NTMFS4707N

Power MOSFET
30 V, 17 A, Single N−Channel, SOIC−8 Flat Lead

Features
- Fast Switching Times
- Low Gate Charge
- Low $R_{DS(on)}$
- Low Inductance SOIC−8 Package
- These are Pb−Free Devices

Applications
- Notebooks, Graphics Cards
- DC−DC Converters
- Synchronous Rectification

ON Semiconductor®

http://onsemi.com

$V_{(BR)DSS}$	$R_{DS(on)}$ Typ	I_D Max
30 V	10 mΩ @ 10 V	17 A
	13.5 mΩ @ 4.5 V	

N−Channel

MARKING DIAGRAM & PIN ASSIGNMENT

**SOIC−8 FLAT LEAD
CASE 488AA
STYLE 1**

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        D
   S ┌────────┐ D
   S │ 4707N  │ D
   S │ AYWZZ  │
   G └────────┘ D
        D
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4707N = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

Device	Package	Shipping[†]
NTMFS4707NT1G	SOIC−8 FL (Pb−Free)	1500 / Tape & Reel
NTMFS4707NT3G	SOIC−8 FL (Pb−Free)	5000 / 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.

MAXIMUM RATINGS (T_J = 25°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 (Note 1)	Steady State	T_A = 25°C	I_D	10.2	A
		T_A = 85°C		7.4	
	t ≤ 10 s	T_A = 25°C		17	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	2.3	W
	t ≤ 10 s			6.25	
Continuous Drain Current (Note 2)	Steady State	T_A = 25°C	I_D	6.9	A
		T_A = 85°C		4.9	
Power Dissipation (Note 2)		T_A = 25°C	P_D	1.0	W
Pulsed Drain Current	t_p ≤ 10 μs		I_{DM}	51	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	°C
Source Current (Body Diode)			I_S	6.25	A
Single Pulse Drain−to−Source Avalanche Energy (V_{DD} = 25 V, V_{GS} = 10 V, I_{PK} = 7.0 A, L = 10 mH, R_G = 25 Ω)			E_{AS}	245	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	°C

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction−to−Ambient − Steady State (Note 1)	$R_{θJA}$	55	°C/W
Junction−to−Ambient − t ≤ 10 s (Note 1)	$R_{θJA}$	20	
Junction−to−Ambient − Steady State (Note 2)	$R_{θJA}$	122.5	

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.
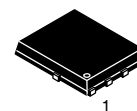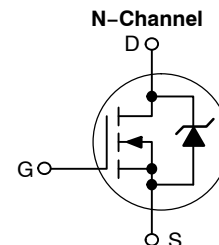1. Surface−mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).
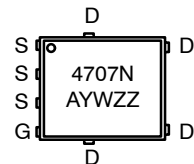2. Surface−mounted on FR4 board using the minimum recommended pad size (Cu area = 0.412 in sq).

NTMFS4707N

ELECTRICAL CHARACTERISTICS (T_J = 25°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 V, I_D = 250 μA		30			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$				6.5		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 24 V	T_J = 25°C			1.0	μA
			T_J = 125°C			50	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±100	nA
ON CHARACTERISTICS (Note 3)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250 μA		1.0		2.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				5.0		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 10 A			10	13	mΩ
		V_{GS} = 4.5 V, I_D = 8.0 A			13.5	17	
Forward Transconductance	g_{FS}	V_{DS} = 15 V, I_D = 10 A			20		S
CHARGES, CAPACITANCES AND GATE RESISTANCE							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = 24 V			735		pF
Output Capacitance	C_{OSS}				295		
Reverse Transfer Capacitance	C_{RSS}				80		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 15 V; I_D = 10 A			7.5	15	nC
Threshold Gate Charge	$Q_{G(TH)}$				1.1		
Gate−to−Source Charge	Q_{GS}				2.0		
Gate−to−Drain Charge	Q_{GD}				3.6		
Gate Resistance	R_G				2.4		Ω
SWITCHING CHARACTERISTICS (Note 4)							
Turn−On Delay Time	$t_{d(on)}$	V_{GS} = 10 V, V_{DD} = 15 V, I_D = 1.0 A, R_G = 3.0 Ω			6.0		ns
Rise Time	t_r				5.0		
Turn−Off Delay Time	$t_{d(off)}$				19		
Fall Time	t_f				11		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 6.25 A	T_J = 25°C		0.79	1.0	V
			T_J = 125°C		0.59		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, d_{IS}/d_t = 100 A/μs, I_S = 6.25 A			26		ns
Charge Time	t_a				14		
Discharge Time	t_b				12		
Reverse Recovery Charge	Q_{RR}				19		nC

3. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
4. Switching characteristics are independent of operating junction temperatures.
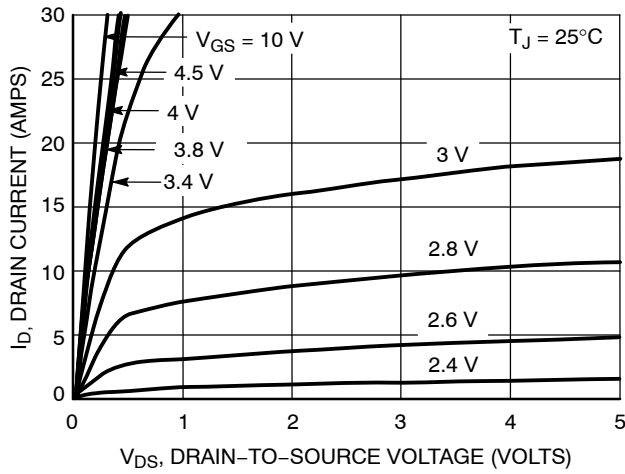
TYPICAL CHARACTERIZATIONS
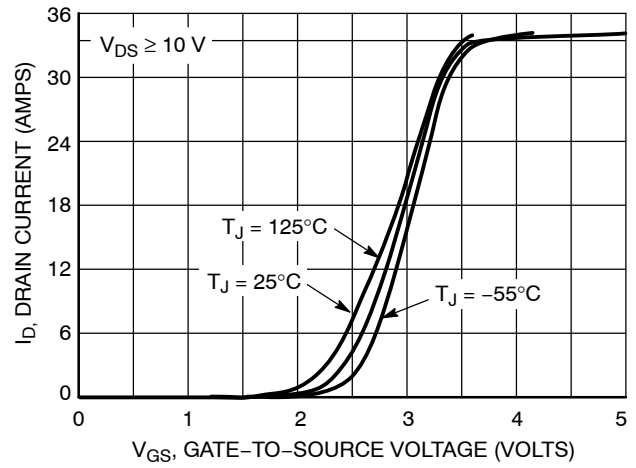

