

MOSFET – Power, Single, N-Channel

80 V, 4.5 mΩ, 107 A

NTMFS6H824N

Features

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

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

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DSS}	80	V
Gate-to-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current $R_{\theta JC}$ (Notes 1, 3)	Steady State	$T_C = 25^\circ\text{C}$	I_D	A
		$T_C = 100^\circ\text{C}$	82	
Power Dissipation $R_{\theta JC}$ (Note 1)		$T_C = 25^\circ\text{C}$	P_D	W
		$T_C = 100^\circ\text{C}$	58	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2, 3)	Steady State	$T_A = 25^\circ\text{C}$	I_D	A
		$T_A = 100^\circ\text{C}$	14	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)		$T_A = 25^\circ\text{C}$	P_D	W
		$T_A = 100^\circ\text{C}$	1.9	
Pulsed Drain Current	$T_A = 25^\circ\text{C}$, $t_p = 10\ \mu\text{s}$	I_{DM}	680	A
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +175	°C
Source Current (Body Diode)		I_S	96	A
Single Pulse Drain-to-Source Avalanche Energy ($I_{L(pk)} = 7\text{ A}$)		E_{AS}	736	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	°C

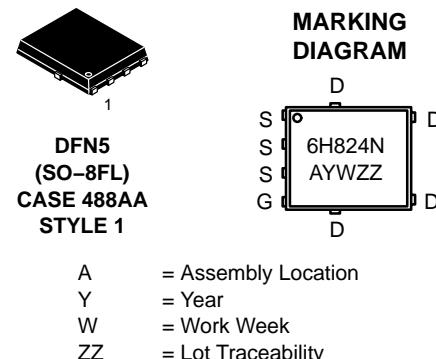
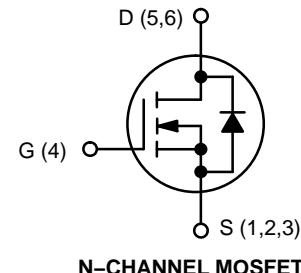
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State	$R_{\theta JC}$	1.3	°C/W
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	39.8	

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. Surface-mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
3. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

$V_{(BR)DSS}$	$R_{DS(ON)}\text{ MAX}$	$I_D\text{ MAX}$
80 V	4.5 mΩ @ 10 V	107 A



ORDERING INFORMATION

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

NTMFS6H824N

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

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA		80			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J				43		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 80 V	T _J = 25°C		10		μA
			T _J = 125°C			100	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = 20 V				100	nA

ON CHARACTERISTICS (Note 4)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 140 μA		2.0		4.0	V
Threshold Temperature Coefficient	V _{GS(TH)} /T _J				-7.2		mV/°C
Drain-to-Source On Resistance	R _{DSS(on)}	V _{GS} = 10 V	I _D = 20 A		3.7	4.5	mΩ
		V _{GS} = 6 V	I _D = 20 A		5.2	7.0	
Forward Transconductance	g _{FS}	V _{DS} = 15 V, I _D = 20 A			75		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = 40 V		2470		pF
Output Capacitance	C _{OSS}			342		
Reverse Transfer Capacitance	C _{rss}			11		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 40 V; I _D = 30 A		38		nC
Threshold Gate Charge	Q _{G(TH)}			7.4		
Gate-to-Source Charge	Q _{GS}			12		
Gate-to-Drain Charge	Q _{GD}			7.0		
Plateau Voltage	V _{GP}			4.7		V

SWITCHING CHARACTERISTICS (Note 5)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 10 V, V _{DS} = 64 V, I _D = 30 A, R _G = 2.5 Ω		20		ns
Rise Time	t _r			52		
Turn-Off Delay Time	t _{d(OFF)}			55		
Fall Time	t _f			42		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 20 A	T _J = 25°C		0.8	1.2	V
			T _J = 125°C		0.7		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 30 A			52		ns
Charge Time	t _a				32		
Discharge Time	t _b				19		
Reverse Recovery Charge	Q _{RR}				67		nC

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.

4. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.

5. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

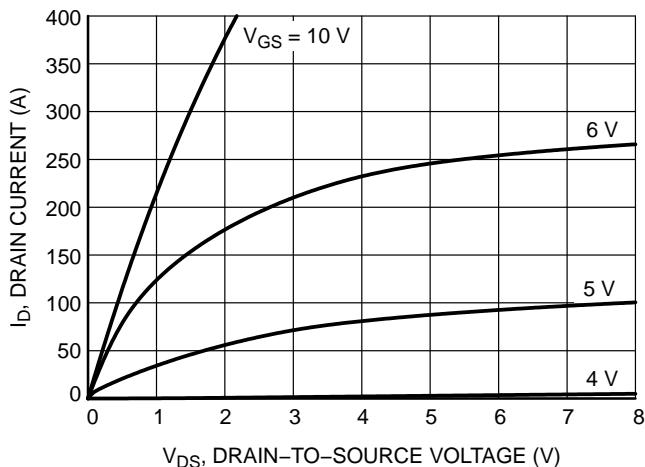


Figure 1. On-Region Characteristics

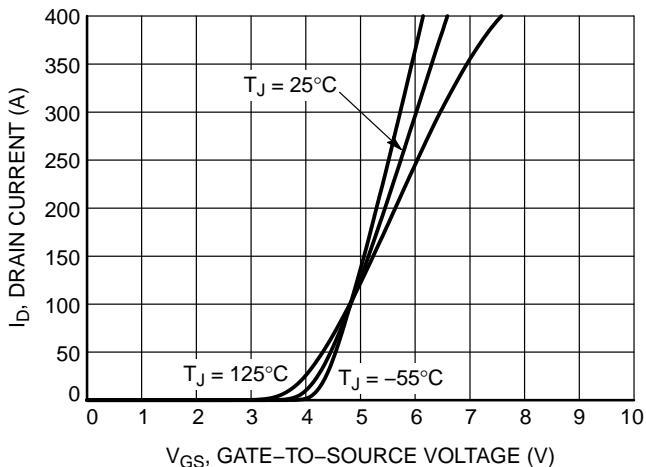


Figure 2. Transfer Characteristics

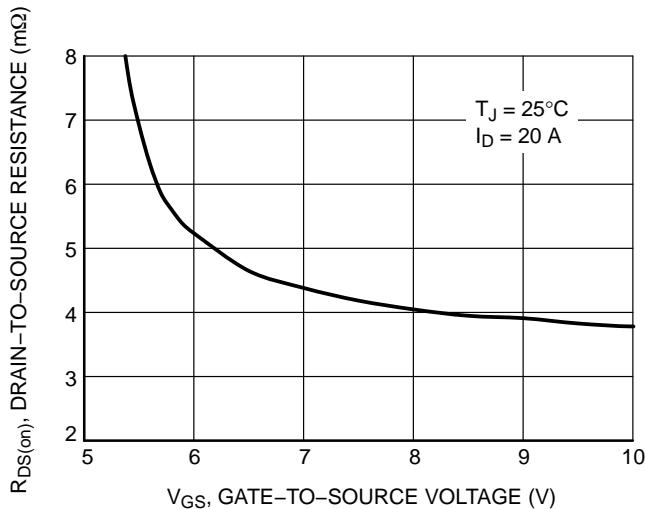


