Silicon Carbide (SiC) MOSFET - 56 mohm, 650 V, M2, D2PAK-7L
NVBG075N065SC1

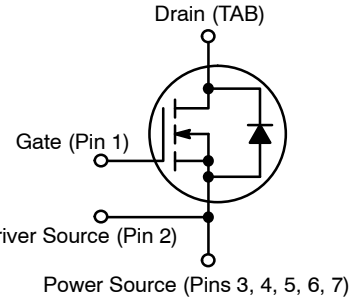
$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
650 V	85 mΩ @ 18 V	37 A

Features

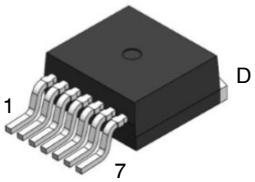
- Typ. $R_{DS(on)}$ = 56 mΩ @ V_{GS} = 18 V
  Typ. $R_{DS(on)}$ = 75 mΩ @ V_{GS} = 15 V
- Ultra Low Gate Charge ($Q_{G(tot)}$ = 59 nC)
- Low Output Capacitance (C_{oss} = 109 pF)
- 100% Avalanche Tested
- AEC−Q101 Qualified and PPAP Capable
- RoHS Compliant

Typical Applications

- Automotive On Board Charger
- Automotive DC/DC Converter for EV/HEV



N−CHANNEL MOSFET



D2PAK−7L
CASE 418BJ

MARKING DIAGRAM

BG075N065SC1 = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	650	V
Gate−to−Source Voltage			V_{GS}	−8/+22	V
Recommended Operation Values of Gate − Source Voltage		T_C < 175°C	V_{GSop}	−5/+18	V
Continuous Drain Current (Note 2)	Steady State	T_C = 25°C	I_D	37	A
Power Dissipation (Note 2)	Steady State	T_C = 25°C	P_D	139	W
Continuous Drain Current (Notes 1, 2)	Steady State	T_C = 100°C	I_D	26	A
Power Dissipation (Notes 1, 2)	Steady State	T_C = 100°C	P_D	69	W
Pulsed Drain Current (Note 3)		T_C = 25°C	I_{DM}	101	A
Operating Junction and Storage Temperature Range			T_J, T_{stg}	−55 to +175	°C
Source Current (Body Diode)			I_S	32	A
Single Pulse Drain−to−Source Avalanche Energy (I_L = 12.9 A_{pk}, L = 1 mH) (Note 4)			E_{AS}	83	mJ
Maximum Lead Temperature for Soldering, 1/8″ from Case for 10 Seconds			T_L	260	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface mounted on a FR−4 board using1 in2 pad of 2 oz copper.
2. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
3. Repetitive rating, limited by max junction temperature.
4. E_{AS} of 83 mJ is based on starting T_J = 25°C; L = 1 mH, I_{AS} = 12.9 A, V_{DD} = 50 V, V_{GS} = 18 V.

THERMAL CHARACTERISTICS

Parameter	Symbol	Typ	Max	Units
Thermal Resistance Junction–to–Case (Note 2)	$R_{\theta JC}$	1.08	–	°C/W
Thermal Resistance Junction–to–Ambient (Notes 1, 2)	$R_{\theta JA}$	–	40	°C/W