Figure 1. On−Region Characteristics

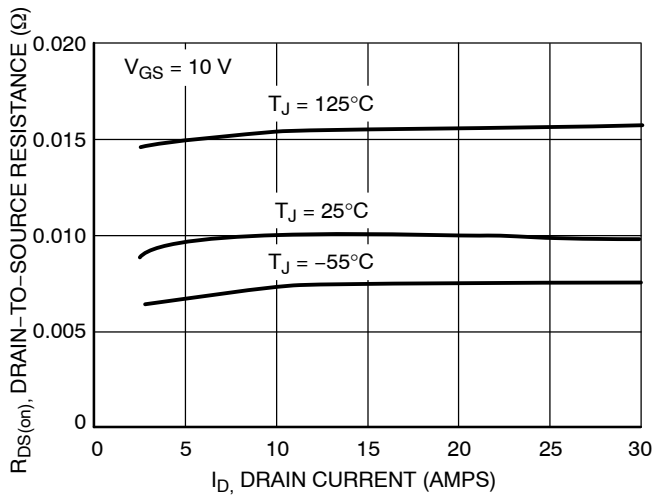Figure 2. Transfer Characteristics

Figure 3. On−Resistance vs. Drain Current and Temperature

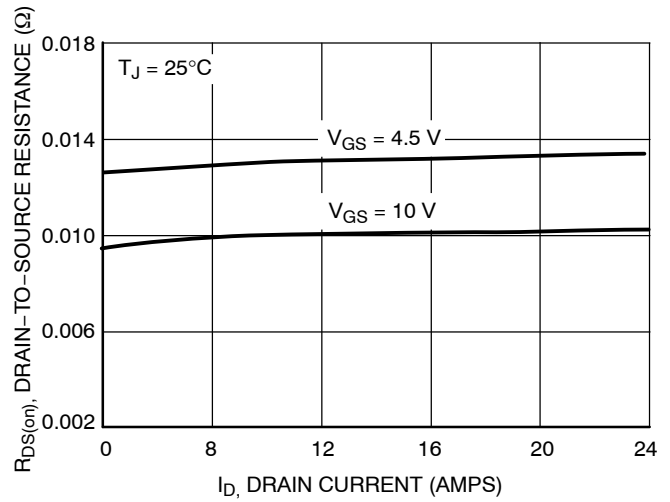

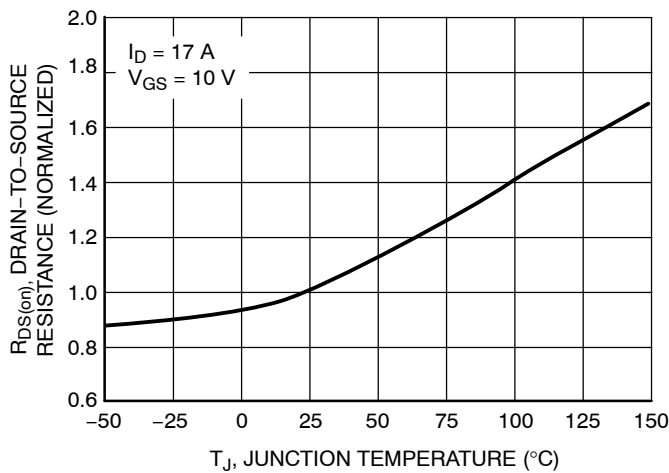Figure 4. On−Resistance vs. Drain Current and Gate Voltage
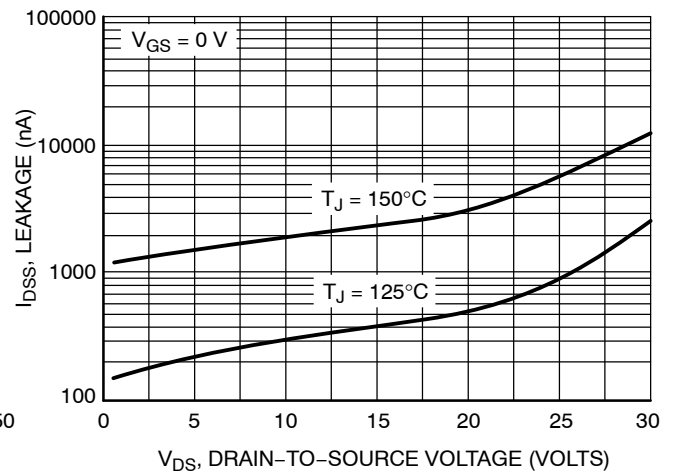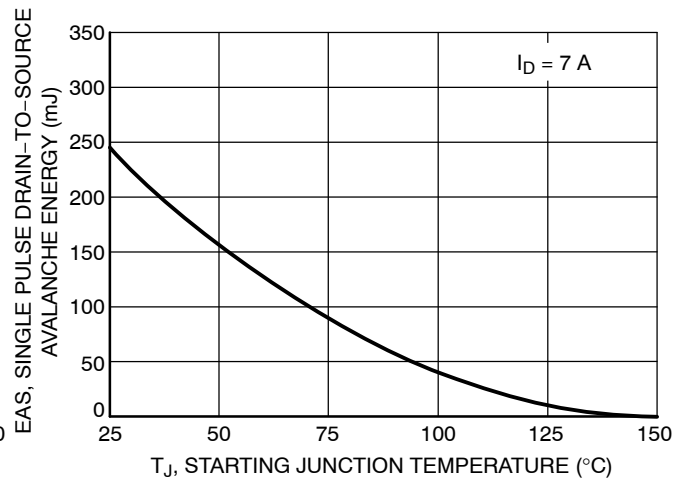

