



# BCZ120N160W1

## N-Channel Silicon Carbide Power MOSFET

1200 V, 22 A, 160 mΩ

### Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness
- Halogen Free, RoHS Compliant

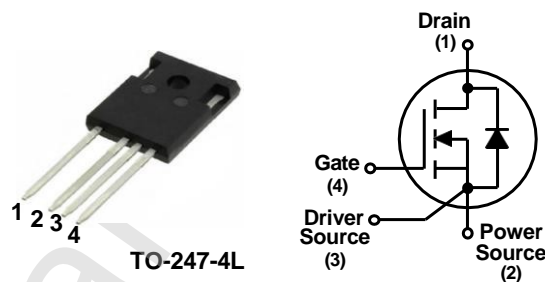
$BV_{DSS, T_c=25^\circ C}$	$I_D, T_c=25^\circ C$	$R_{DS(on), typ}$	$Q_{g, typ}$
1200 V	22 A	160 mΩ	40 nC

### Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

### Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives
- Pulsed Power applications



### Absolute Maximum Ratings (T<sub>c</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Value	Unit
V <sub>DSmax</sub>	Drain - Source Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =100μA	1200	V
V <sub>GSMAX</sub>	Gate - Source Voltage	Absolute maximum values	-8 / +22	V
V <sub>GSop</sub>	Gate - Source Voltage	Recommended operational values	-5 / +18	V
I <sub>D</sub>	Continuous Drain Current	V <sub>GS</sub> =18V, T <sub>c</sub> =25°C	22	A
		V <sub>GS</sub> =18V, T <sub>c</sub> =100°C	16	
I <sub>DM</sub>	Pulse Drain Current	Pulse width limited by T <sub>jmax</sub>	58	A
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature		-55 to 175	°C

### Electrical Characteristics (T<sub>C</sub> = 25°C, Note1)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
BV <sub>DSS</sub>	Drain to Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> =100 μA	1200			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =5.0 mA, T <sub>C</sub> =25°C	2.0	3.5	4.0	V
		V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =5.0 mA, T <sub>C</sub> =175°C		2.7		
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 1200 V, V <sub>GS</sub> = 0 V		10	100	μA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = 18 V, V <sub>DS</sub> = 0 V		10	200	nA
R <sub>DS(on)</sub>	Static Drain to Source On Resistance	V <sub>GS</sub> = 18 V, I <sub>D</sub> = 10 A, T <sub>C</sub> = 25°C		125	180	mΩ
		V <sub>GS</sub> = 15 V, I <sub>D</sub> = 10 A, T <sub>C</sub> = 25°C		160	190	
		V <sub>GS</sub> = 18 V, I <sub>D</sub> = 10 A, T <sub>C</sub> = 175°C		220		
g <sub>fs</sub>	Transconductance	V <sub>GS</sub> = 18 V, I <sub>D</sub> = 10 A, T <sub>J</sub> = 25°C		7.0		S
		V <sub>GS</sub> = 18 V, I <sub>D</sub> = 10 A, T <sub>J</sub> = 175°C		6.0		
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =800 V, f=1MHz, V <sub>AC</sub> =25 mV		550		pF
C <sub>oss</sub>	Output Capacitance			28		
C <sub>rss</sub>	Reverse Transfer Capacitance			8		
E <sub>ON</sub>	Turn-On Switching Energy	V <sub>DS</sub> =800V, V <sub>GS</sub> = -5/18V, I <sub>D</sub> = 10A, R <sub>G(ext)</sub> = 0Ω, L= 256μH		200		μJ
E <sub>OFF</sub>	Turn-Off Switching Energy			50		
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DS</sub> =800V, V <sub>GS</sub> = -5/18V, I <sub>D</sub> = 100A, R <sub>G(ext)</sub> = 0Ω, Timing relative to V <sub>DS</sub>		20		ns
t <sub>r</sub>	Rise Time			45		
t <sub>d(off)</sub>	Turn-Off Delay Time			20		
t <sub>f</sub>	Fall Time			15		
R <sub>G(int)</sub>	Internal Gate Resistance	f=1 MHz, V <sub>AC</sub> =25mV		10.0		Ω
Q <sub>gs</sub>	Gate to Source Charge	V <sub>DD</sub> =800V, V <sub>GS</sub> = -5/18V, I <sub>D</sub> = 10A		11		nC
Q <sub>gd</sub>	Gate to Drain Charge			8		
Q <sub>g</sub>	Total Gate Charge			40		

