

MOSFET - Power, Single N-Channel, SO8FL 40 V, 4.7 mΩ, 66 A

NTMFS4D7N04XM

Features

- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Small Footprint (5x6 mm) for Compact Design
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Motor Drive
- Battery Protection
- Oring

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	40	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	66	A
		47	
Power Dissipation	P_D	38	W
Pulsed Drain Current	I_{DM}	375	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 Avalanche Energy ($I_{PK} = 32$ A)	E_{AS}	68	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T_L	260	°C

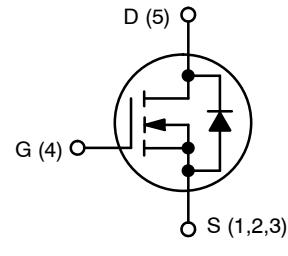
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	3.9	°C/W
Thermal Resistance, Junction-to-Ambient (Notes 1, 2)	$R_{\theta JA}$	42	

1. Surface-mounted on FR4 board using 650 mm², 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.

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ MAX}$
40 V	4.7 mΩ @ 10 V	66 A



DFN5 (SO-8FL)
CASE 488AA



4D7N4 = Specific Device Code

A = Assembly Location

Y = Year

W = Work Week

ZZ = Assembly Lot Code

ORDERING INFORMATION

Device	Package	Shipping [†]
NTMFS4D7N04XMT1G	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 Specification Brochure, BRD8011/D.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 1 mA, T _J = 25°C	40	—	—	V
Drain-to-Source Breakdown Voltage Temperature Coefficient	ΔV _{(BR)DSS} /ΔT _J	I _D = 1 mA, Referenced to 25°C	—	15	—	mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40 V, T _J = 25°C	—	—	10	μA
		V _{DS} = 40 V, T _J = 125°C	—	—	100	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} = 20 V, V _{DS} = 0 V	—	—	100	nA
ON CHARACTERISTICS						
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 10 A, T _J = 25°C	—	4.1	4.7	mΩ
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 30 μA, T _J = 25°C	2.5	—	3.5	V
Gate Threshold Voltage Temperature Coefficient	ΔV _{GS(TH)} /ΔT _J	V _{GS} = V _{DS} , I _D = 30 μA	—	-7.29	—	mV/°C
Forward Transconductance	g _{FS}	V _{DS} = 5 V, I _D = 10 A	—	45.5	—	S
CHARGES, CAPACITANCES & GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz	—	668	—	pF
Output Capacitance	C _{OSS}		—	479	—	
Reverse Transfer Capacitance	C _{RSS}		—	13.6	—	
Total Gate Charge	Q _{G(TOT)}	V _{DD} = 20 V, I _D = 30 A, V _{GS} = 10 V	—	10.4	—	nC
Threshold Gate Charge	Q _{G(TH)}		—	1.97	—	
Gate-to-Source Charge	Q _{GS}		—	3.19	—	
Gate-to-Drain Charge	Q _{GD}		—	1.92	—	
Gate-Resistance	R _G	f = 1 MHz	—	1.6	—	Ω
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	Resistive Load, V _{GS} = 0/10 V, V _{DD} = 20 V, I _D = 30 A, R _G = 0 Ω	—	12	—	ns
Rise Time	t _r		—	4.13	—	
Turn-Off Delay Time	t _{d(OFF)}		—	16.3	—	
Fall Time	t _f		—	3.81	—	
SOURCE-TO-DRAIN DIODE CHARACTERISTICS						
Forward Diode Voltage	V _{SD}	I _S = 10 A, V _{GS} = 0 V, T _J = 25°C	—	0.8	1.2	V
		I _S = 10 A, V _{GS} = 0 V, T _J = 125°C	—	0.7	—	
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, I _S = 30 A, dI/dt = 100 A/μs, V _{DD} = 20 V, T _J = 25°C	—	21.6	—	ns
Charge Time	t _a		—	9.01	—	
Discharge Time	t _b		—	12.6	—	
Reverse Recovery Charge	Q _{RR}		—	11.6	—	

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.

