



BC16SG120SPS

N-Channel Silicon Carbide Power MOSFET

1200 V, 129 A, 16 mΩ

Features

- High switching speed with a low gate charge
- Fast intrinsic diode with low reverse recovery
- Robust Avalanche Capability
- 100% Avalanche Tested
- Pb-free, Halogen Free, and RoHS Compliant

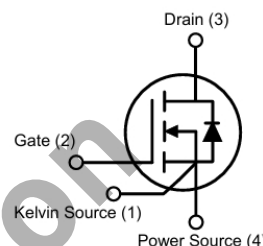
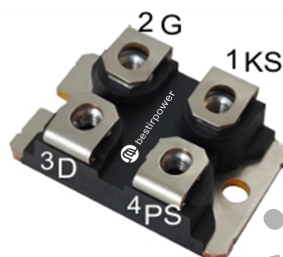
Benefits

- System efficiency improvement
- Higher frequency applicability
- Increased power density
- Reduced cooling effort

Applications

- Solar inverter
- EV charging station
- UPS
- Industrial power supply

$BV_{DSS, T_C=25^{\circ}C}$	$I_D, T_C=25^{\circ}C$	$R_{DS(on), typ}$	$Q_{g, typ}$
1200 V	129 A	16 mΩ	152 nC



Absolute Maximum Ratings ($T_C = 25^{\circ}C$ unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		1200	V
V_{GS}	Gate to Source Voltage (DC)		-10 / +22	V
V_{GSop}	Recommended Operation Value		-5...-3 / +18	V
I_D	Drain Current	Continuous ($T_C = 25^{\circ}C$) (Note1)	129	A
		Continuous ($T_C = 100^{\circ}C$)	91	
I_{DM}	Drain Current	Pulsed (Note1)	322	A
P_D	Power Dissipation	($T_C = 25^{\circ}C$)	TBD	W
		Derate Above 25°C	TBD	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to 175	°C
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 10 Seconds		260	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	TBD	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	TBD	

Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$		1	100	μA
		$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$		10		
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = +22\text{ V}, V_{DS} = 0\text{ V}$			+100	nA
		$V_{GS} = -10\text{ V}, V_{DS} = 0\text{ V}$			-100	

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 24\text{ mA}$ (tested after $V_{GS} = 22\text{ V}, 1\text{ ms pulse}$)	2.0	3.0	4.5	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 18\text{ V}, I_D = 50\text{ A}$		16.0	22.4	mΩ
		$V_{GS} = 18\text{ V}, I_D = 50\text{ A}, T_J = 175^\circ\text{C}$		25.6		
		$V_{GS} = 15\text{ V}, I_D = 50\text{ A}$		21.5		
g_{fs}	Transconductance	$V_{DS} = 20\text{ V}, I_D = 50\text{ A}$		32.7		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}, f = 250\text{ kHz}$		4063		pF
C_{oss}	Output Capacitance			227		
C_{rss}	Reverse Capacitance			3		
E_{oss}	Stored Energy in Output Capacitance	$V_{DS} = 0\text{ V to } 800\text{ V}, V_{GS} = 0\text{ V}$		94		μJ
$C_{o(er)}$	Energy Related Output Capacitance			295		pF
$C_{o(tr)}$	Time Related Output Capacitance			476		
$Q_{g(tot)}$	Total Gate Charge	$V_{DS} = 800\text{ V}, I_D = 50\text{ A},$ $V_{GS} = -3\text{ V} / 18\text{ V},$ Inductive load		152		nC
Q_{gs}	Gate to Source Charge			49		
Q_{gd}	Gate to Drain "Miller" Charge			29		
R_G	Internal Gate Resistance	$f = 1\text{ MHz}, V_{AC} = 30\text{ mV}$		2.7		Ω