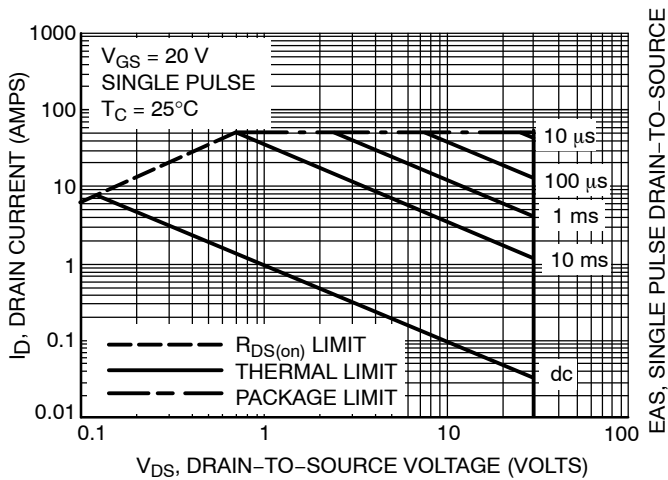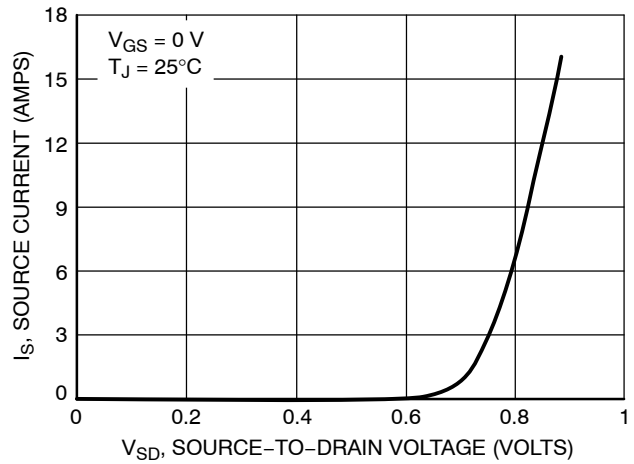Figure 5. On−Resistance Variation with Temperature
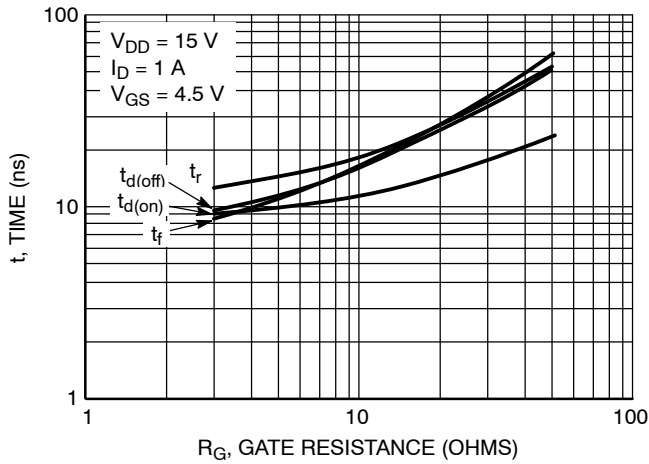

Figure 6. Drain−to−Source Leakage Current vs. Voltage
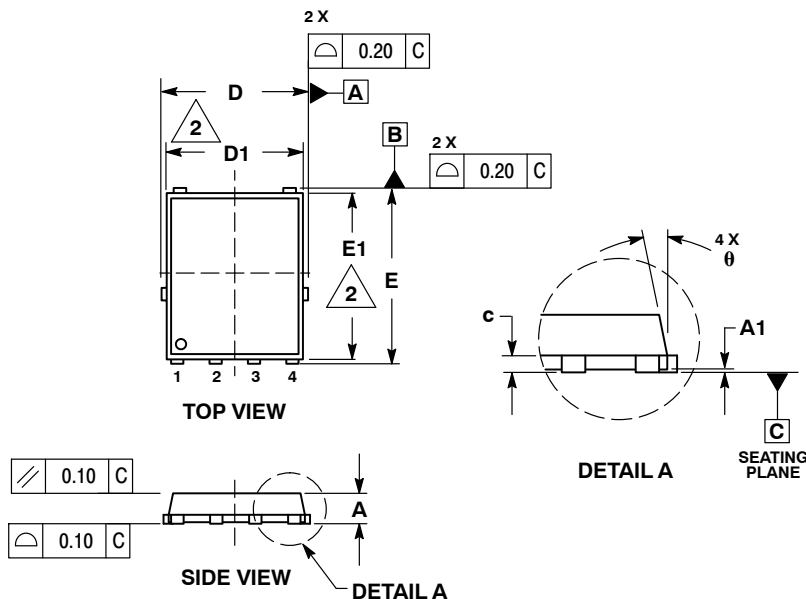
TYPICAL CHARACTERIZATIONS

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. Maximum Rated Forward Biased Safe Operating Area

Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature
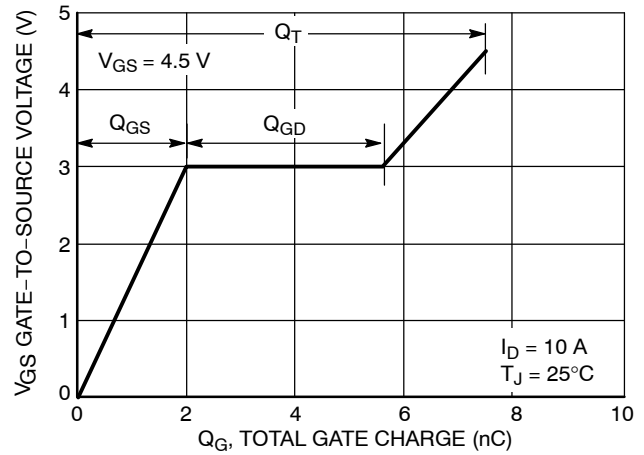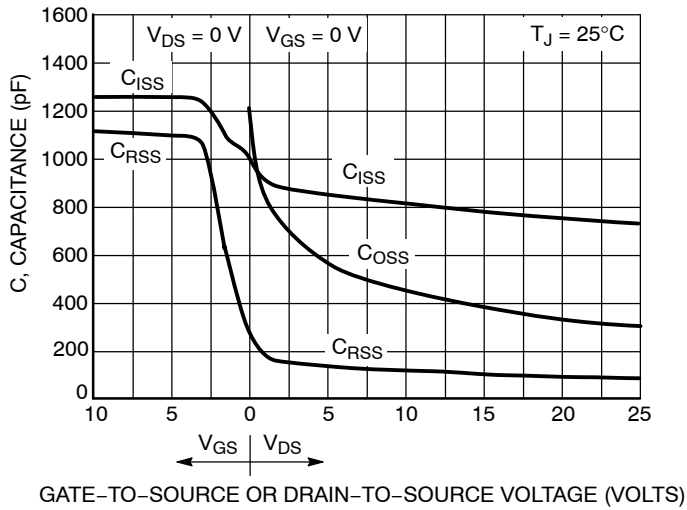
DFN5 5x6, 1.27P
(SO–8FL)
CASE 488AA
ISSUE N

SCALE 2:1

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.

2 X
⌒ | 0.20 | C

D
2
D1
B
2 X
⌒ | 0.20 | C

E1
2
E

4 X
θ

c
A1

TOP VIEW

DETAIL A

C
SEATING PLANE

∥ | 0.10 | C
⌒ | 0.10 | C

A

SIDE VIEW

DETAIL A

	MILLIMETERS		
DIM	**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*

1
XXXXXX
AYWZZ
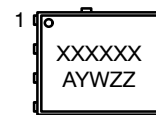
XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*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.

8X b
⊕ | 0.10 | C | A | B
| 0.05 | c

e/2
e
L
1
4
K

E2
PIN 5
(EXPOSED PAD)
L1
M

G
D2

BOTTOM VIEW

RECOMMENDED
SOLDERING FOOTPRINT*

2X 0.495
4.560
2X 1.530
2X 0.475
3.200
4.530
1.330
2X 0.905
1
0.965
4X 1.000
4X 0.750
1.270
PITCH
DIMENSIONS: MILLIMETER
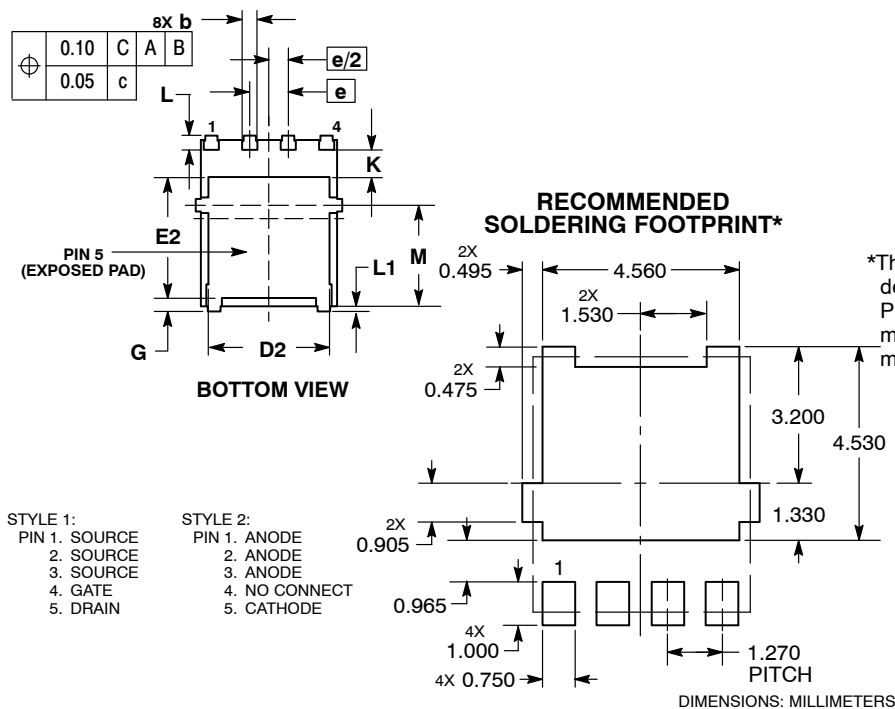
STYLE 1:
PIN 1. SOURCE
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN

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		
DESCRIPTION:	DFN5 5x6, 1.27P (SO–8FL)		PAGE 1 OF 1

ADDITIONAL INFORMATION

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