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain–to–Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA		650			V
Drain–to–Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 20 mA, refer to 25°C (Note 5)			0.12		V/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 650 V	T_J = 25°C			10	μA
			T_J = 175°C (Note 5)			1	mA
Gate–to–Source Leakage Current	I_{GSS}	V_{GS} = +18/–5 V, V_{DS} = 0 V				250	nA
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS} , I_D = 5 mA		1.8	2.8	4.3	V
Recommended Gate Voltage	V_{GOP}			–5		+18	V
Drain–to–Source On Resistance	$R_{DS(on)}$	V_{GS} = 15 V, I_D = 15 A, T_J = 25°C			75		mΩ
		V_{GS} = 18 V, I_D = 15 A, T_J = 25°C			56	85	
		V_{GS} = 18 V, I_D = 15 A, T_J = 175°C (Note 5)			70		
Forward Transconductance	g_{FS}	V_{DS} = 10 V, I_D = 15 A (Note 5)			8		S
CHARGES, CAPACITANCES & GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 325 V (Note 5)			1191		pF
Output Capacitance	C_{OSS}				109		
Reverse Transfer Capacitance	C_{RSS}				11		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = –5/18 V, V_{DS} = 520 V, I_D = 15 A (Note 5)			59		nC
Gate–to–Source Charge	Q_{GS}				17		
Gate–to–Drain Charge	Q_{GD}				20		
Gate–Resistance	R_G	f = 1 MHz			5.6		Ω
SWITCHING CHARACTERISTICS							
Turn–On Delay Time	$t_{d(ON)}$	V_{GS} = –5/18 V, V_{DS} = 400 V, I_D = 15 A, R_G = 2.2 Ω, Inductive Load (Note 5)			9		ns
Rise Time	t_r				12		
Turn–Off Delay Time	$t_{d(OFF)}$				20		
Fall Time	t_f				8		
Turn–On Switching Loss	E_{ON}				35		μJ
Turn–Off Switching Loss	E_{OFF}				12		
Total Switching Loss	E_{TOT}				47		
SOURCE–DRAIN DIODE CHARACTERISTICS							
Continuous Source–Drain Diode Forward Current	I_{SD}	V_{GS} = –5 V, T_J = 25°C (Note 5)				32	A
Pulsed Source–Drain Diode Forward Current (Note 3)	I_{SDM}	V_{GS} = –5 V, T_J = 25°C (Note 5)				101	A
Forward Diode Voltage	V_{SD}	V_{GS} = –5 V, I_{SD} = 15 A, T_J = 25°C			4.4		V

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
SOURCE−DRAIN DIODE CHARACTERISTICS						
Reverse Recovery Time	t_{RR}	V_{GS} = −5/18 V, I_{SD} = 15 A, dI_S/dt = 1000 A/μs (Note 5)		16		ns
Reverse Recovery Charge	Q_{RR}			66		nC
Reverse Recovery Energy	E_{REC}			2.6		μJ
Peak Reverse Recovery Current	I_{RRM}			8.4		A
Charge time	Ta			8.6		ns
Discharge time	Tb			7.1		ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

