

N2M0025120D

Silicon Carbide Power MOSFET

N-Channel Enhancement Mode

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

Benefits

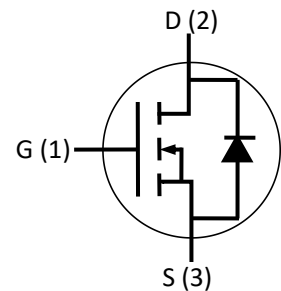
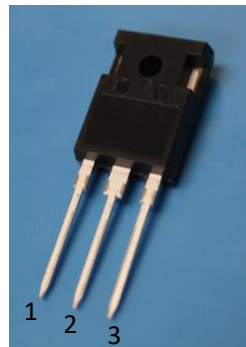
- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Applications

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

- Pulsed Power applications

Package



Part Number	Package
N2M0025120D	TO-247-3

Maximum Ratings ($T_c = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain - Source Voltage	1200	V	$V_{GS}=0V, I_D=100\mu A$	
V_{GSmax}	Gate - Source Voltage	-10/+25	V	Absolute maximum values	
V_{GSop}	Gate - Source Voltage	-5/+20	V	Recommended operational values	
I_D	Continuous Drain Current	80 60	A	$V_{GS}=20V, T_c=25^\circ\text{C}$ $V_{GS}=20V, T_c=100^\circ\text{C}$	
P_D	Power Dissipation	419	W	$T_c=25^\circ\text{C}, T_J=150^\circ\text{C}$	Fig. 11
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$		

Electrical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	1200			V	$V_{GS}=0V, I_D=100\mu A$	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.5	4.0	V	$V_{GS}=V_{DS}, I_{DS}=15mA, T_C=25^\circ C$	Fig. 6
			1.8			$V_{GS}=V_{DS}, I_{DS}=15mA, T_C=150^\circ C$	
I_{DSS}	Zero Gate Voltage Drain Current		2	100	μA	$V_{DS}=1200V, V_{GS}=0V$	
I_{GSS+}	Gate-Source Leakage Current		20	250	nA	$V_{GS}=20V, V_{DS}=0V$	
I_{GSS-}	Gate-Source Leakage Current		20	250	nA	$V_{GS}=-10V, V_{DS}=0V$	
$R_{DS(on)}$	Drain-Source on-state Resistance		25	38	m Ω	$V_{GS}=20V, I_D=50A, T_C=25^\circ C$	Fig. 4
			43			$V_{GS}=20V, I_D=50A, T_C=150^\circ C$	
g_{fs}	Transconductance		14.6		S	$V_{GS}=20V, I_D=50A, T_J=25^\circ C$	Fig. 5
			14.3		S	$V_{GS}=20V, I_D=50A, T_J=150^\circ C$	
C_{iss}	Input Capacitance		6700		pF	$V_{GS}=0V, V_{DS}=1000V, f=1MHz$ $V_{AC}=25mV$	Fig. 9
C_{oss}	Output Capacitance		188				
C_{rss}	Reverse Transfer Capacitance		42.8				
E_{AS}	Avalanche Energy, Single plus		2.6				
E_{ON}	Turn-On Switching Energy		2.2		mJ	$V_{DS}=800V, V_{GS}=-5/20V, I_D=50A,$	
E_{OFF}	Turn-Off Switching Energy		0.5				
$t_{d(on)}$	Turn-On Delay Time		62		ns	$V_{DD}=800V, V_{GS}=-5/20V$ $I_D=50A,$	
t_r	Rise Time		93				
$t_{d(off)}$	Turn-Off Delay Time		60				
t_f	Fall Time		39				
$R_{G(int)}$	Internal Gate Resistance		0.8		Ω	$f=1MHz, V_{AC}=25mV$	
Q_{gs}	Gate to Source Charge		58		nC	$V_{DS}=800V, V_{GS}=-5/20V$ $I_D=50A$	Fig. 10
Q_{gd}	Gate to Drain Charge		90				
Q_g	Total Gate Charge		185				

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	3.63		V	$V_{GS}=-5V, I_{SD}=25A, T_J=25^\circ C$	Fig. 7
		3.45		V	$V_{GS}=-5V, I_{SD}=25A, T_J=150^\circ C$	Fig. 8
I_S	Continuous Diode Forward Current		80	A	$T_C=25^\circ C$	
t_{rr}	Reverse Recovery Time	45		ns	$V_{GS}=-5V, I_{SD}=50A, T_J=25^\circ C,$ $V_{DS}=800V$	
Q_{rr}	Reverse Recovery Charge	480		nC		
I_{rrm}	Peak Reverse Recovery Current	13.5		A		

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.3	°C/W		Fig. 12
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	40			

