10V	230A

TO-220C



PIN1:GATE
PIN2:DRAIN
PIN3:SOURCE

Schematic diagram



Features

- Fast switching
- 100% EAS Guaranteed
- Green device available

Applications

- Motor Drives
- UPS
- DC-DC Converter
- SR
- BMS

Marking

G020N09	: Device Code
YY	: Year Code
WW	: Week Code

Absolute Maximum rating（T_A = 25℃ unless otherwise noted）

Parameter		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	100	V
Gate - Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25°C	I_D	230	A
	T_C = 100°C		145	
Pulsed drain current		I_{DM}	920	A
Avalanche energy[1]		E_{AS}	1300	mJ
Power Dissipation		P_D	227	W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.55	℃/W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55~ +150	℃
Soldering temperature, wave soldering only allowed		T_{sold}	260	℃

Electrical Characteristics（T_A = 25℃ unless otherwise noted）

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}= 0V, I_D= 250μA	85			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}= 85V, V_{GS}= 0V, T_J= 25°C			1	μA
		V_{DS}= 85V, V_{GS}= 0V, T_J= 125°C			100	
Gate - Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}= 0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D= 250μA	2	3	4	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS}= 10V, I_D= 20A, T_J= 25℃		2.5	3.0	mΩ
Forward transconductance	g_{FS}	V_{DS}= 5V, I_D= 20A		55		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}= 40V,V_{GS}= 0V,f= 1MHz		7200		pF
Output Capacitance	C_{oss}			1400		
Reverse Transfer Capacitance	C_{rss}			45		
Gate resistance	Rg	V_{DS}= 0V,V_{GS}= 0V, f= 1MHz		1.6		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}= 40V, I_D= 20A, V_{GS}= 10 V		100		nC
Gate-source Charge	Q_{gs}			32		
Gate-drain Charge	Q_{gd}			22		
Gate plateau voltage	$V_{plateau}$			4.9		V
Turn-on Delay Time	$t_{d(on)}$	V_{DD}= 40V, V_{GS}= 10V, I_D= 20A, R_g= 3Ω		20		ns
Turn-on Rise Time	t_r			35		
Turn-off Delay Time	$t_{d(off)}$			55		
Turn-off Fall Time	t_f			30		
Source - Drain Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}= 0V, I_S= 50A			1.2	V
Reverse Recovery Time	t_{rr}	I_F= 20A, dI/dt= 100A/μs		65		ns
Reverse Recovery Charge	Q_{rr}			150		nC

Notes :