Figure 3. On-Resistance vs. Gate-to-Source Voltage

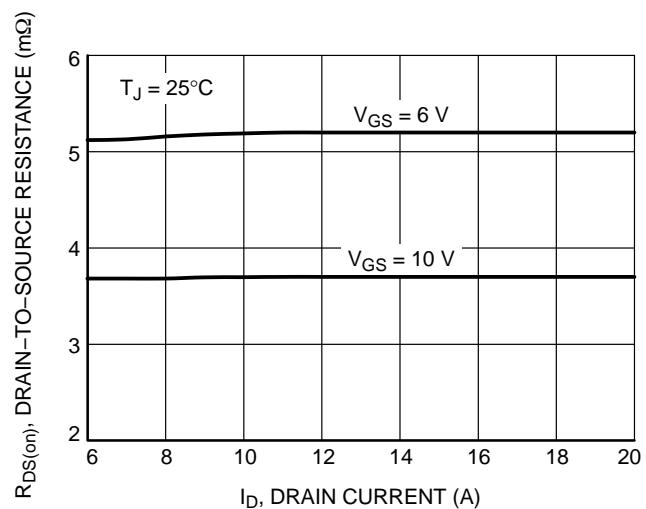


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

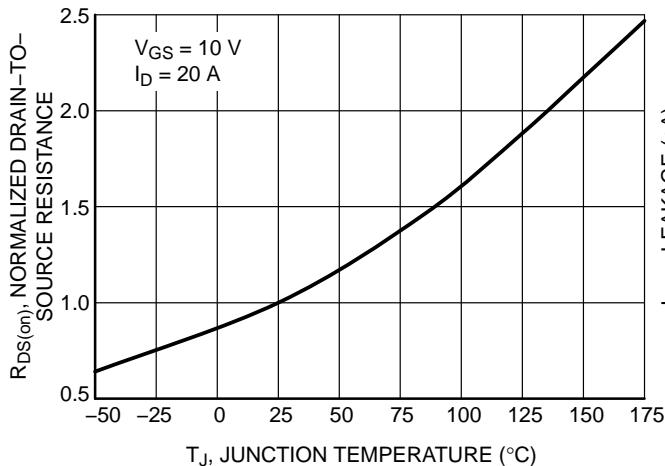


Figure 5. On-Resistance Variation with Temperature

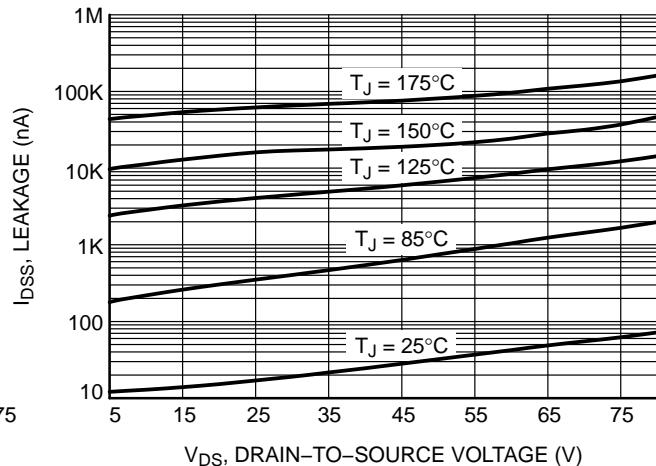