Typical Performance

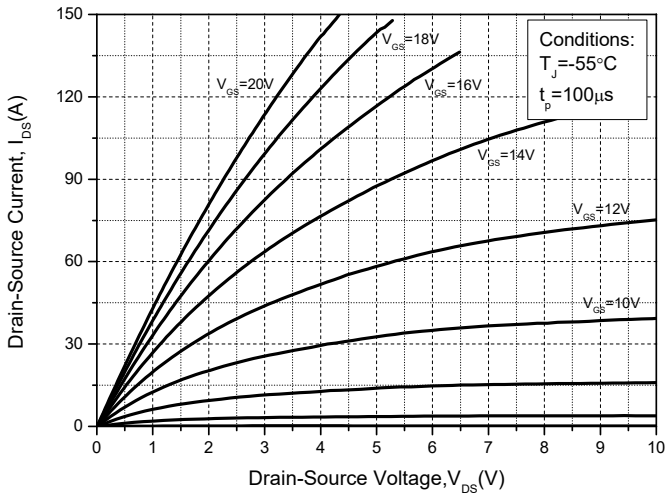


Figure 1. Output Characteristics $T_J = -55^\circ\text{C}$

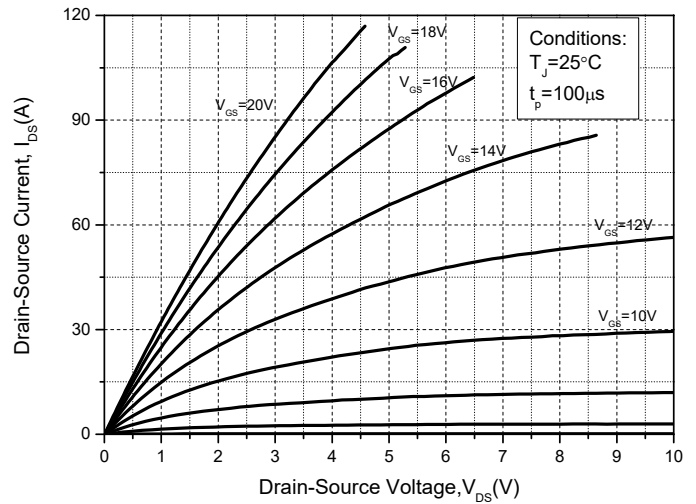


Figure 2. Output Characteristics $T_J = 25^\circ\text{C}$

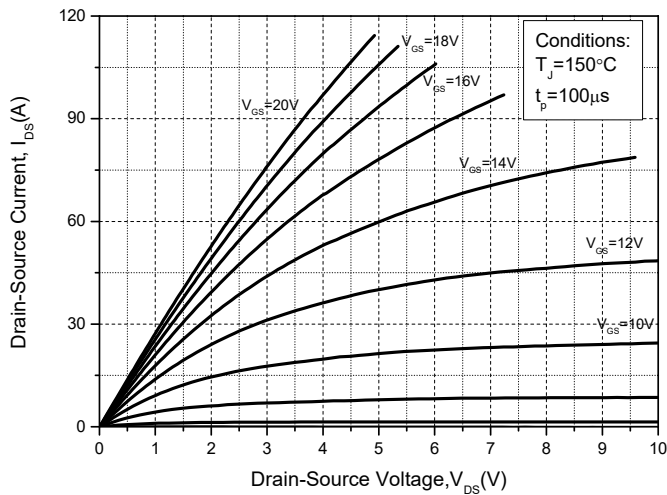


Figure 3. Output Characteristics $T_J = 150^\circ\text{C}$

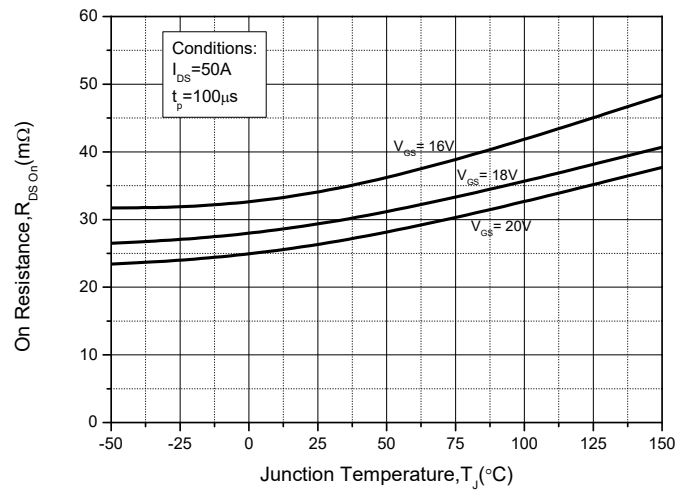