5. Defind by design, not subject to production test.

TYPICAL CHARACTERISTICS

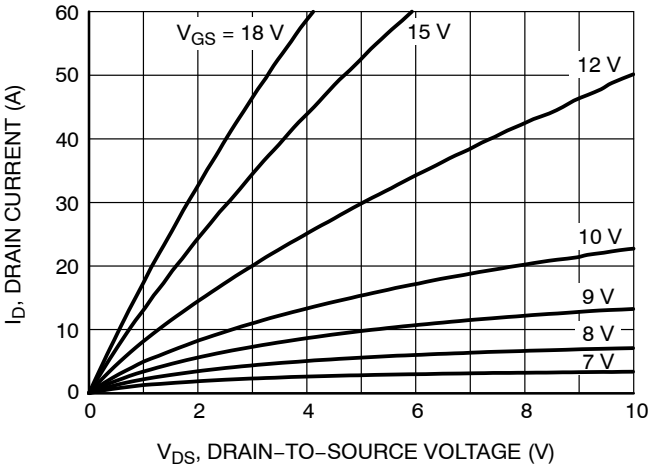


Figure 1. On−Region Characteristics

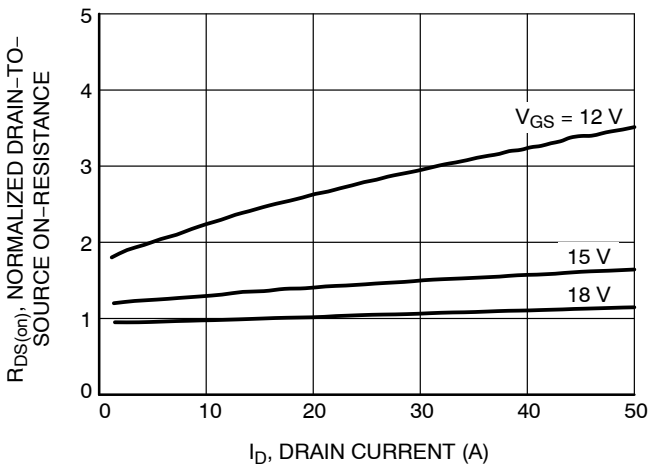


Figure 2. Normalized On−Resistance vs. Drain Current and Gate Voltage

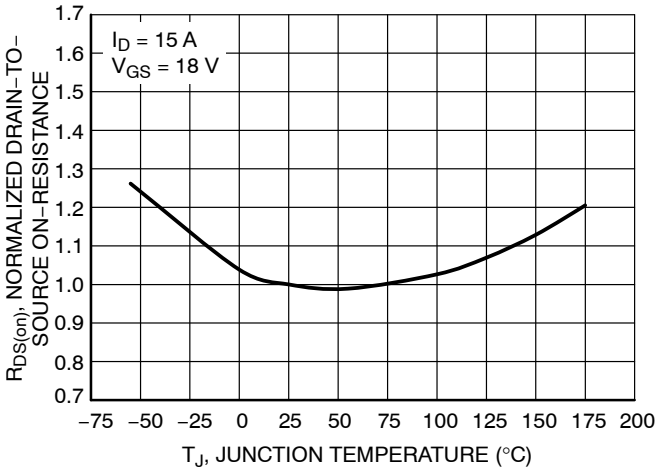


Figure 3. On−Resistance Variation with Temperature

