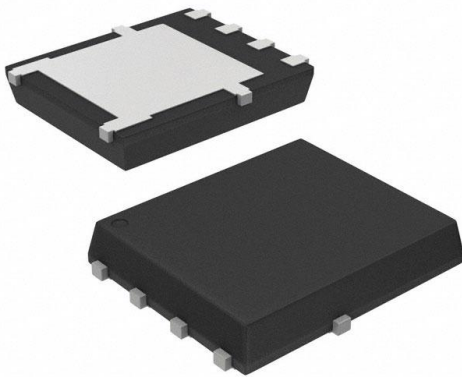


NTMFS0D9N03CGT1G Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	NTMFS0D9N03CGT1G-DG
Manufacturer	onsemi
Manufacturer Product Number	NTMFS0D9N03CGT1G
Description	MOSFET N-CH 30V 48A/298A 5DFN
Detailed Description	N-Channel 30 V 48A (Ta), 298A (Tc) 3.8W (Ta), 144W (Tc) Surface Mount 5-DFN (5x6) (8-SOFL)

This model NTMFS0D9N03CGT1G is available at DiGi Electronics.

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RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

NTMFS0D9N03CGT1G

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

30 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

2.2V @ 200µA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 175°C (Tj)

Supplier Device Package:

5-DFN (5x6) (8-SOFL)

Base Product Number:

NTMFS0

Manufacturer:

onsemi

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

48A (Ta), 298A (Tc)

Rds On (Max) @ Id, Vgs:

0.9mOhm @ 20A, 10V

Gate Charge (Qg) (Max) @ Vgs:

131.4 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

9450 pF @ 15 V

Power Dissipation (Max):

3.8W (Ta), 144W (Tc)

Mounting Type:

Surface Mount

Package / Case:

8-PowerTDFN, 5 Leads

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

MOSFET - Power, Single N-Channel, SO8-FL

30 V, 0.9 mΩ, 298 A

NTMFS0D9N03CG

Features

- Advanced Package (5x6 mm) with Excellent Thermal Conduction
- Ultra Low $R_{DS(on)}$ to Improve System Efficiency
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Hot Swap Application
- Power Load Switch
- Battery Management and Protection

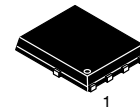
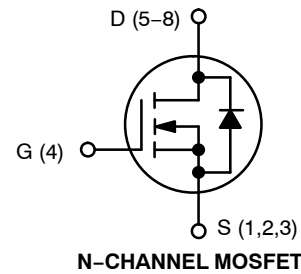
MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	30	V	
Gate-to-Source Voltage		V_{GS}	± 20	V	
Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State	$T_C = 25^\circ\text{C}$	I_D	298	A
		$T_C = 100^\circ\text{C}$		211	
Power Dissipation $R_{\theta JC}$ (Note 2)		$T_C = 25^\circ\text{C}$	P_D	144	W
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	$T_A = 25^\circ\text{C}$	I_D	48	A
		$T_A = 100^\circ\text{C}$		34	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)		$T_A = 25^\circ\text{C}$	P_D	3.8	W
Pulsed Drain Current	$T_A = 25^\circ\text{C}$, $t_p = 10 \mu\text{s}$	I_{DM}	900	A	
Source Current (Body Diode)		I_S	120	A	
Single Pulse Drain-to-Source Avalanche Energy ($I_L = 29.2 \text{ A}_{pk}$)		E_{AS}	556	mJ	
Operating Junction and Storage Temperature		T_J , T_{STG}	-55 to +175	$^\circ\text{C}$	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$	

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.

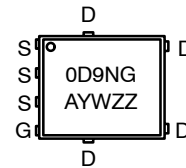
1. Surface-mounted on FR4 board using 1 in² pad, 2 oz Cu pad.
2. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

$V_{(BR)DSS}$	$R_{DS(ON) MAX}$	$I_D MAX$
30 V	0.9 mΩ @ 10 V	298 A



**SO-8 FLAT LEAD
CASE 488AA
STYLE 1**

MARKING DIAGRAM



A = Assembly Location
 Y = Year
 W = Work Week
 ZZ = Lot Traceability

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

NTMF50D9N03CG**THERMAL RESISTANCE MAXIMUM RATINGS**

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State	$R_{\theta JC}$	1.0	°C/W
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	39	

3. Surface-mounted on FR4 board using 1 in² pad, 2 oz Cu pad.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
-----------	--------	----------------	-----	-----	-----	------

OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = 250\ \mu\text{A}$. ref to 25°C		13		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}$	$T_J = 25^\circ\text{C}$		1.0	μA
			$T_J = 125^\circ\text{C}$		100	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			100	nA

ON CHARACTERISTICS (Note 4)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 200\ \mu\text{A}$	1.3		2.2	V
Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	$I_D = 200\ \mu\text{A}$. ref to 25°C		-5		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.71	0.9	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 3\text{ V}, I_D = 20\text{ A}$		70		S
Gate Resistance	R_G	$T_A = 25^\circ\text{C}$		1.5		Ω

CHARGES AND CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, V_{DS} = 15\text{ V}, f = 1\text{ MHz}$	6615	9450	12285	pF
Output Capacitance	C_{OSS}		3014	4306	5598	
Reverse Transfer Capacitance	C_{RSS}		146	243	486	
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}; I_D = 20\text{ A}$		131.4		nC
Threshold Gate Charge	$Q_{G(TH)}$			14.2		
Gate-to-Source Charge	Q_{GS}			24.2		
Gate-to-Drain Charge	Q_{GD}			13.5		

SWITCHING CHARACTERISTICS (Note 5)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 20\text{ A}, R_G = 3.0\ \Omega$		20		ns
Rise Time	t_r			16		
Turn-Off Delay Time	$t_{d(OFF)}$			93		
Fall Time	t_f			24		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 10\text{ A}$	$T_J = 25^\circ\text{C}$		0.75	1.2	V
			$T_J = 125^\circ\text{C}$		0.60		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s}, V_{DS} = 15\text{ V}, I_S = 20\text{ A}$			83		ns
Reverse Recovery Charge	Q_{RR}				114		nC

4. Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

5. Switching characteristics are independent of operating junction temperatures.

NTMFS0D9N03CG

TYPICAL CHARACTERISTICS

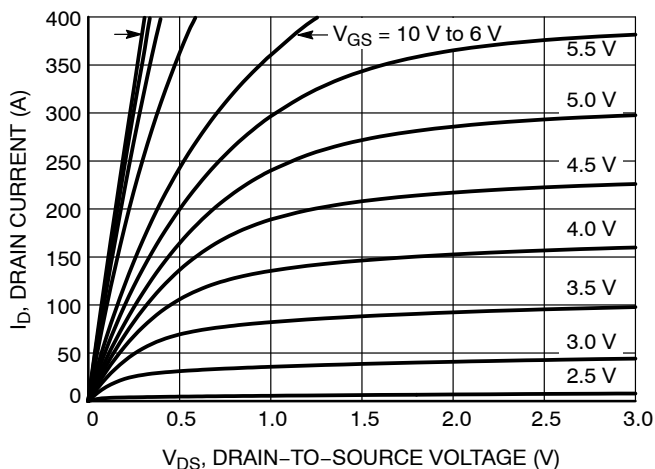


Figure 1. On-Region Characteristics

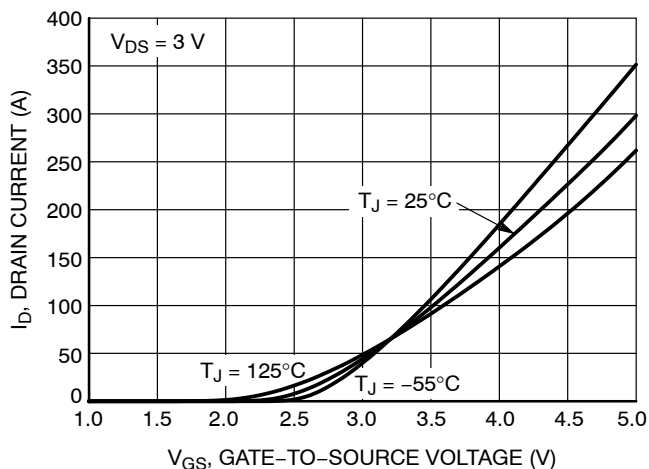


Figure 2. Transfer Characteristics

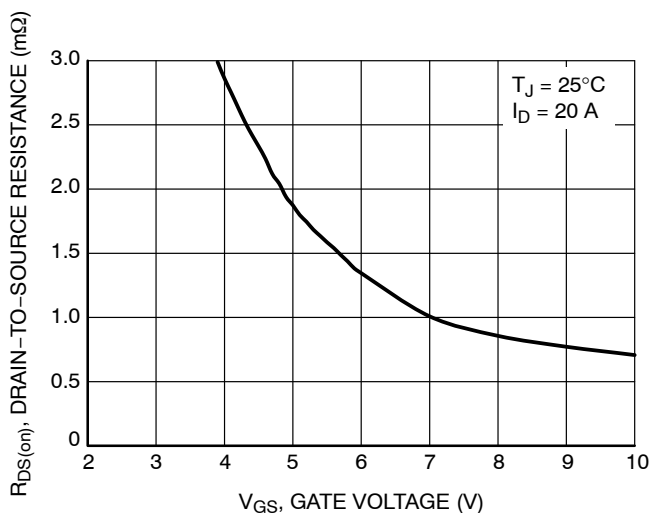


Figure 3. On-Resistance vs. Gate-to-Source Voltage

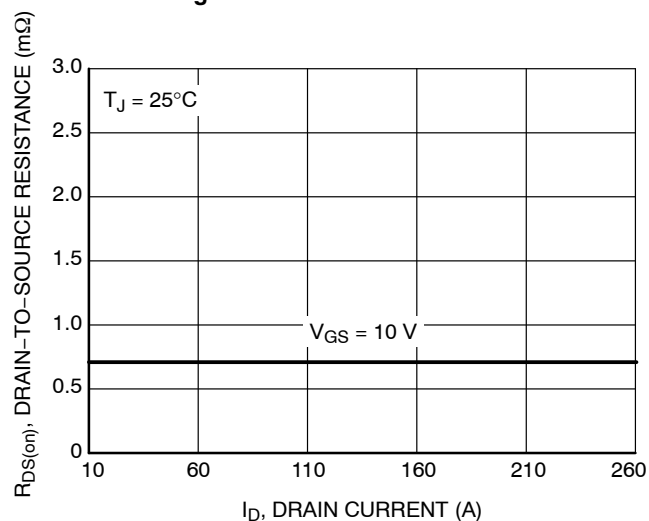


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