1. E_{AS} condition: T_J=25℃,V_{DD}= 40V,V_G= 10V, R_g= 25Ω, L= 1mH.

Typical Characteristic

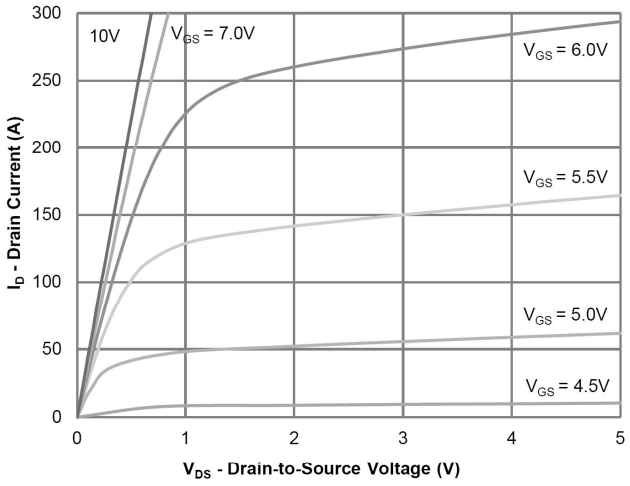


Figure 1: Output Characteristics

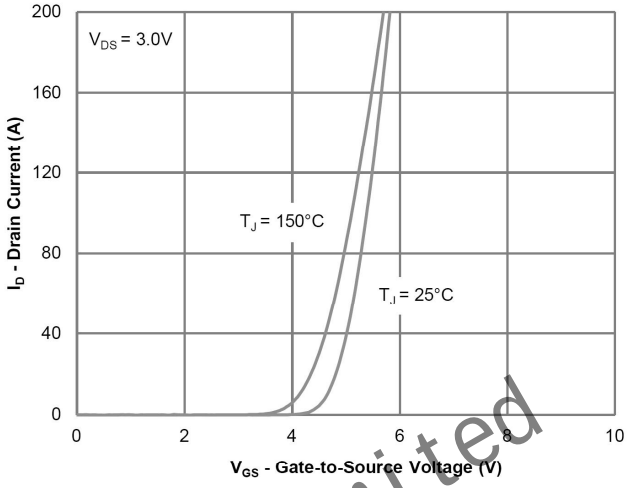


Figure 2: Transfer Characteristics

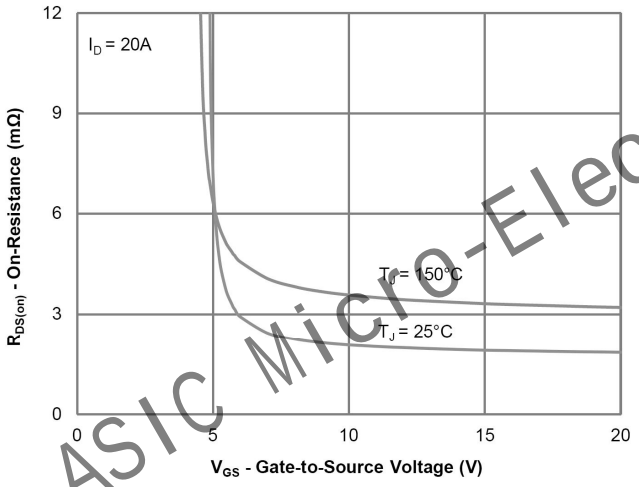


Figure 3: On-Resistance vs. Gate-Source Voltage

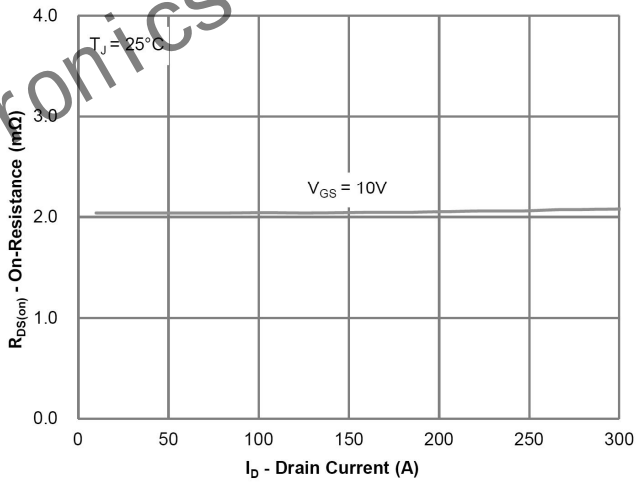


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

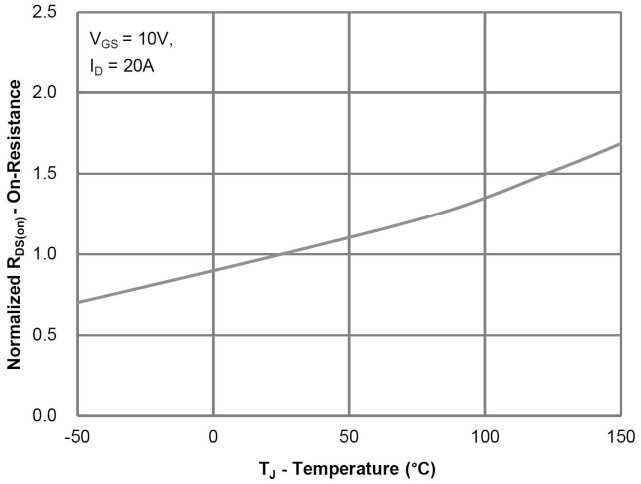


Figure 5: On-Resistance vs. Junction Temperature

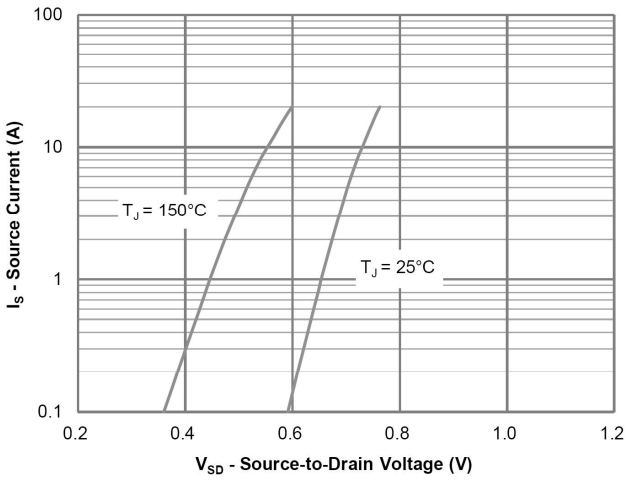