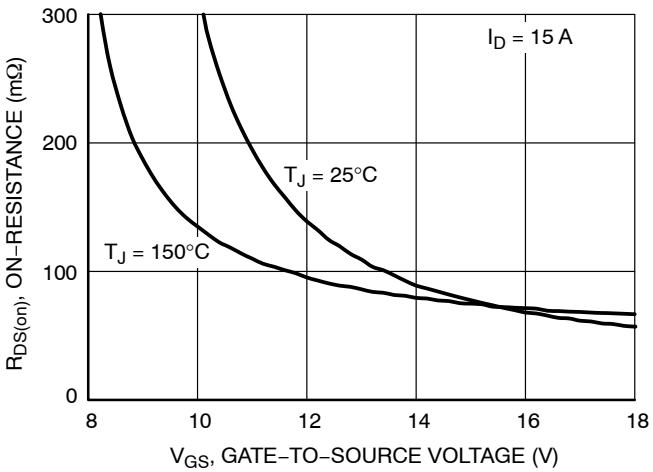


Figure 4. On−Resistance vs. Gate−to−Source Voltage

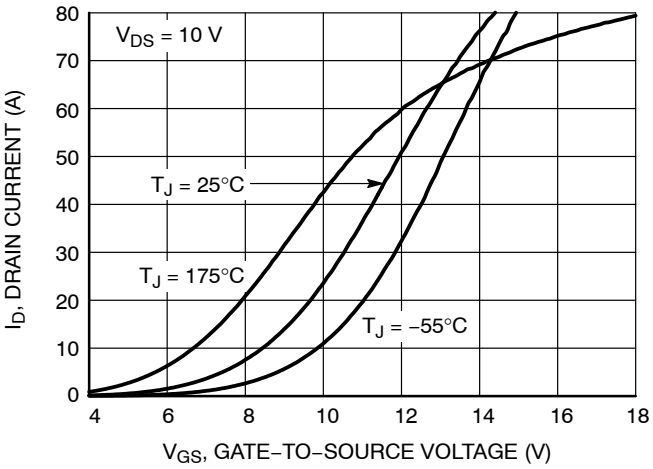


Figure 5. Transfer Characteristics

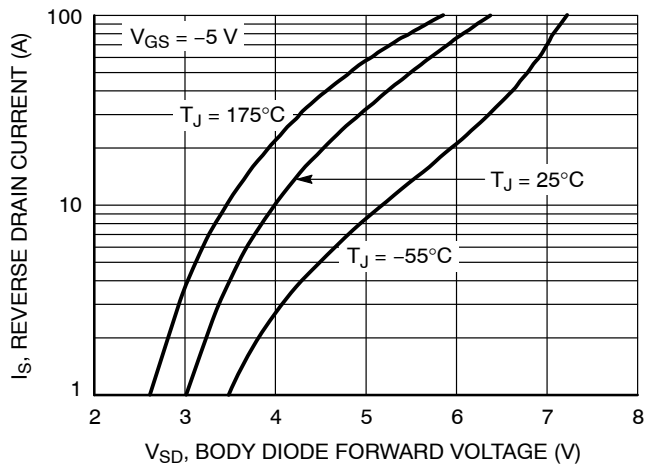


Figure 6. Diode Forward Voltage vs. Current

TYPICAL CHARACTERISTICS

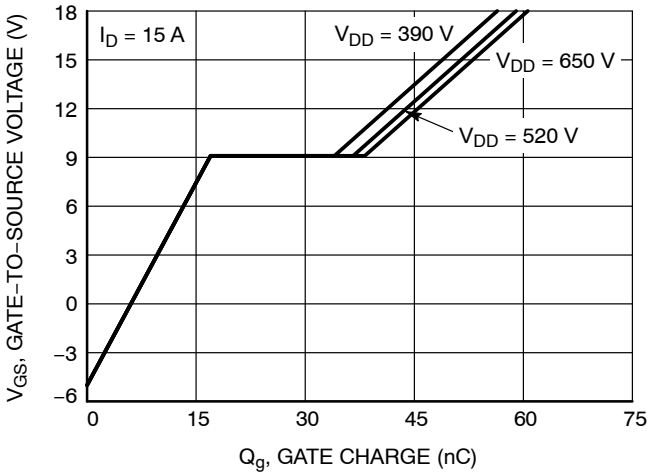


Figure 7. Gate−to−Source Voltage vs. Total Charge

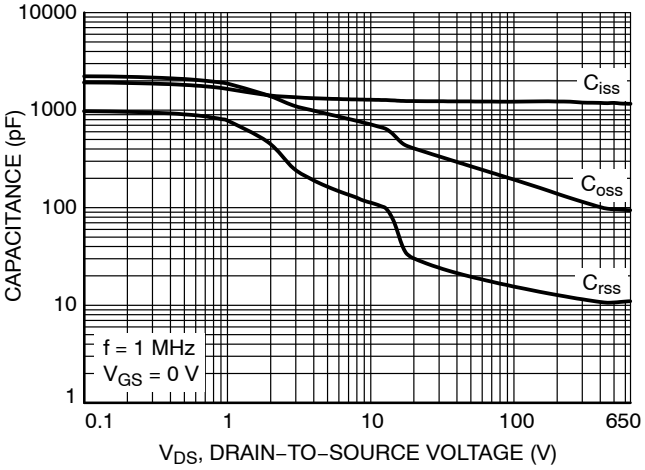


