

Silicon Carbide (SiC)  
MOSFET - 19 mohm, 650 V,  
M2, D2PAK-7L  
NVBG025N065SC1

Features

- Typ.  $R_{DS(on)} = 19\text{ m}\Omega$  @  $V_{GS} = 18\text{ V}$   
Typ.  $R_{DS(on)} = 25\text{ m}\Omega$  @  $V_{GS} = 15\text{ V}$
- Ultra Low Gate Charge ( $Q_{G(tot)} = 164\text{ nC}$ )
- Low Output Capacitance ( $C_{oss} = 278\text{ pF}$ )
- 100% Avalanche Tested
- AEC-Q101 Qualified and PPAP Capable
- RoHS Compliant

Typical Applications

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

MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$  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		$T_C < 175^\circ\text{C}$ $V_{GSop}$	-5/+18	V	
Continuous Drain Current (Note 2)	Steady State	$T_C = 25^\circ\text{C}$	$I_D$	106	A
Power Dissipation (Note 2)			$P_D$	395	W
Continuous Drain Current (Notes 1, 2)	Steady State	$T_C = 100^\circ\text{C}$	$I_D$	75	A
Power Dissipation (Notes 1, 2)			$P_D$	197	W
Pulsed Drain Current (Note 3)		$T_C = 25^\circ\text{C}$	$I_{DM}$	284	A



D2PAK-7L  
CASE 418BJ

1.5843 Tm(75)TjETf4ng284= 26 Source Current (Body Diode) Pulse Drain to Source Avalanche

$L = 11.2\text{ A}_{pk}, L = 1\text{ mH}$ (Note 4)	$E_{AS}$	62 4. E
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$E_{AS}$  of 62 mJ is based on starting  $T_J = 25^\circ\text{C}$ ;  $L = 1\text{ mH}$ ,  $I_{AS} = 11.2\text{ A}$ ,  
 $V_{DD} = 50\text{ V}$ ,  $V_{GS} = 18\text{ V}$ .

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## THERMAL CHARACTERISTICS

Parameter	Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Case (Note 2)	$R_{\theta JC}$	0.38	–	°C/W
Thermal Resistance Junction-to-Ambient (Notes 1, 2)	$R_{\theta JA}$	–	40	°C/W

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 1\text{ mA}$	650			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = 20\text{ mA}$ , refer to $25^\circ\text{C}$ (Note 5)		0.15		V/°C
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}$ $V_{DS} = 650\text{ V}$	$T_J = 25^\circ\text{C}$		10	$\mu\text{A}$
			$T_J = 175^\circ\text{C}$ (Note 5)		1	mA
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS} = +18/-5\text{ V}, V_{DS} = 0\text{ V}$			250	nA

### ON CHARACTERISTICS

Gate Threshold Voltage  $V_{GS(th)}$     N                    C    H    A    R    A    C    T    4    4    6    5    0    D

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## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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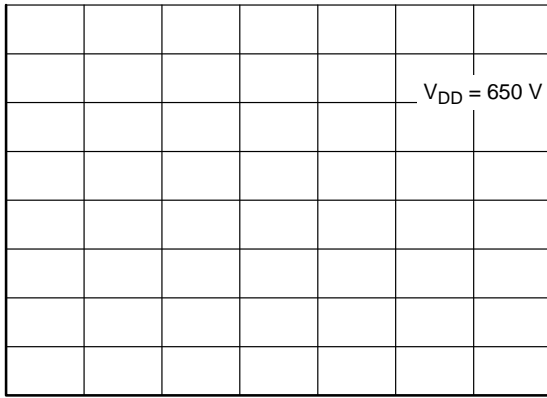
### SOURCE-DRAIN DIODE CHARACTERISTICS

Reverse Recovery Time	t <sub>RR</sub>	V <sub>GS</sub> = -5/18 V, I <sub>SD</sub> = 45 A, dI <sub>S</sub> /dt = 1000 A/μs (Note 5)		25		ns
Reverse Recovery Charge	Q <sub>RR</sub>			171		nC

