SUP60020E-GE3-VB Datasheet

N-Channel 100 V (D-S) MOSFET

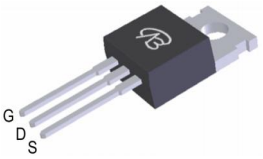
PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) MAX.	I_D (A)	Q_g (TYP.)
100	0.0020 at V_{GS} = 10 V	340	130 nC

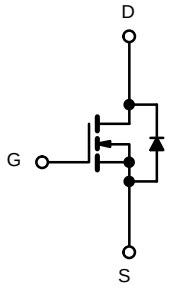
FEATURES

- SGT technology Power MOSFET
- Maximum 175°C junction temperature
- 100 % R_g and UIS tested

RoHS COMPLIANT
HALOGEN FREE

TO220





N-Channel MOSFET

APPLICATIONS

- Power supplies:
  - Uninterruptible power supplies
  - AC/DC switch-mode power supplies
  - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	340	A
	T_C = 100 °C		204	
Pulsed Drain Current (t = 100 µs)		I_{DM}	1020	
Avalanche Current	L = 0.5 mH	I_{AS}	100	
Single Avalanche Energy [a]		E_{AS}	2500	mJ
Maximum Power Dissipation [a]	T_C = 25 °C	P_D	455[b]	W
	T_C = 100 °C		227[b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) [c]	R_{thJA}	62	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.33	

Notes

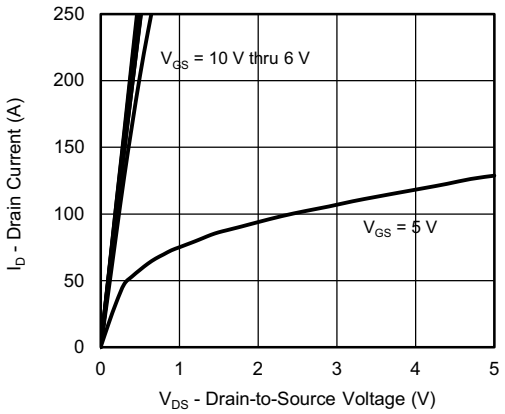
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When mounted on 1" square PCB (FR4 material).

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2	3	4	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 80 V, V_{GS} = 0 V, T_J = 125 °C	-	-	100	
		V_{DS} = 80 V, V_{GS} = 0 V, T_J = 150°C	-	-	5	mA
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	150	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 60 A	-	0.0020	-	Ω
		V_{GS} = 7.5 V, I_D = 50 A	-	0.0023	-	
Forward Transconductance [a]	g_{fs}	V_{DS} = 25 V, I_D = 100 A	-	260	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz	-	9400	-	pF
Output Capacitance	C_{oss}		-	3246	-	
Reverse Transfer Capacitance	C_{rss}		-	18	-	
Total Gate Charge [c]	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 20 A	-	130	-	nC
Gate-Source Charge [c]	Q_{gs}		-	50	-	
Gate-Drain Charge [c]	Q_{gd}		-	30	55	
Gate Resistance	R_g	f = 1 MHz	-	0.8	1.2	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 50 V, R_L = 5 Ω I_D ≅ 50 A, V_{GEN} = 10 V, R_g = 1 Ω	-	33	-	ns
Rise Time [c]	t_r		-	30	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	50	-	
Fall Time [c]	t_f		-	55	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Pulsed Current (t = 100 µs)	I_{SM}		-	-	1020	A
Forward Voltage [a]	V_{SD}	I_F = 500 A, V_{GS} = 0 V	-	0.75	1.2	V
Reverse Recovery Time	t_{rr}	I_F = 50 A, di/dt = 100 A/µs	-	140	280	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$		-	11	20	A
Reverse Recovery Charge	Q_{rr}		-	0.3	0.8	µC