TYPICAL CHARACTERISTICS

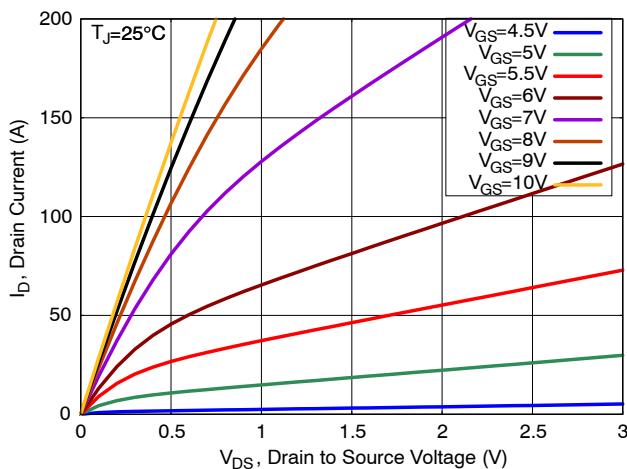


Figure 1. On-Region Characteristics

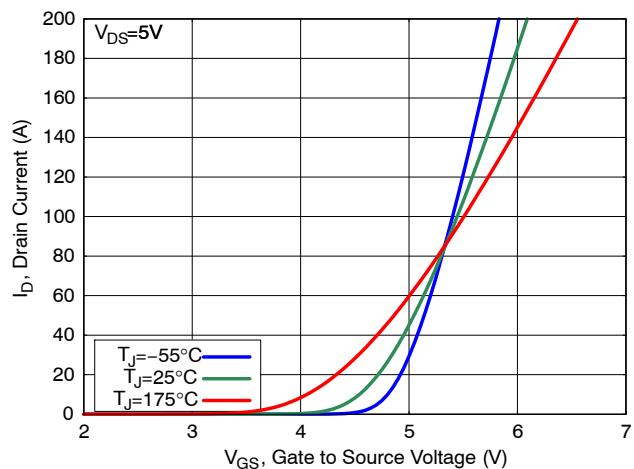


Figure 2. Transfer Characteristics

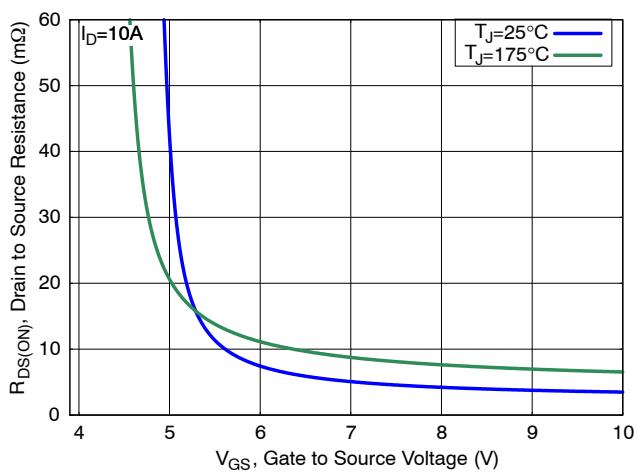


Figure 3. On-Resistance vs. Gate Voltage