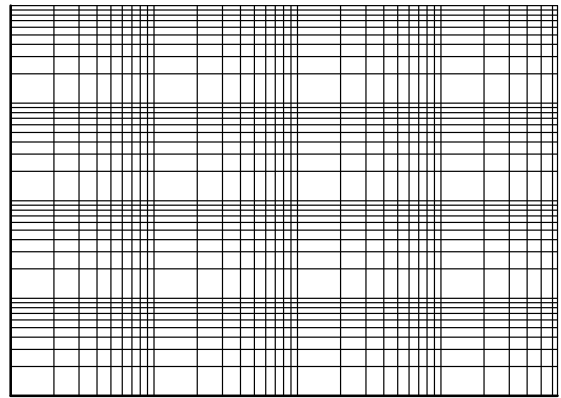


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## TYPICAL CHARACTERISTICS

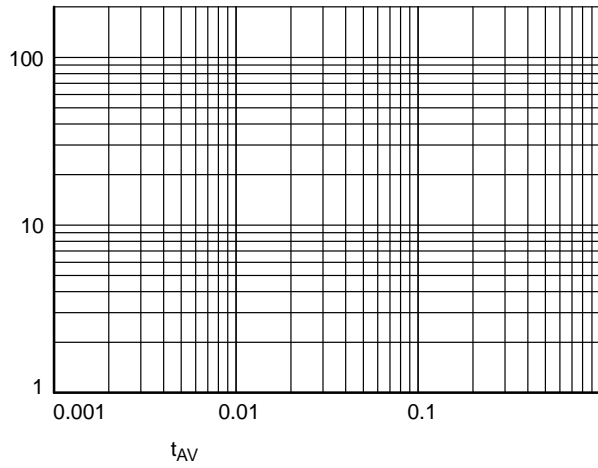


**Figure 7. Gate-to-Source Voltage vs. Total Charge**



$V_{DS}$ , DRAIN-TO-SOURCE VOLTAGE (V)

**Figure 8. Capacitance vs. Drain-to-Source Voltage**



**Figure 9. Unclamped Inductive Switching Capability**

**Figure 10. Maximum Continuous Drain Current vs. Case Temperature**

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## TYPICAL CHARACTERISTICS

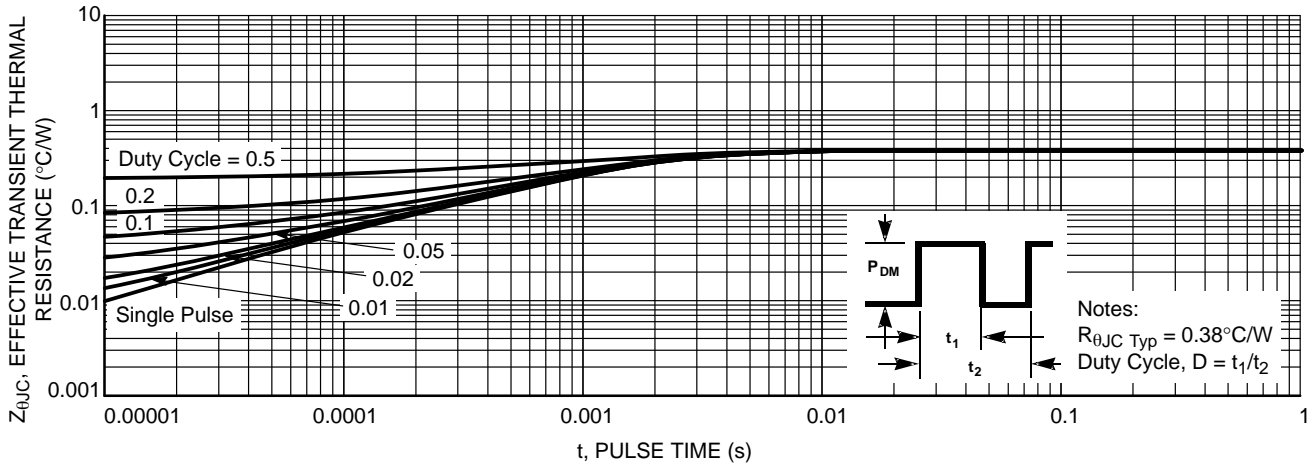


Figure 13. Junction-to-Case Transient Thermal Response

### DEVICE ORDERING INFORMATION

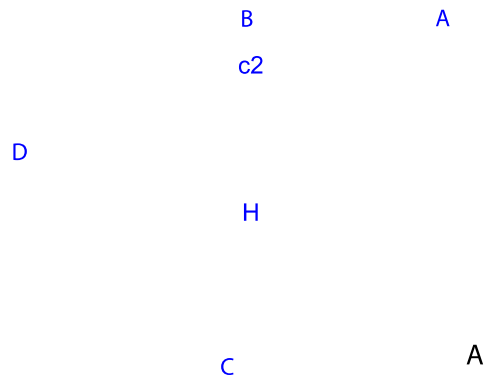
Device	Package	Shipping <sup>†</sup>
NVBG025N065SC1	D2PAK-7L	800 / Tape & Reel

<sup>†</sup>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.

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## PACKAGE DIMENSIONS

D<sup>2</sup>PAK7 (TO-263-7L HV)  
CASE 418BJ  
ISSUE B



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