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Silicon Carbide (SiC)  
MOSFET – 12 mohm, 650 V,  
M2, TO-247-4L

NVH4L015N065SC1

**Features**

- Typ.  $R_{DS(on)} = 12 \text{ m}\Omega$  @  $V_{GS} = 18 \text{ V}$   
Typ.  $R_{DS(on)} = 15 \text{ m}\Omega$  @  $V_{GS} = 15 \text{ V}$
- Ultra Low Gate Charge ( $Q_{G(tot)} = 283 \text{ nC}$ )
- High Speed Switching with Low Capacitance ( $C_{oss} = 430 \text{ pF}$ )
- 100% Avalanche Tested
- AEC–

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**Table 1. THERMAL CHARACTERISTICS**

Parameter	Symbol	Max	Unit
Junction-to-Case – Steady State (Note 1)	$R_{\theta JC}$	0.3	°C/W
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	40	

**Table 2. ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>							
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	$V_{(BR)DSS}/T_J$	$I_D = 20\text{ mA}$ , referenced to $25^\circ\text{C}$	–	0.12	–	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	$\mu\text{A}$
			$T_J = 175^\circ\text{C}$	–	–	1	mA
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS} = +18/-5\text{ V}, V_{DS} = 0\text{ V}$	–	–	250	nA	
<b>ON CHARACTERISTICS</b> (Note 2)							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 25\text{ mA}$	1.8	2.5	4.3	V	
Recommended Gate Voltage	$V_{GOP}$		–5	–	+18	V	
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 15\text{ V}, I_D = 75\text{ A}, T_J = 25^\circ\text{C}$					

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**Table 2. ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise specified) (continued)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>SOURCE-DRAIN DIODE CHARACTERISTICS</b>						
Reverse Recovery Time	$t_{RR}$	$V_{GS} = -5/18\text{ V}$ , $I_{SD} = 75\text{ A}$ , $di/dt = 1000\text{ A}/\mu\text{s}$	-	28	-	ns
Reverse Recovery Charge	$Q_{RR}$		-	234	-	nC
Reverse Recovery Energy						

TYPICAL CHARACTERISTICS

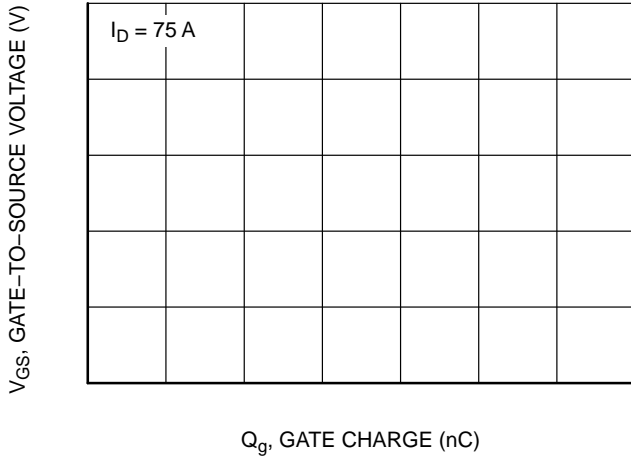




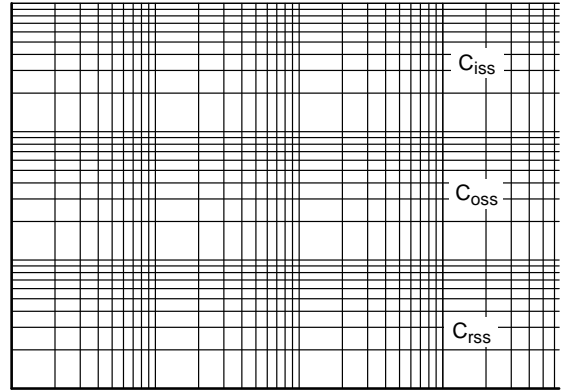


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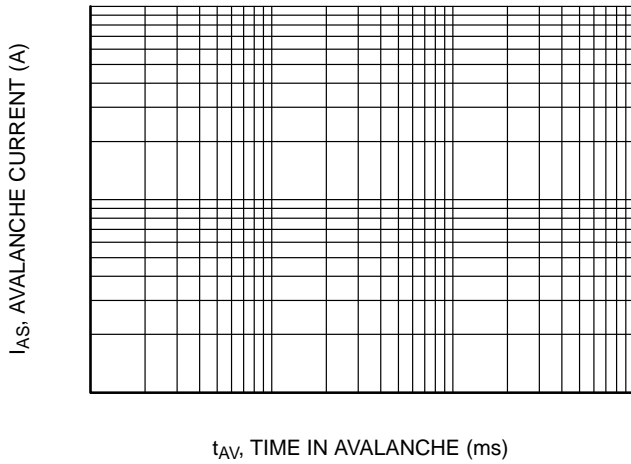
## TYPICAL CHARACTERISTICS (continued)