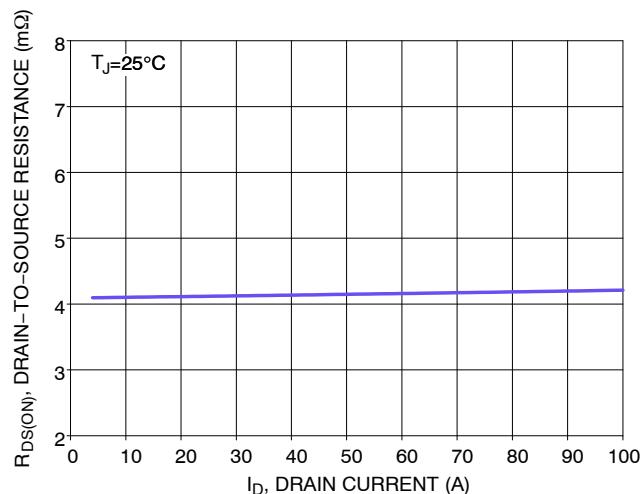


Figure 4. On-Resistance vs. Drain Current

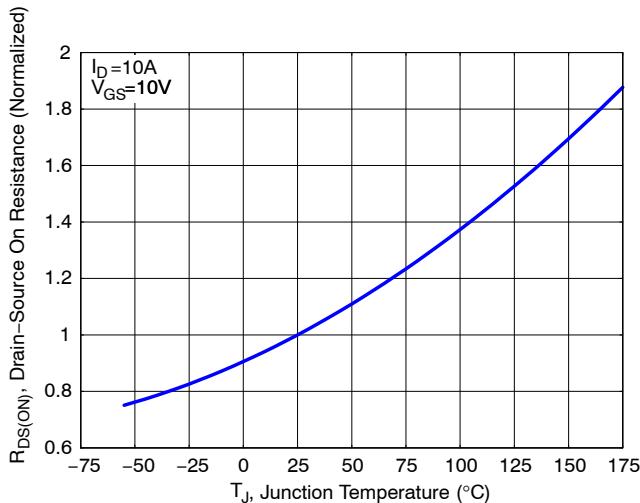


Figure 5. Normalized On-Resistance vs. Junction Temperature

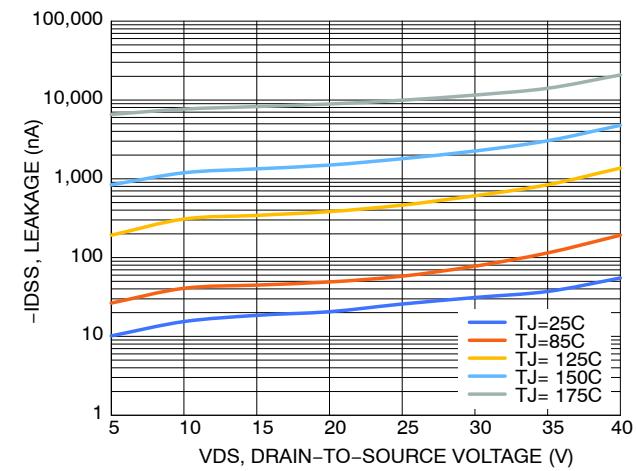