Figure 8. Capacitance vs. Drain−to−Source Voltage

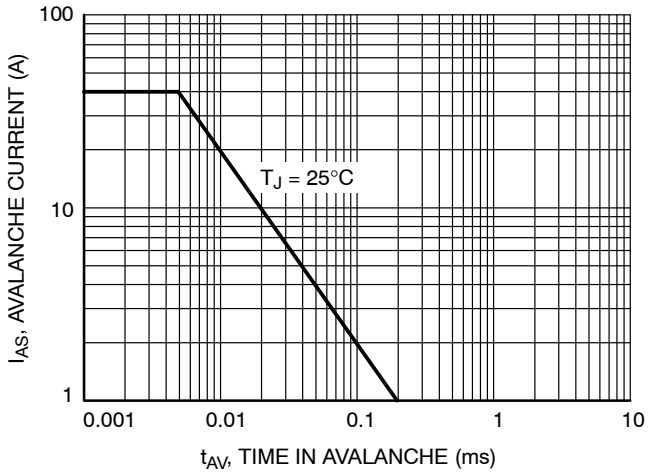


Figure 9. Unclamped Inductive Switching Capability

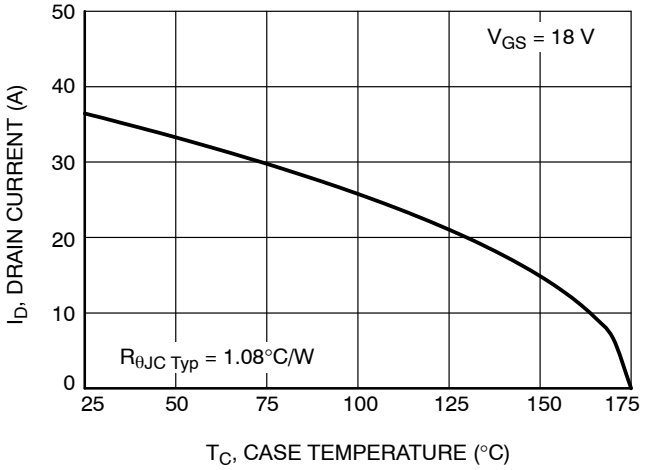


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

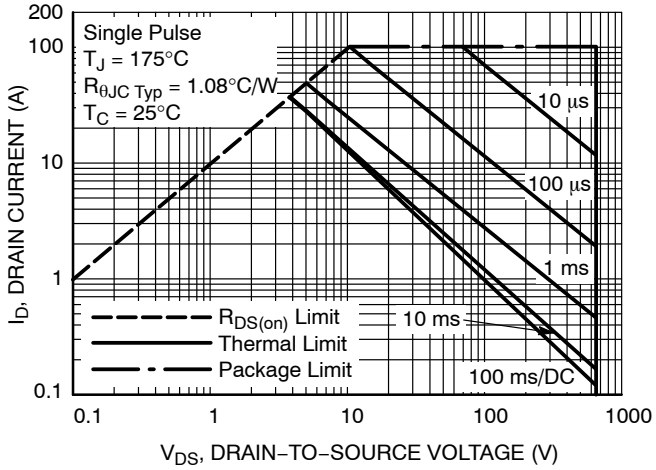


Figure 11. Safe Operating Area

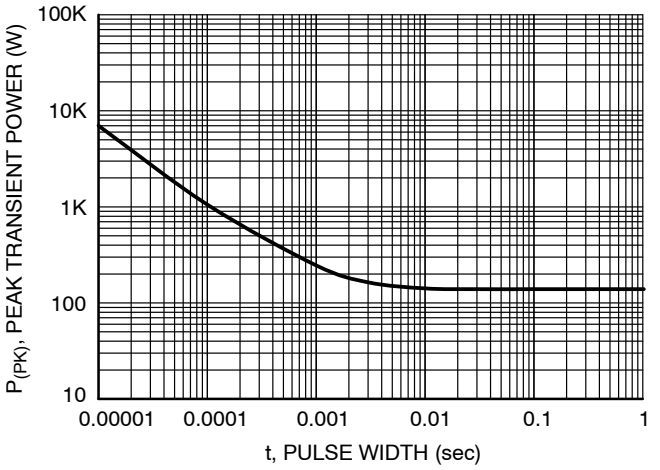