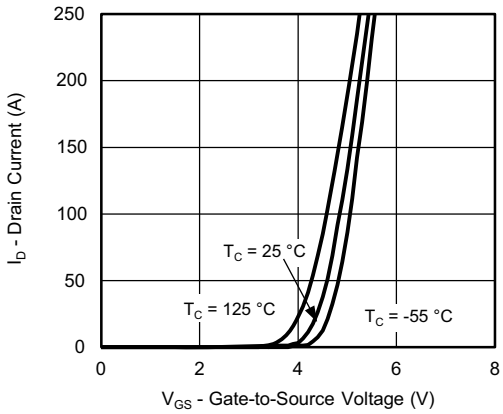
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

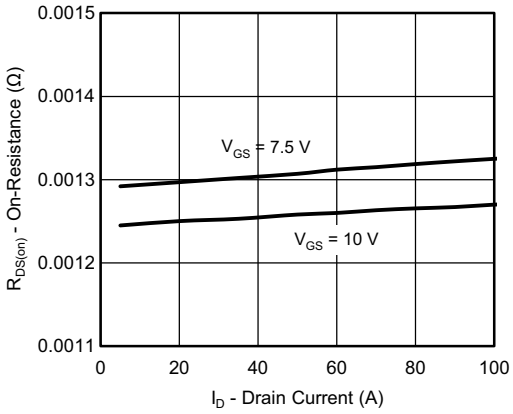
TYPICAL CHARACTERISTICS (T_C = 25 °C, unless otherwise noted)



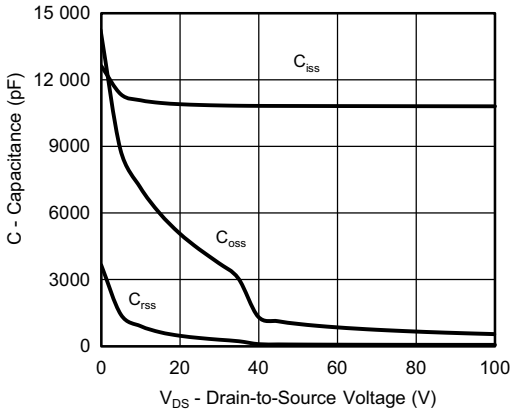
Output Characteristics



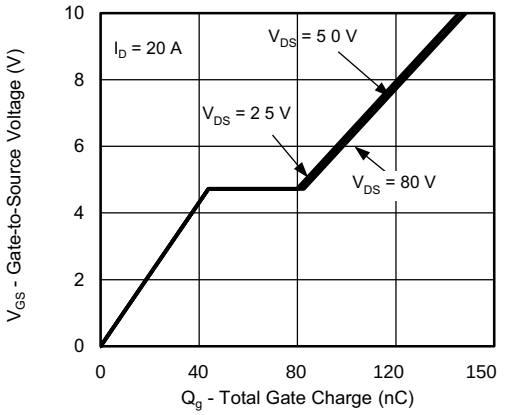
Transfer Characteristics



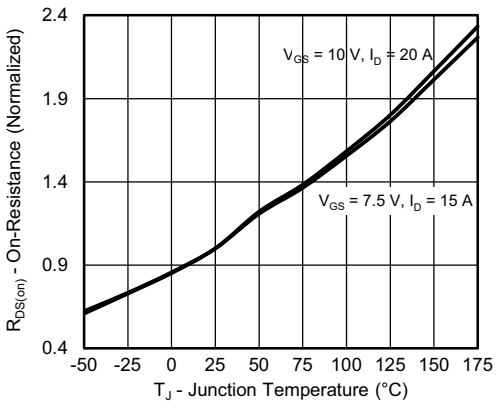
On-Resistance vs. Drain Current and Gate Voltage