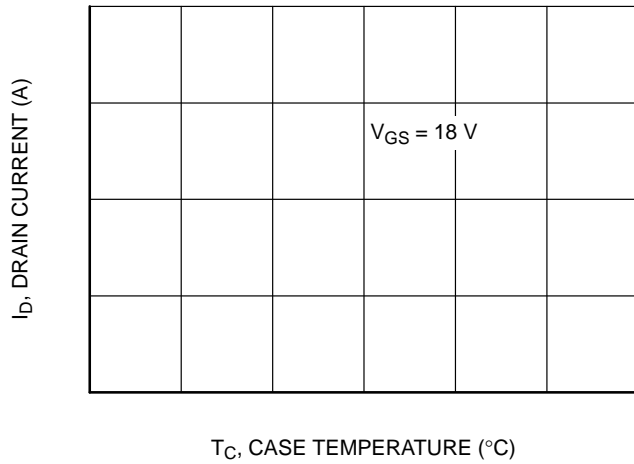
**Figure 7. Gate-to-Source Voltage vs. Total Charge**



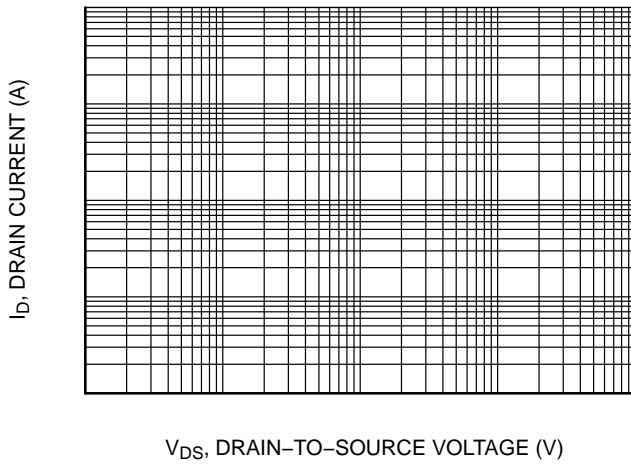
**Figure 8. Capacitance vs. Drain-to-Source Voltage**



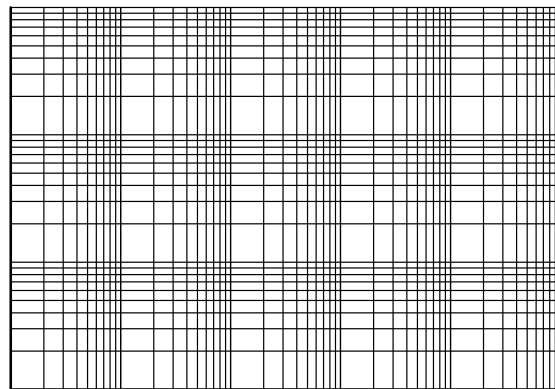
**Figure 9. Unclamped Inductive Switching Capability**



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



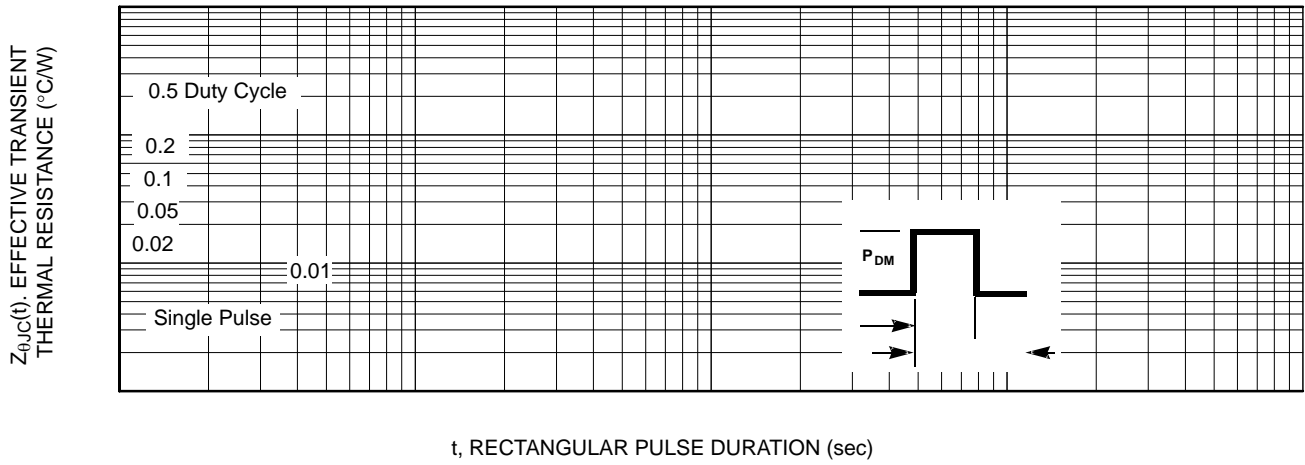
**Figure 11. Safe Operating Area**



**Figure 12. Single Pulse Maximum Power**

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## TYPICAL CHARACTERISTICS (continued)



**Figure 13. Junction-to-Case Thermal Response**

TO-247-4LD  
CASE 340CJ  
ISSUE A

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A E A B  
A2 E1  $\emptyset$ p1  
D2

E/2 Q

D D1

$\emptyset$

L1

b2 A1

b1 (3X) L

1 4

e1 b(4X) c

e 2X

$\oplus$  0.254 (M) B A (M)

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