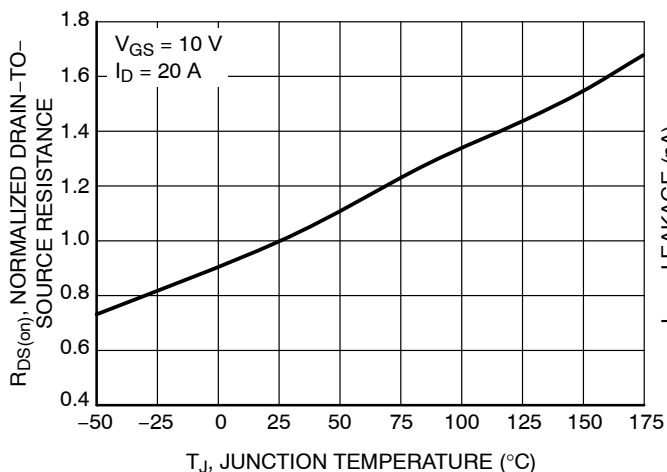


Figure 5. On-Resistance Variation with Temperature

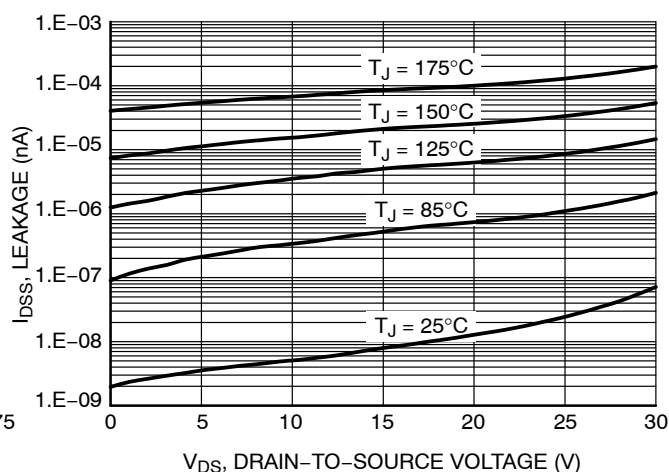


Figure 6. Drain-to-Source Leakage Current vs. Voltage

NTMFS0D9N03CG

TYPICAL CHARACTERISTICS

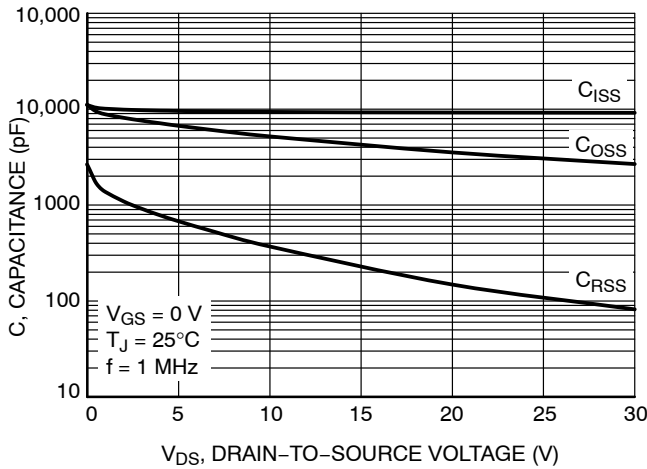


Figure 7. Capacitance Variation

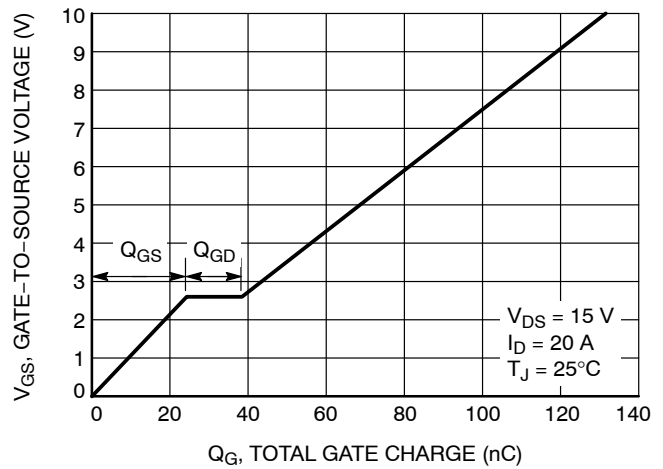


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

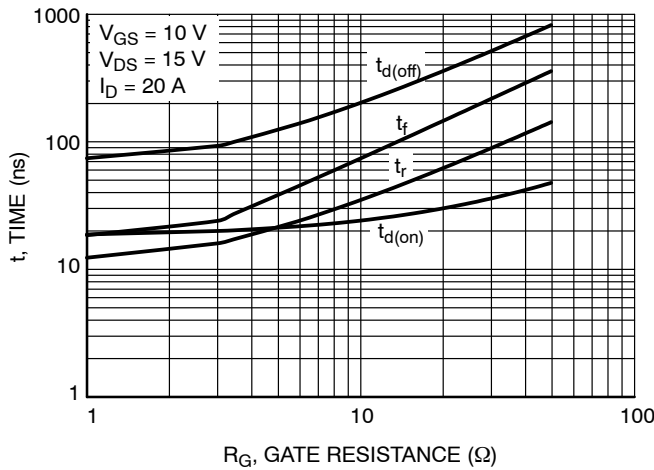


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

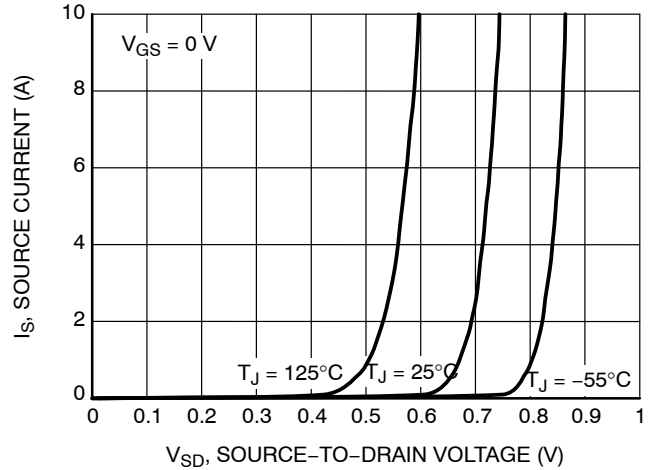