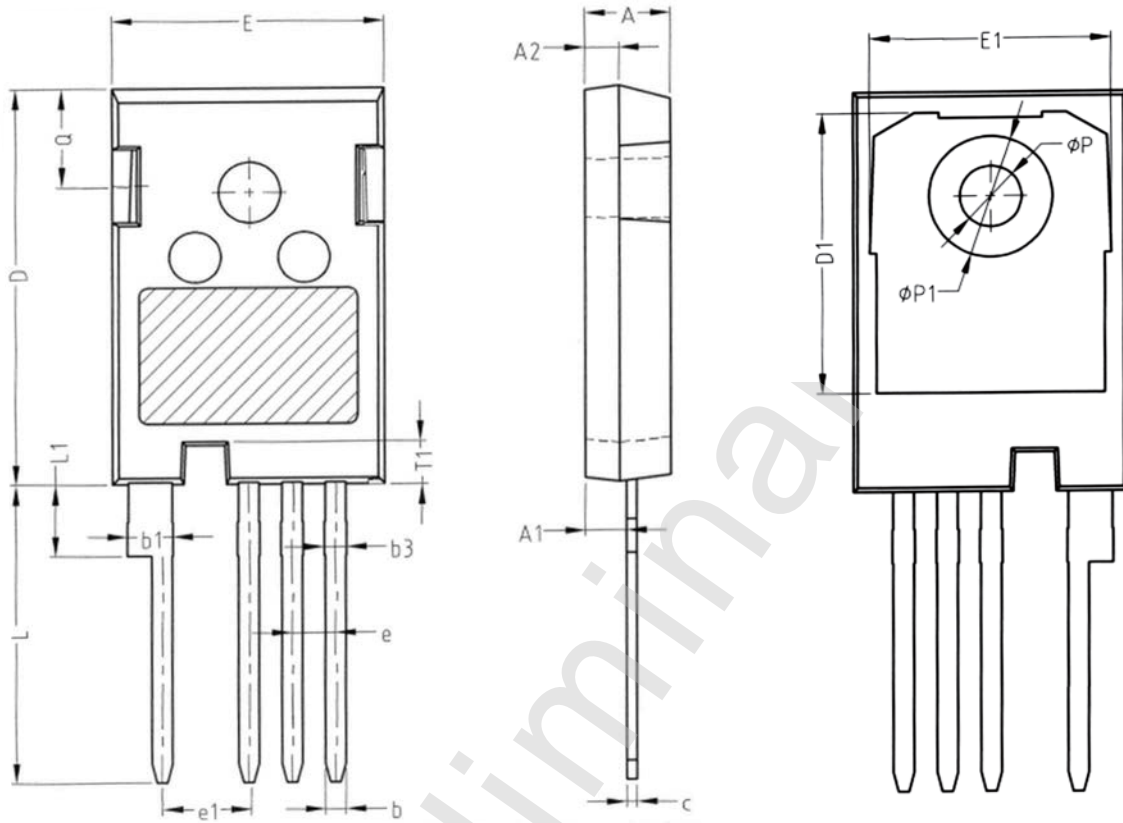
### Reverse Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = -5 V, I <sub>SD</sub> = 5 A, T <sub>J</sub> = 25°C		3.5		V
		V <sub>GS</sub> = -5 V, I <sub>SD</sub> = 5 A, T <sub>J</sub> = 175°C		3.2		
I <sub>S</sub>	Continuous Diode Forward Current	T <sub>C</sub> = 25°C			30	A
t <sub>rr</sub>	Reverse Recovery time	V <sub>GS</sub> = -5V, I <sub>SD</sub> = 10 A, V <sub>R</sub> = 800V, dif / dt=1200A/μs;		10		ns
Q <sub>rr</sub>	Reverse Recovery Charge			40		nC
I <sub>rrm</sub>	Peak Reverse Recovery Current			3		A

※. Note 1 : Limited by maximum junction temperature.

Package Outlines

TO247-4



SYMBOL	NM		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.80	2.00	2.20
b	1.06	1.21	1.36
b1	2.33	2.63	2.93
b3	1.07	1.30	1.60
c	0.51	0.61	0.75
D	23.30	23.45	23.60
D1	16.25	16.55	16.85
E	15.74	15.94	16.14
E1	13.72	14.02	14.32
T1	2.35	2.50	2.65
e	2.54 BSC		
e1	5.08 BSC		
Q	5.49	5.79	6.09
L	17.27	17.57	17.87
L1	3.99	4.19	4.39
ϕp	3.40	3.60	3.80
ϕp1	7.19 REF		

\* Dimensions in millimeters

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