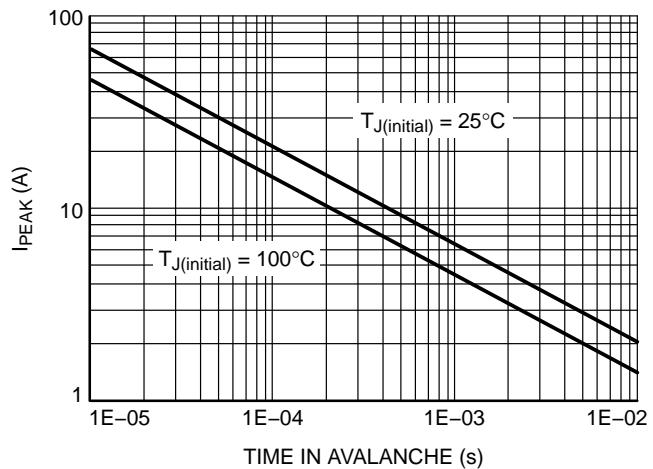
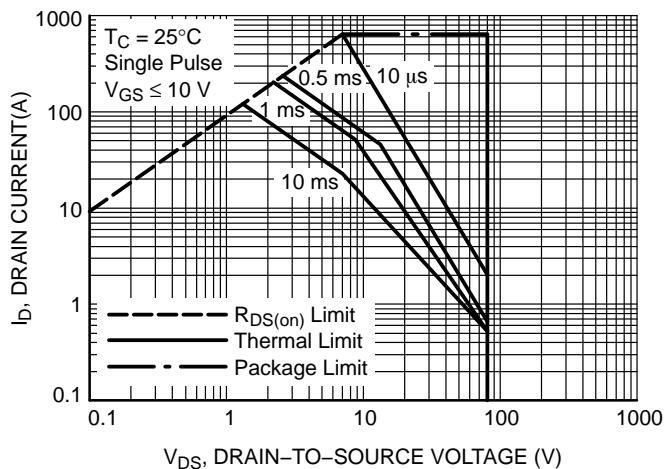
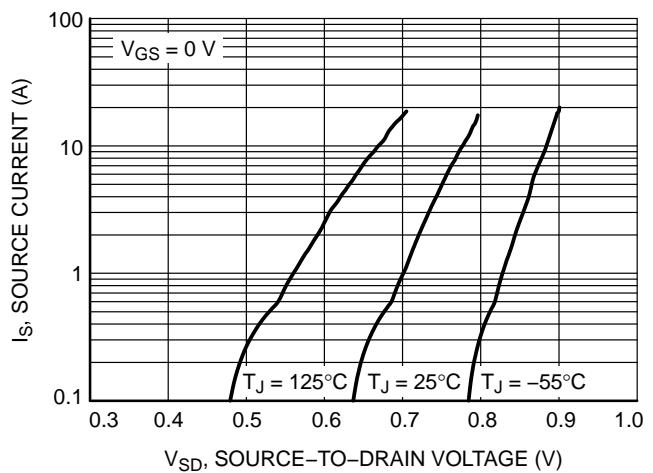
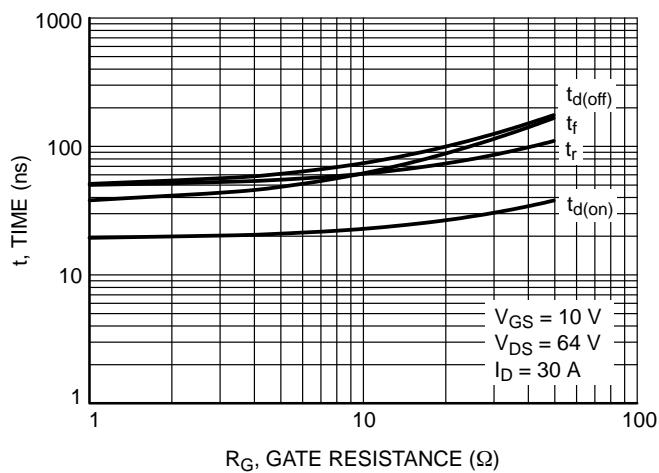
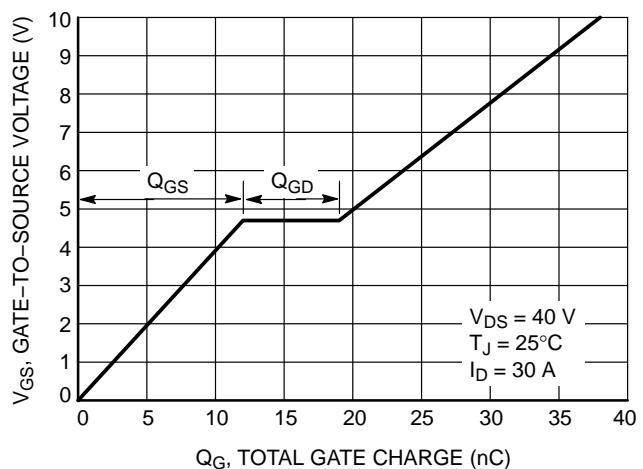
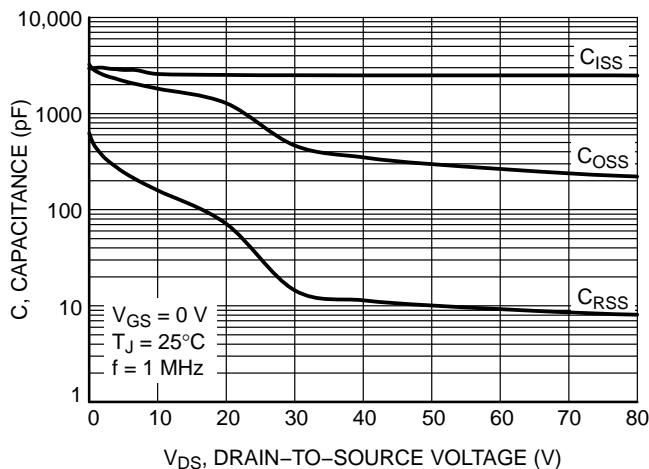