Figure 6: Source-Drain Diode Forward Voltage

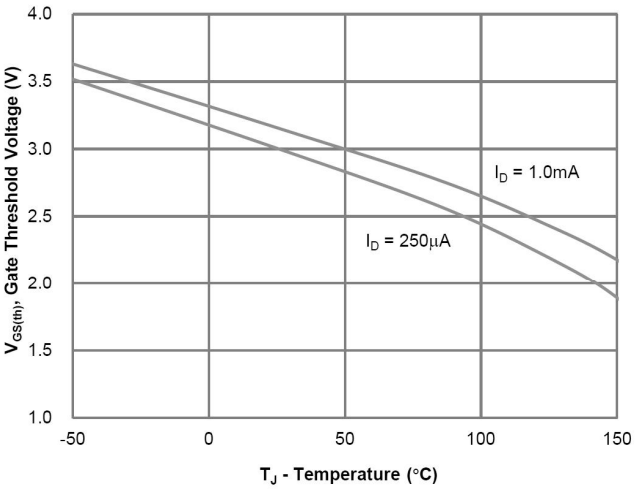


Figure 7: Gate Threshold Variation vs. Junction Temperature

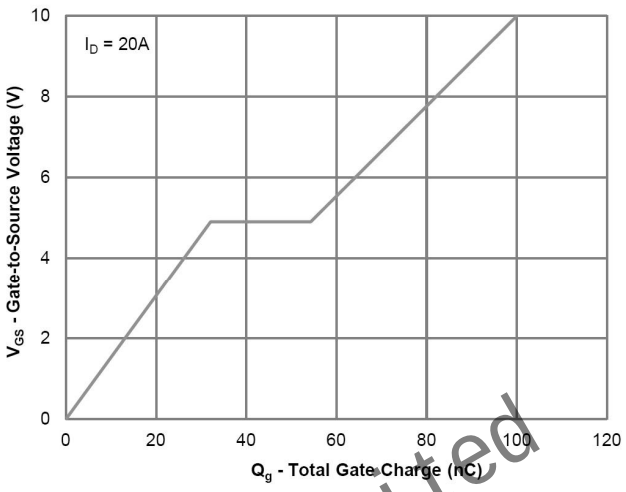


Figure 8: Gate Charge Characteristics

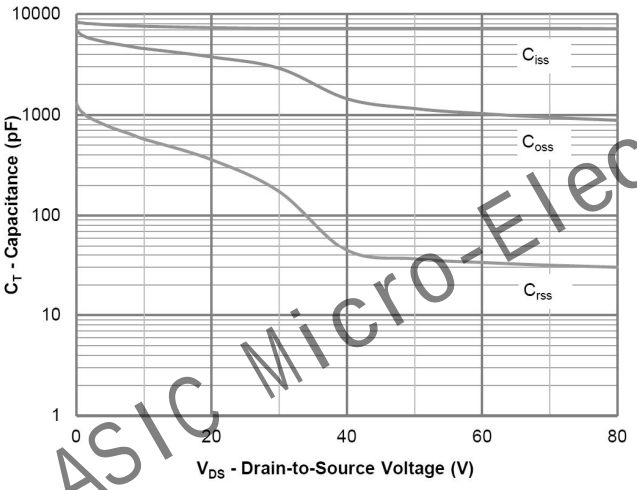


Figure 9: Capacitance Characteristics

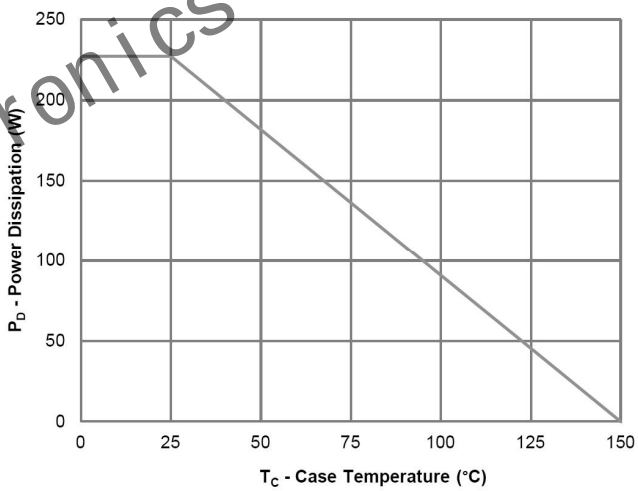


Figure 10: Power Derating

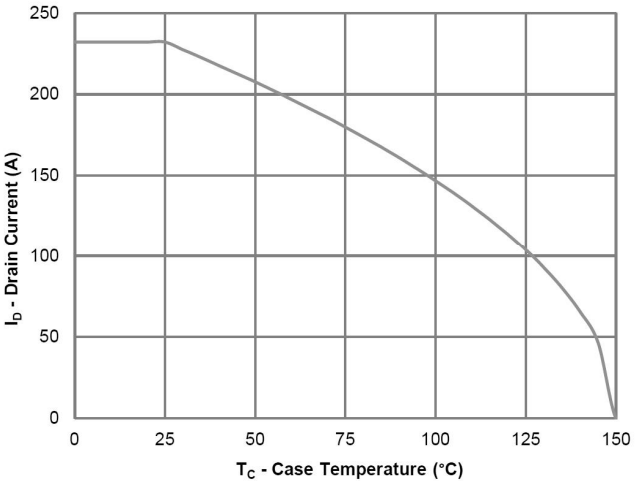


Figure 11: Current Derating

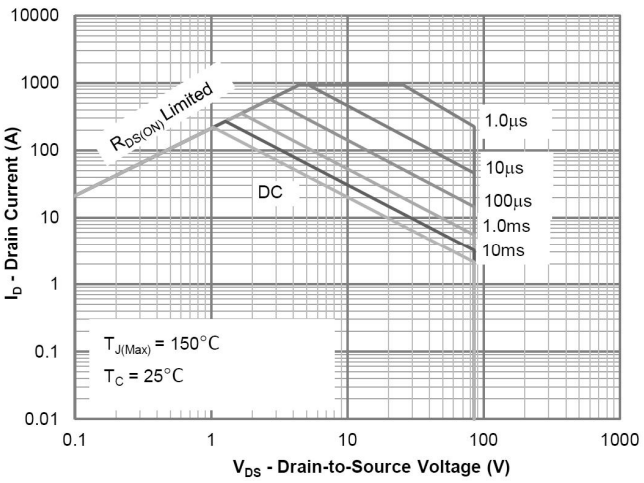


Figure 12: Safe Operating Area

Dimension

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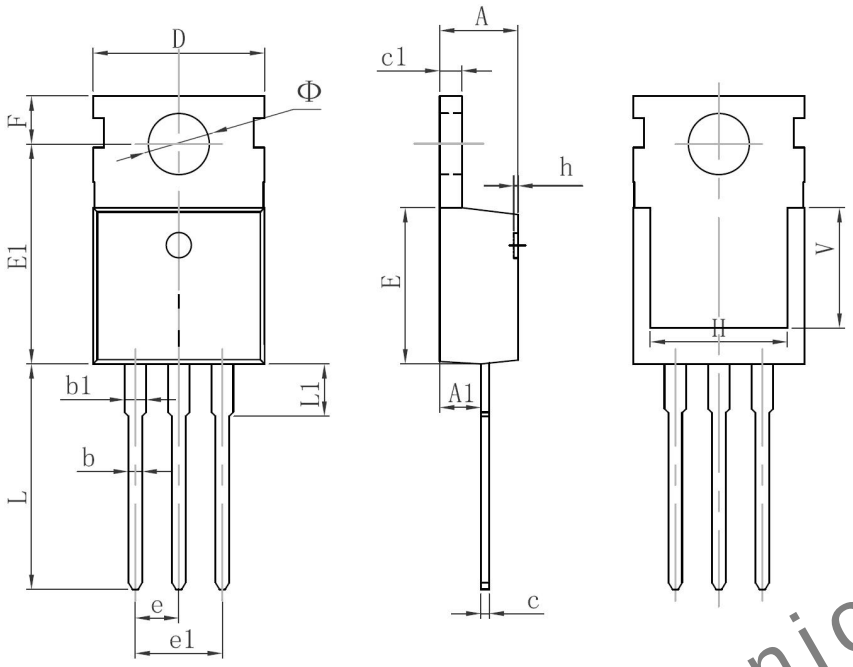

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	4.400	4.600	0.17	0.18
A1	2.250	2.550	0.08	0.10
b	0.710	0.910	0.02	0.03
b1	1.170	1.370	0.04	0.05
c	0.330	0.650	0.01	0.02
c1	1.200	1.400	0.04	0.05
D	9.910	10.25	0.39	0.40
E	8.950	9.750	0.35	0.38
E1	12.65	12.95	0.49	0.51
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.19	0.20
F	2.650	2.950	0.10	0.11
H	7.900	8.100	0.31	0.31
h	0.000	0.300	0.00	0.01
L	12.90	13.40	0.50	0.52
L1	2.850	3.250	0.11	0.12
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.13	0.15
A	4.400	4.600	0.17	0.18
A1	2.250	2.550	0.08	0.10