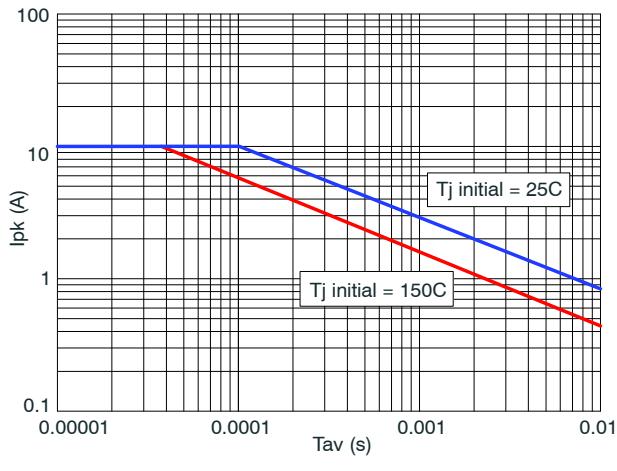
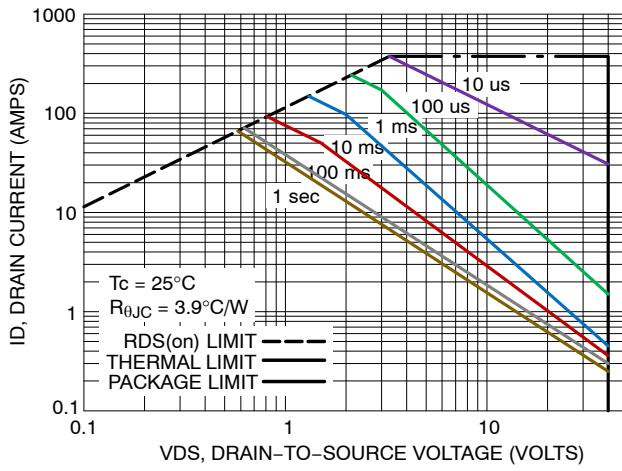
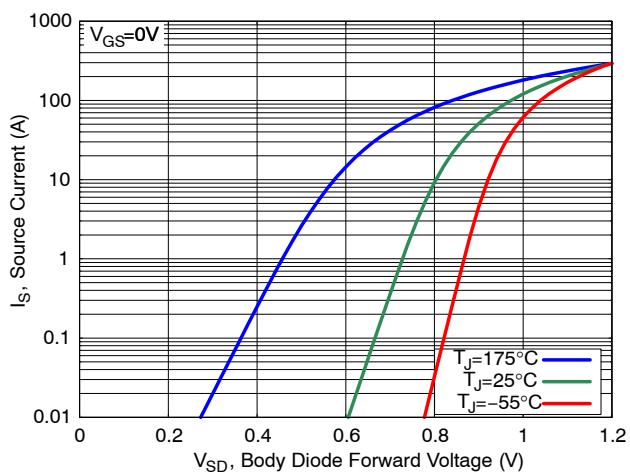
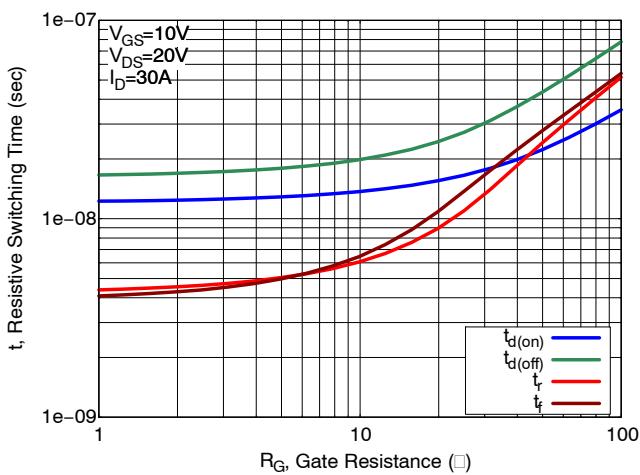
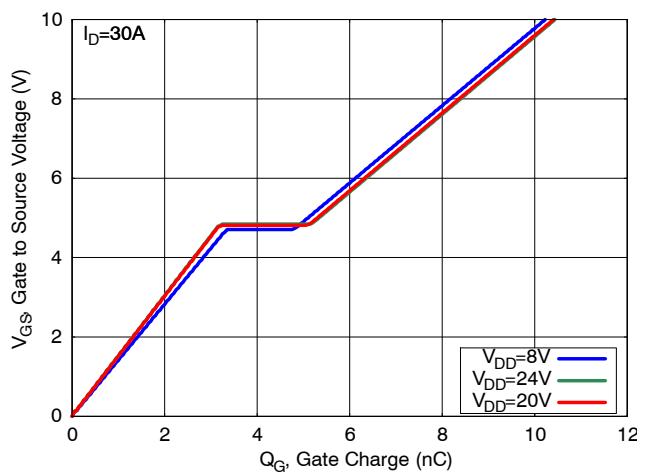
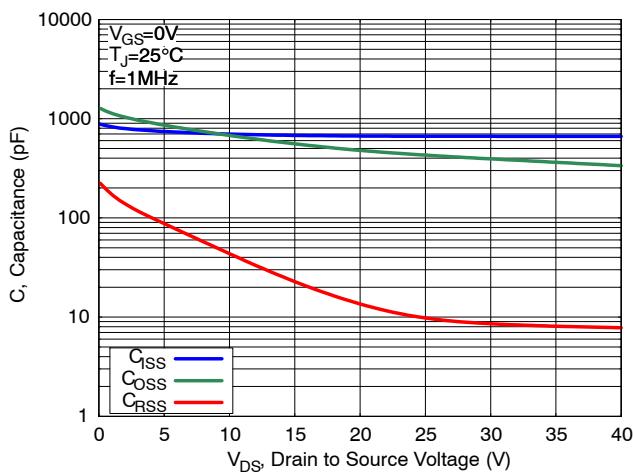