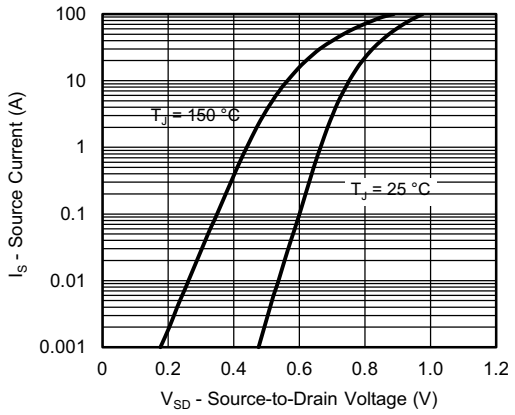
Capacitance



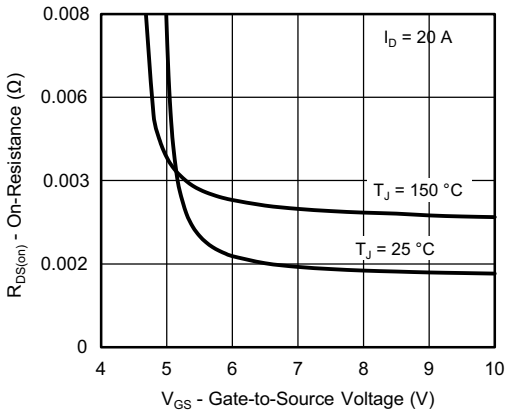
Gate Charge



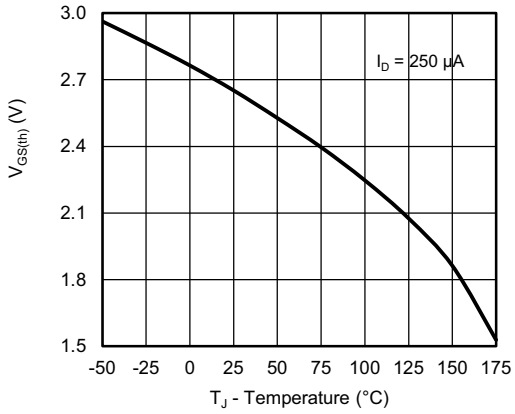
On-Resistance vs. Junction Temperature



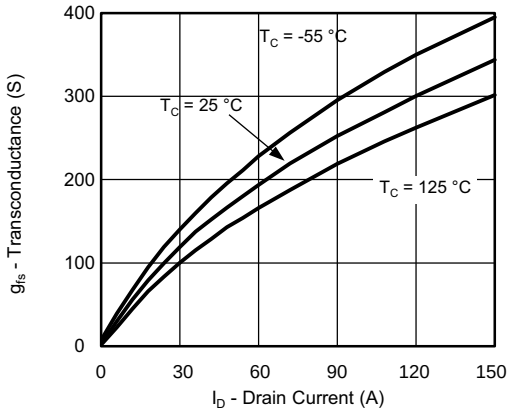
Source-Drain Diode Forward Voltage



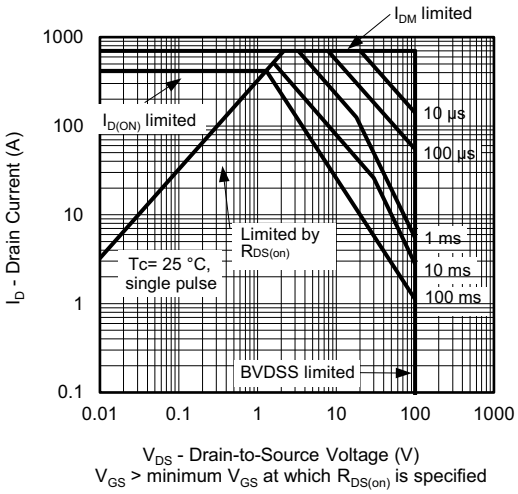
On-Resistance vs. Gate-to-Source Voltage