Figure 4. On-Resistance For Various Gate Voltage

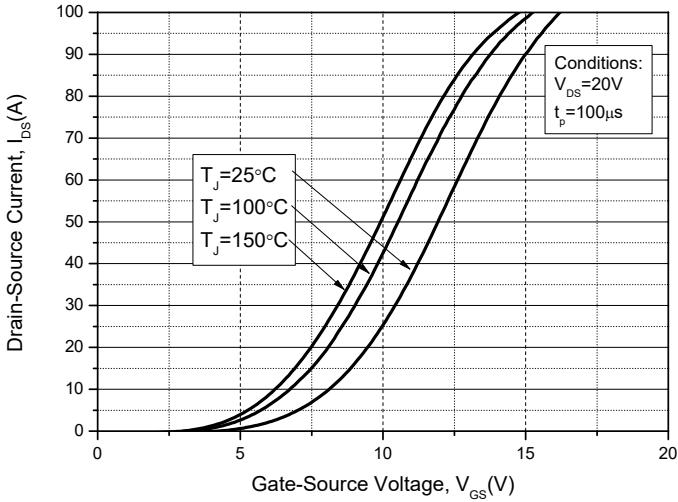


Figure 5. Transfer Characteristic for Various Junction Temperatures

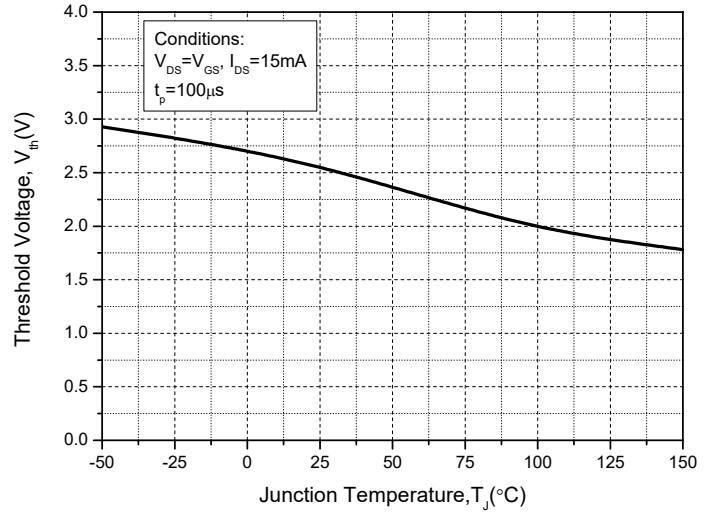


Figure 6. Threshold Voltage vs. Temperature

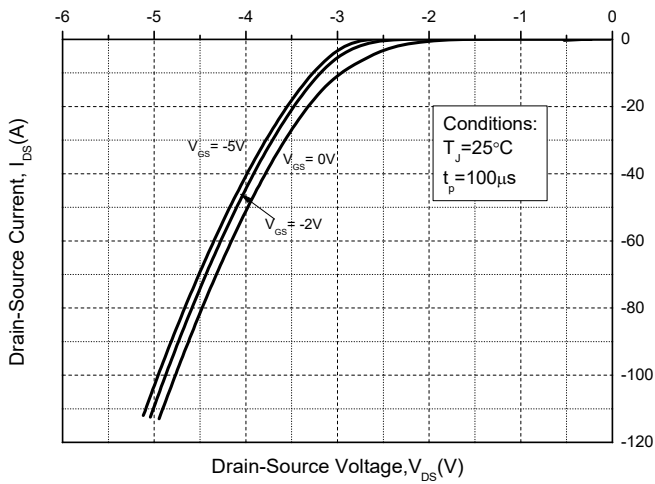


Figure 7. Body Diode Characteristics

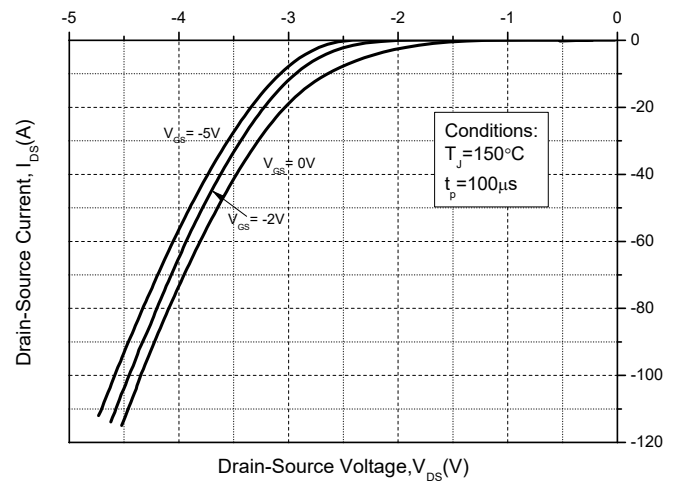


Figure 8. Body Diode Characteristics