Figure 6. Drain Leakage Current vs. Drain Voltage

TYPICAL CHARACTERISTICS



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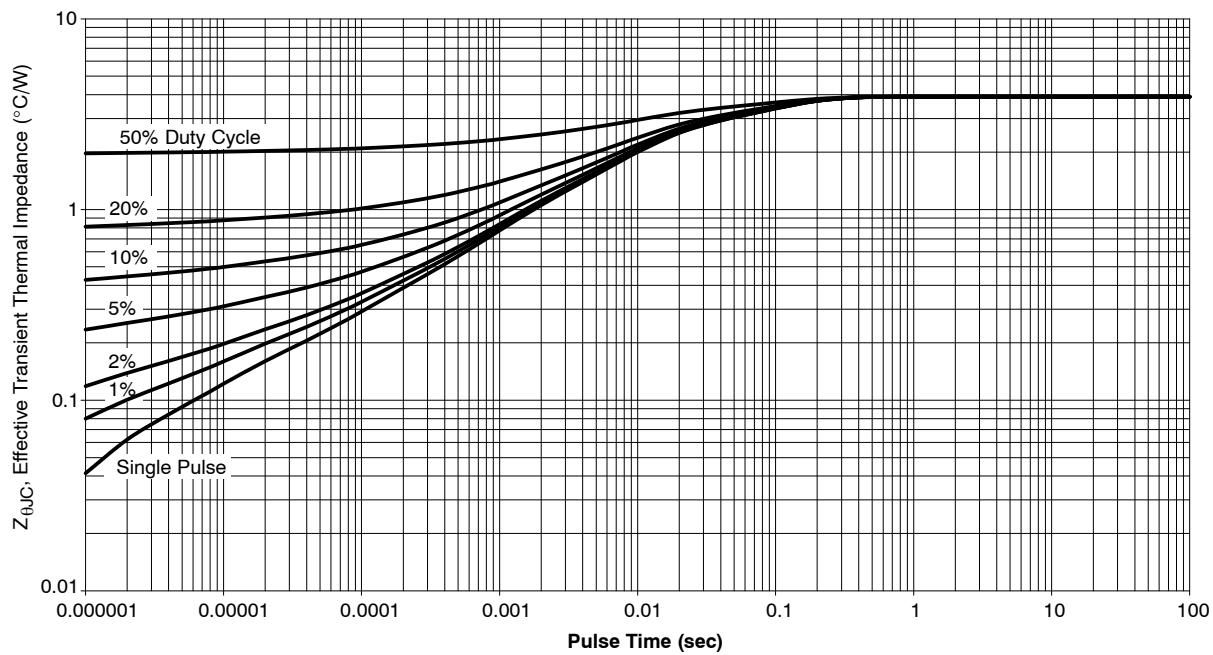