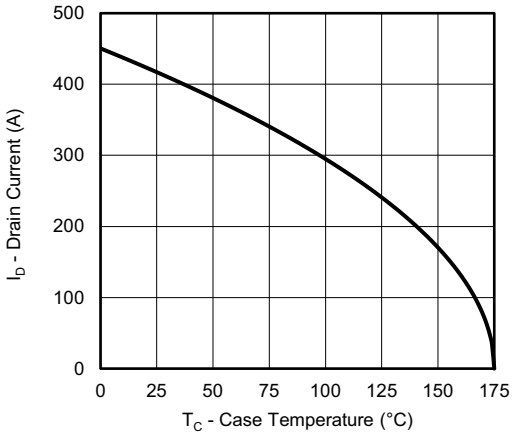
Threshold Voltage



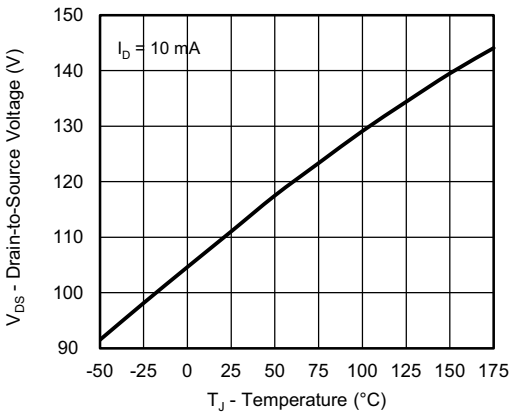
Transconductance



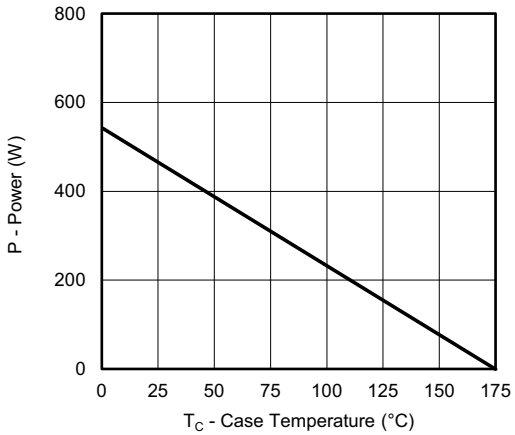
Safe Operating Area, Junction-to-Ambient



Current Derating [a]



Drain Source Breakdown vs. Junction Temperature

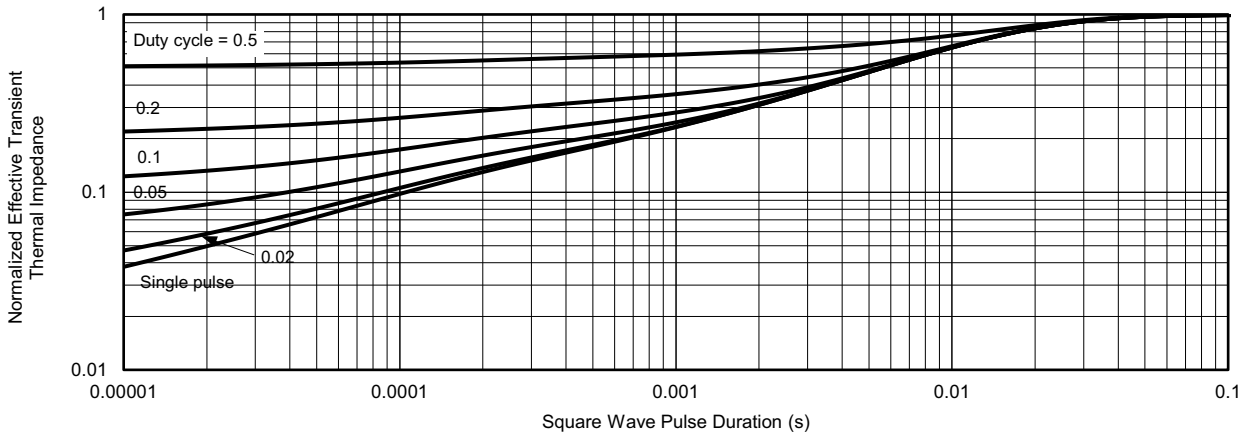


Power, Junction-to-Case

Note

a. The power dissipation P_D is based on T_J max. = 25 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