Figure 12. Single Pulse Maximum Power Dissipation

TYPICAL CHARACTERISTICS

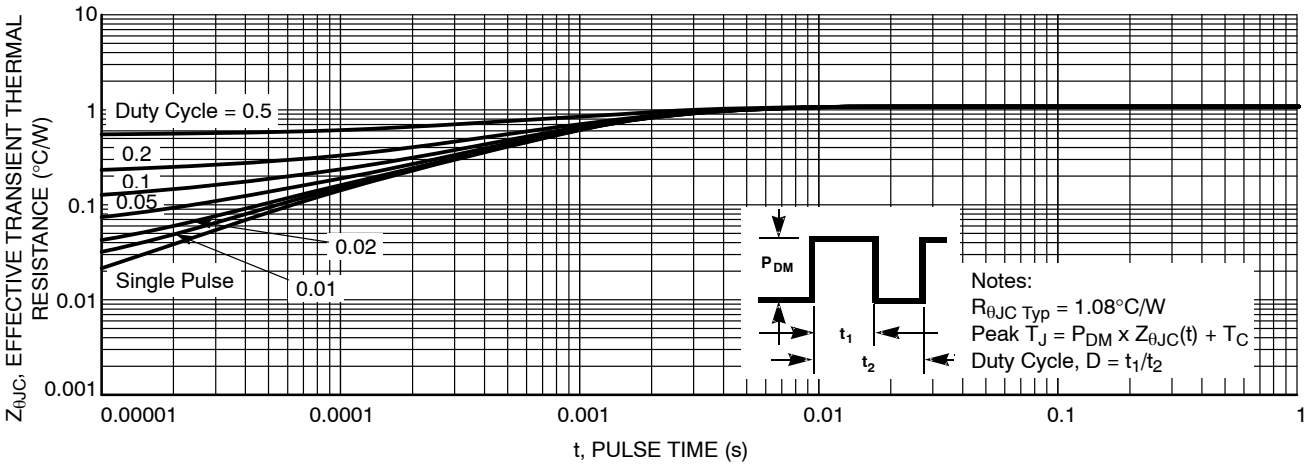


Figure 13. Junction−to−Case Transient Thermal Response

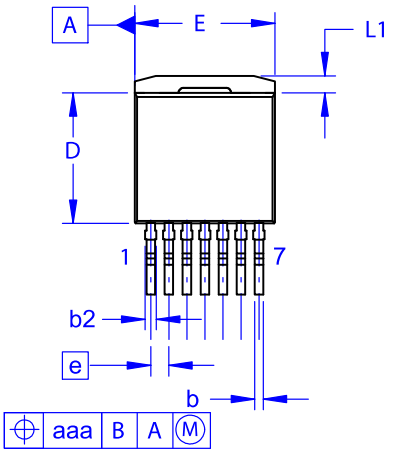
DEVICE ORDERING INFORMATION

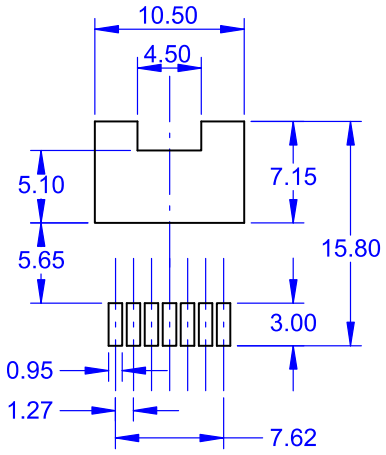
Device	Package	Shipping†
NVBG075N065SC1	D2PAK−7L	800 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