Figure 10. Diode Forward Voltage vs. Current

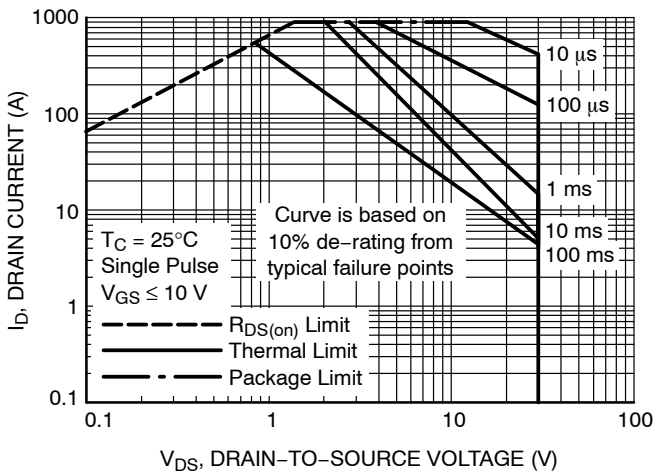


Figure 11. Safe Operating Area

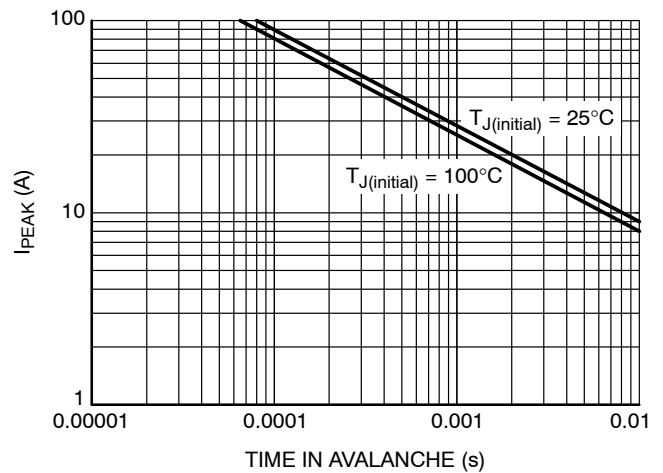


Figure 12. I_{PEAK} vs. Time in Avalanche

NTMFS0D9N03CG

TYPICAL CHARACTERISTICS

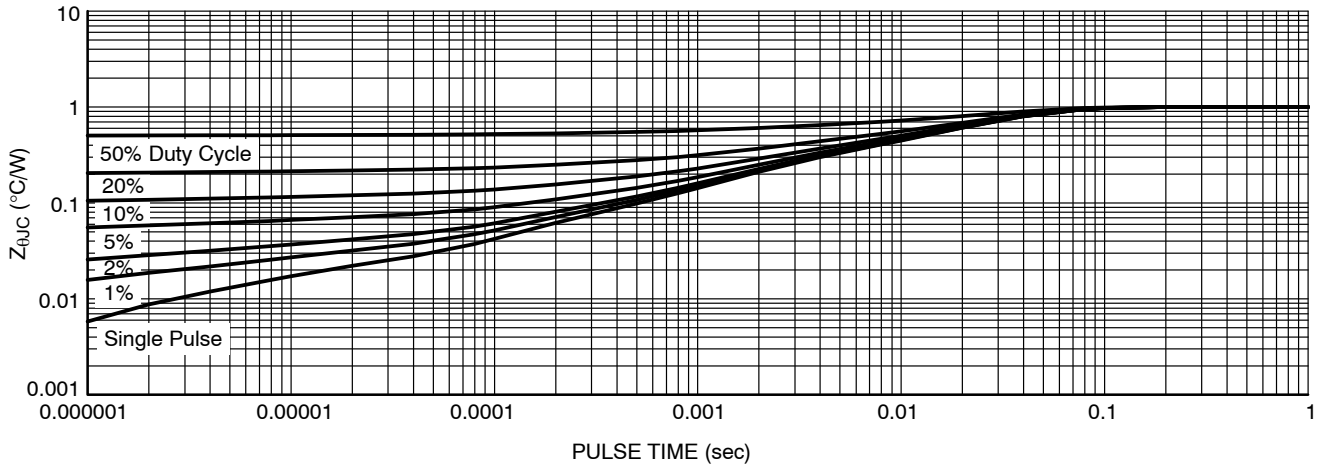


Figure 13. Thermal Impedance

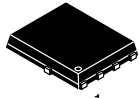
DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
NTMFS0D9N03CGT1G	0D9NG	DFN5 (Pb-Free)	1500 / 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.