THERMAL RATINGS (T_C = 25 °C, unless otherwise noted)



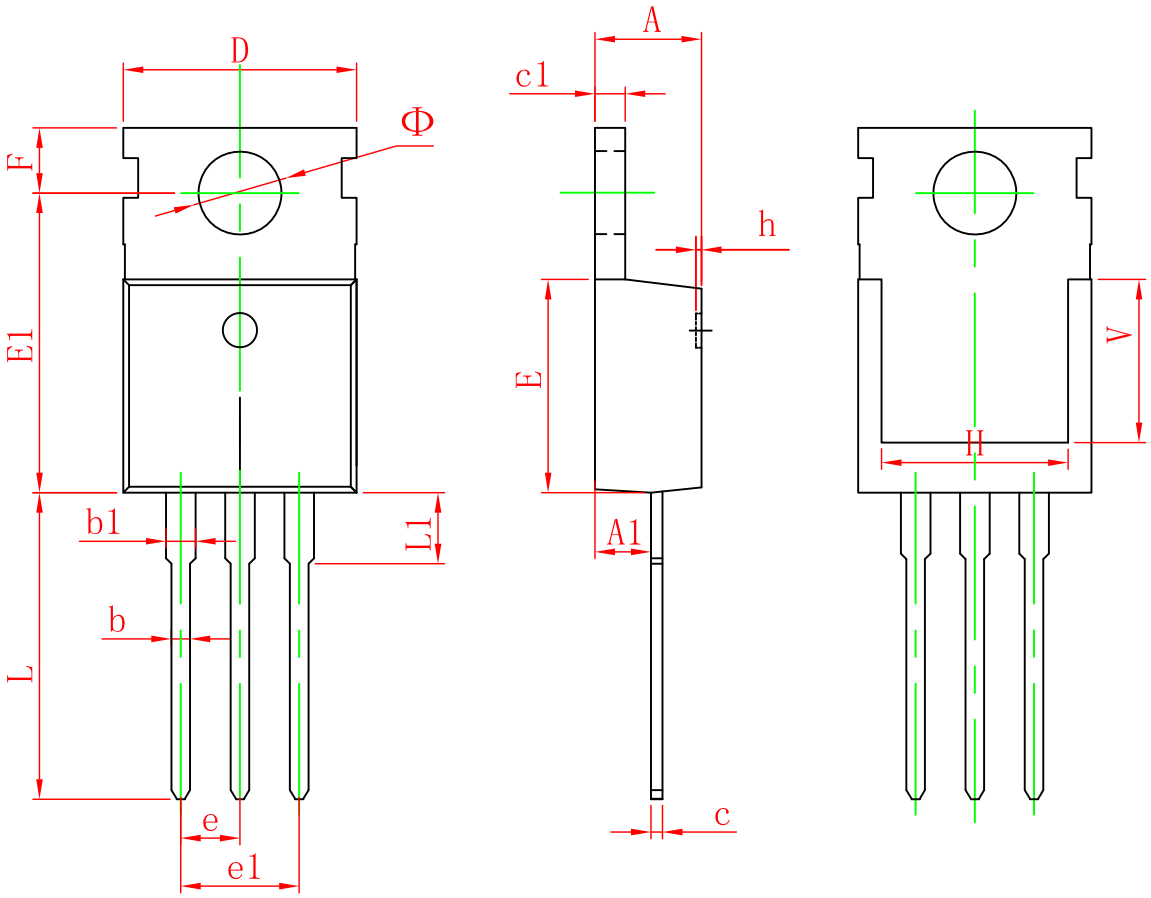
Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction to Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction to Case (25 °C)

  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150

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