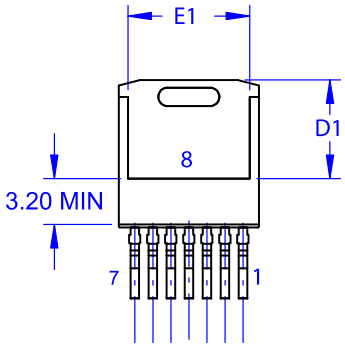
PACKAGE DIMENSIONS

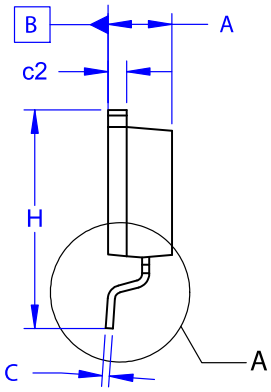
D²PAK7 (TO−263−7L HV)
CASE 418BJ
ISSUE B





LAND PATTERN RECOMMENDATION

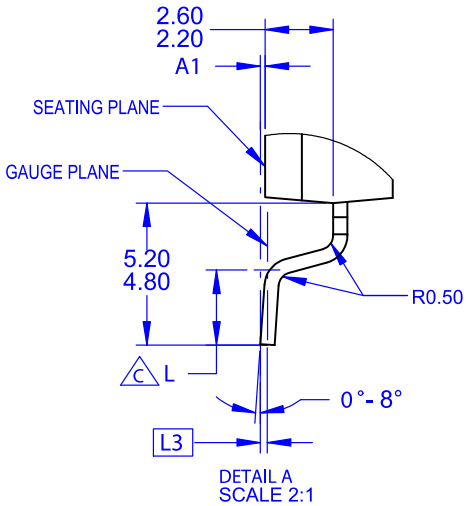




NOTES:

A. PACKAGE CONFORMS TO JEDEC TO-263 VARIATION CB EXCEPT WHERE NOTED.
B. ALL DIMENSIONS ARE IN MILLIMETERS.
C OUT OF JEDEC STANDARD VALUE.
D. DIMENSION AND TOLERANCE AS PER ASME Y14.5-2009.
E. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	0.00	0.10	0.20
b2	0.60	0.70	0.80
b	0.51	0.60	0.70
c	0.40	0.50	0.60
c2	1.20	1.30	1.40
D	9.00	9.20	9.40
D1	6.15	6.80	7.15
E	9.70	9.90	10.20
E1	7.15	7.65	8.15
e	~	1.27	~
H	15.10	15.40	15.70
L	2.44	2.64	2.84
L1	1.00	1.20	1.40
L3	~	0.25	~
aaa	~	~	0.25



PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT
North American Technical Support:
Voice Mail: 1 800−282−9855 Toll Free USA/Canada
Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:
Phone: 00421 33 790 2910
For additional information, please contact your local Sales Representative

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for SiC MOSFETs ***category:***

Click to view products by ON Semiconductor ***manufacturer:***

Other Similar products are found below :

NTC040N120SC1 HC3M001K170J IMBG65R048M1HXTMA1 IMW120R045M1 SCT3080ALGC11 C3M0120100K C2M1000170J C3M0120090J C3M0065090J C3M0280090J SCT2750NYTB SCT2H12NYTB C3M0021120D C3M0016120K C3M0045065D C3M0045065K E3M0120090J C3M0065090J-TR C3M0120100J C3M0075120J DMWS120H100SM4 DMWSH120H28SM4 DMWSH120H90SM4 DMWSH120H90SM4Q DMWSH120H28SM4Q DMWSH120H90SCT7Q DMWSH120H28SM3 DMWSH120H43SM3 DMWSH120H90SM3 DMWSH120H28SM3Q DMWSH120H90SM3Q DIF120SIC053-AQ DIW120SIC059-AQ G2R1000MT17D G3R60MT07K G2R50MT33K G3R12MT12K G3R160MT12D G3R160MT12J-TR G3R160MT17D G3R160MT17J-TR G3R20MT12K G3R20MT12N G3R20MT17K G3R20MT17N G3R30MT12J-TR G3R30MT12K G3R350MT12D G3R40MT12D G3R40MT12J