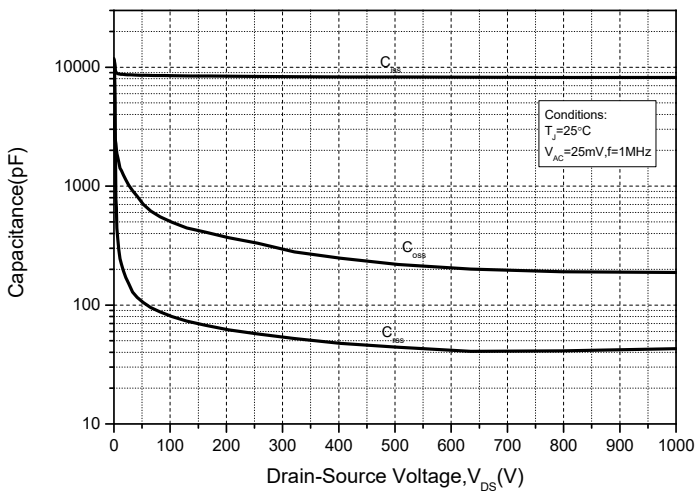


Figure 9. Capacitances vs. Drain-Source Voltage

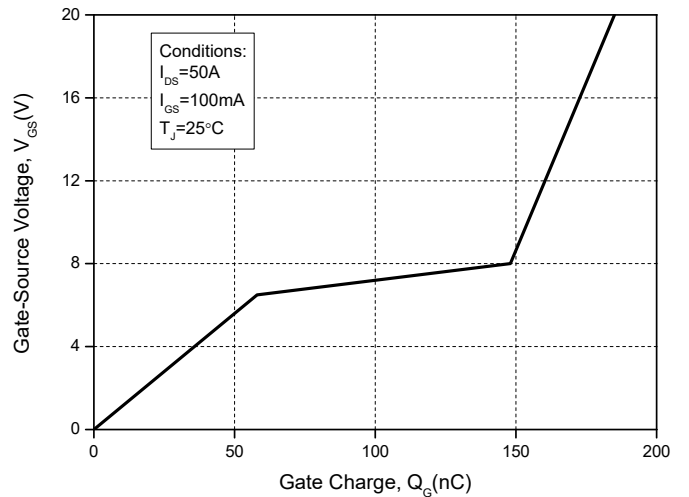


Figure 10. Gate Charge Characteristics

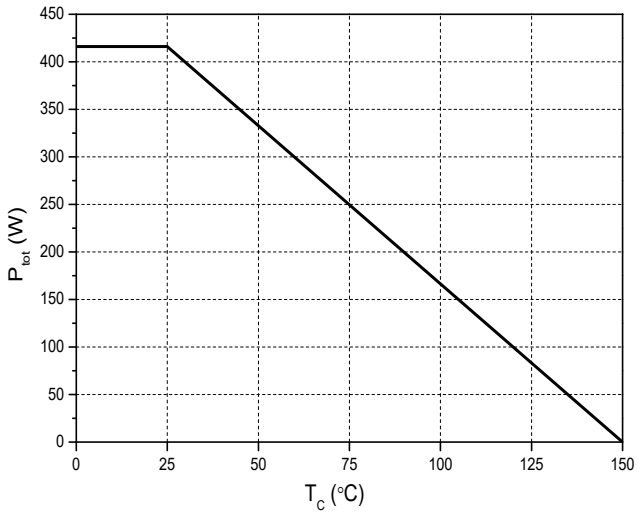


Figure 11. Power Dissipation Derating

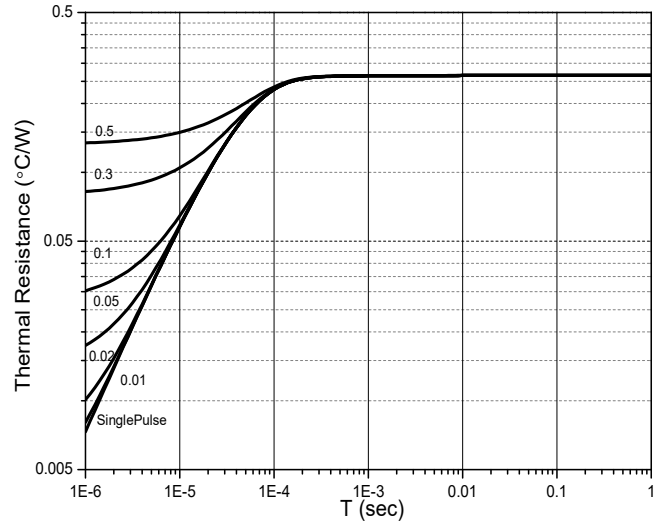


Figure 12. Transient Thermal Impedance

Package Dimensions: TO-247-3L