Figure 13. Transient Thermal Response

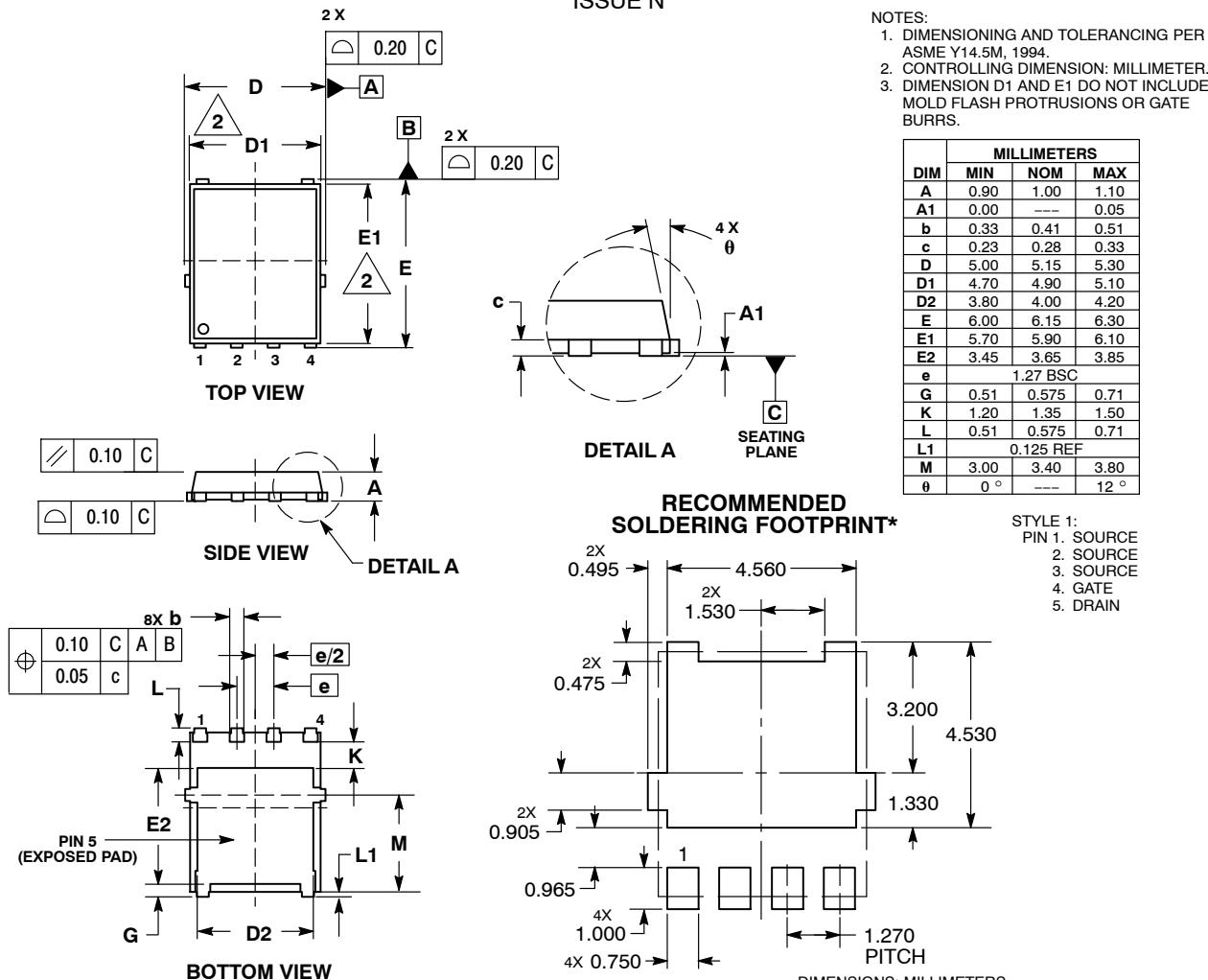
PACKAGE DIMENSIONS

DFN5 5x6, 1.27P

(SO-8FL)

CASE 488AA

ISSUE N



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

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