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{DS} = 800\text{ V}, I_D = 50\text{ A},$ $V_{GS} = -3\text{ V} / 18\text{ V}, R_G = 4.7\text{ }\Omega,$ FWD : BCH120S20D2, Inductive load		34		ns
t_r	Turn-on Rise Time			54		
$t_{d(off)}$	Turn-off Delay Time			68		
t_f	Turn-off Fall Time			13		
E_{on}	Turn-on Switching Energy			1325		μJ
E_{off}	Turn-off Switching Energy			455		
E_{tot}	Total Switching Energy			1780		

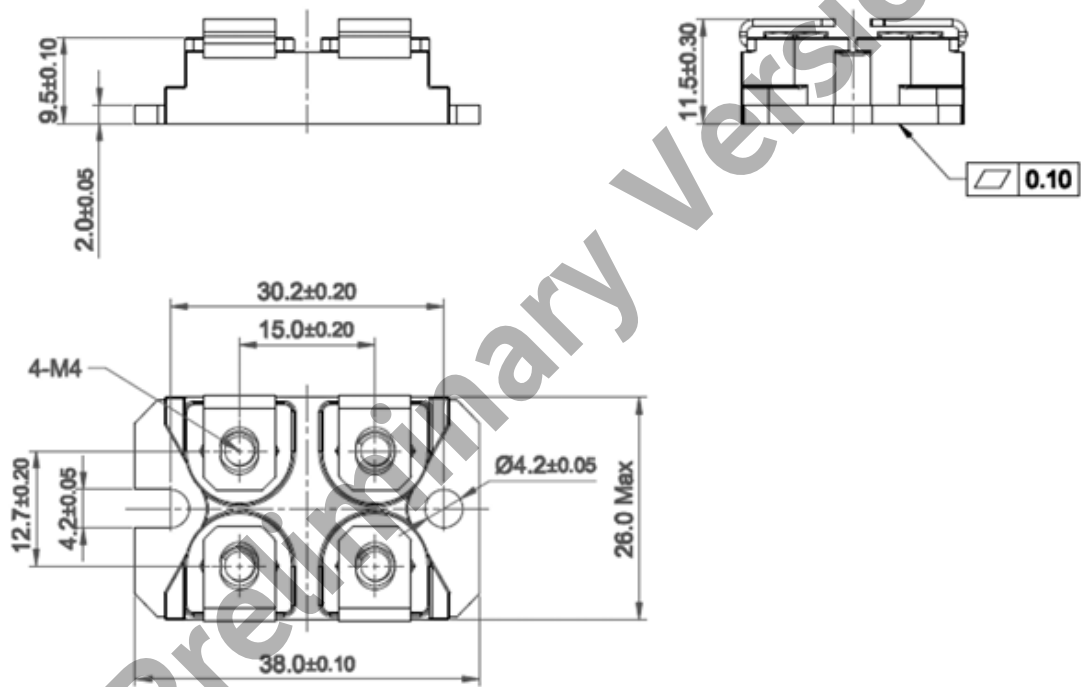
Electrical Characteristics (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Source-Drain Diode Characteristics						
I _S	Continuous Diode Forward Current	V _{GS} = -3 V (Note1)			122	A
I _{SM}	Pulsed Diode Forward Current	V _{GS} = -3 V (Note1)			322	
V _{SD}	Diode Forward Voltage	V _{GS} = -3 V, I _{SD} = 50 A		4.0		V
t _{rr}	Reverse Recovery Time	V _{DD} = 800 V, I _{SD} = 50 A, dI _F /dt = 1200 A/μs, Includes Q _{oss}		43		ns
Q _{rr}	Reverse Recovery Charge			420		nC
I _{rrm}	Peak Reverse Recovery Current			17		A

※Note 1 : Limited by maximum junction temperature.

Package Outlines
SOT-227

Package Drawing and Dimensions (UNIT: mm)



Package Marking and Ordering Information

Part Number	Top Marking	Package	Packing Method	Quantity
BC16SG120SPS	BC16SG120SPS	SOT-227	Tube	10 units

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