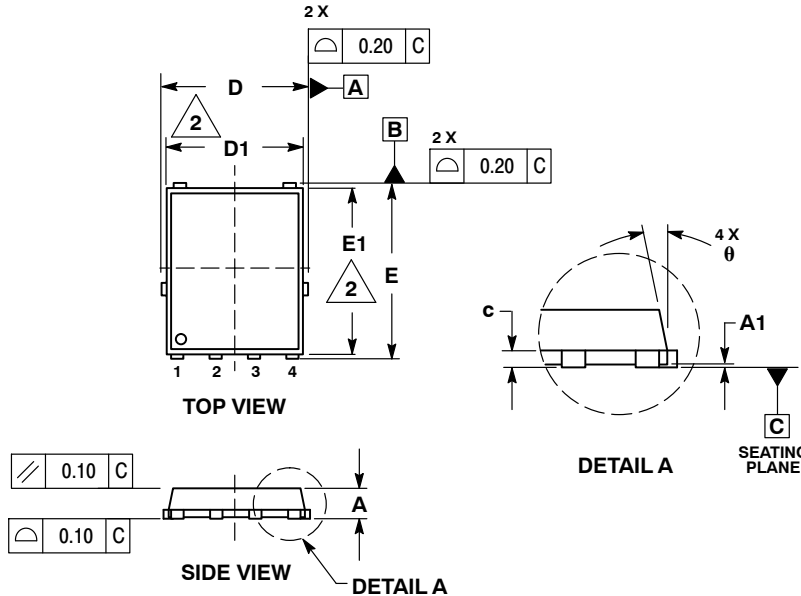
**MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS**



1
SCALE 2:1

**DFN5 5x6, 1.27P
(SO-8FL)
CASE 488AA
ISSUE N**

DATE 25 JUN 2018



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

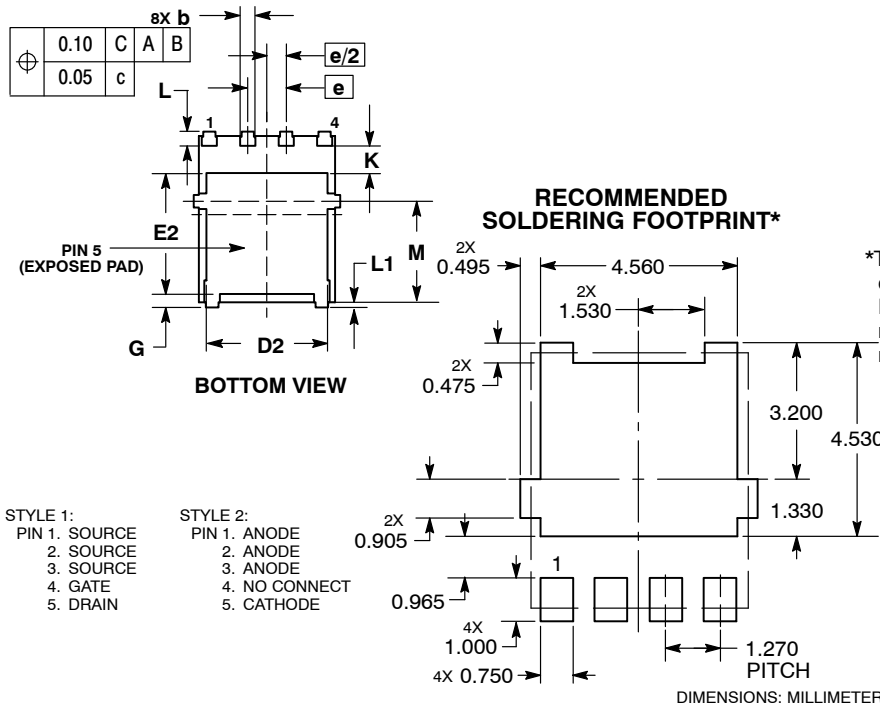
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
e	1.27 BSC		
G	0.51	0.575	0.71
K	1.20	1.35	1.50
L	0.51	0.575	0.71
L1	0.125 REF		
M	3.00	3.40	3.80
θ	0°	---	12°

GENERIC MARKING DIAGRAM*



- XXXXXX = Specific Device Code
- A = Assembly Location
- Y = Year
- W = Work Week
- ZZ = Lot Traceability

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.



- STYLE 1:
PIN 1. SOURCE
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN
- STYLE 2:
PIN 1. ANODE
2. ANODE
3. ANODE
4. NO CONNECT
5. CATHODE

*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

DOCUMENT NUMBER:	98AON14036D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	DFN5 5x6, 1.27P (SO-8FL)	PAGE 1 OF 1

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