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS



NTMFS6H824N

TYPICAL CHARACTERISTICS

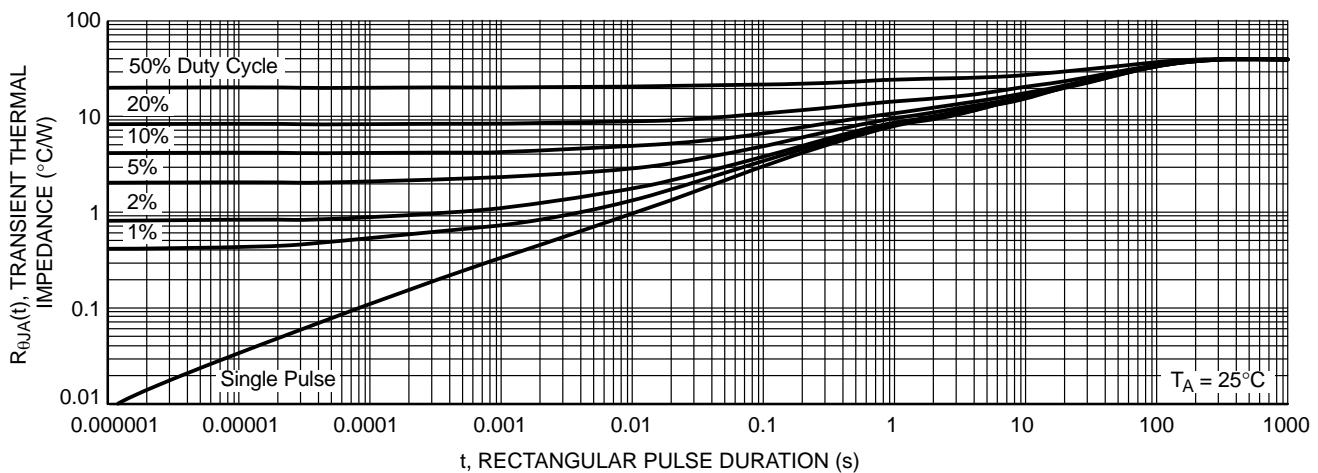


Figure 13. Thermal Response

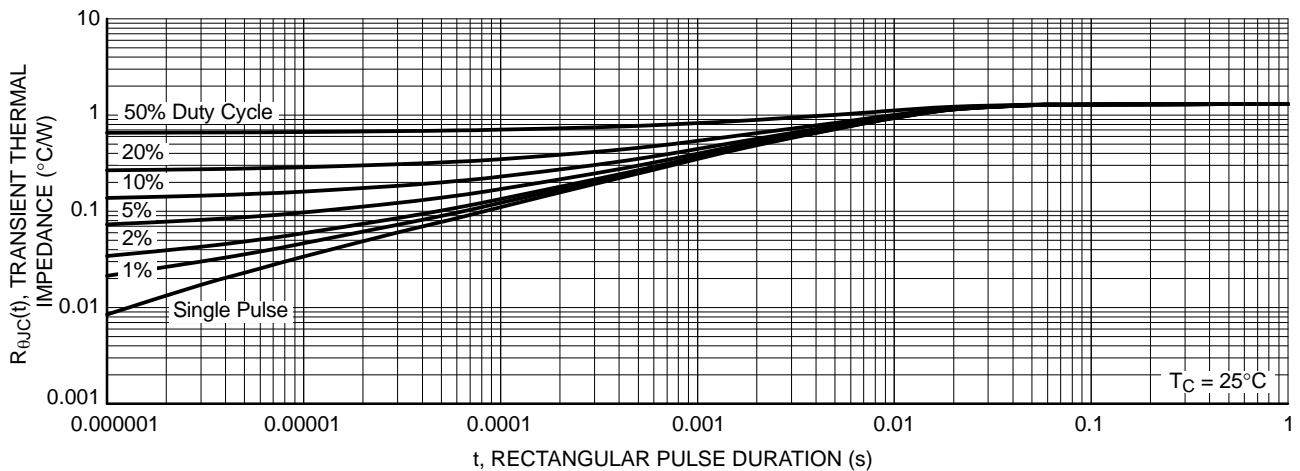


Figure 14. Thermal Response

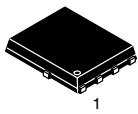
DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NTMFS6H824NT1G	6H824N	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

onsemiTM



SCALE 2:1

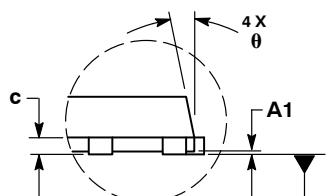
**DFN5 5x6, 1.27P
(SO-8FL)**
CASE 488AA
ISSUE N

DATE 25 JUN 2018

NOTES:

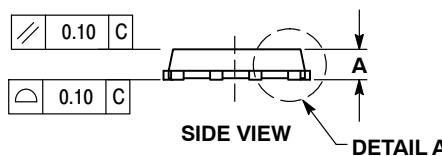
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

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°

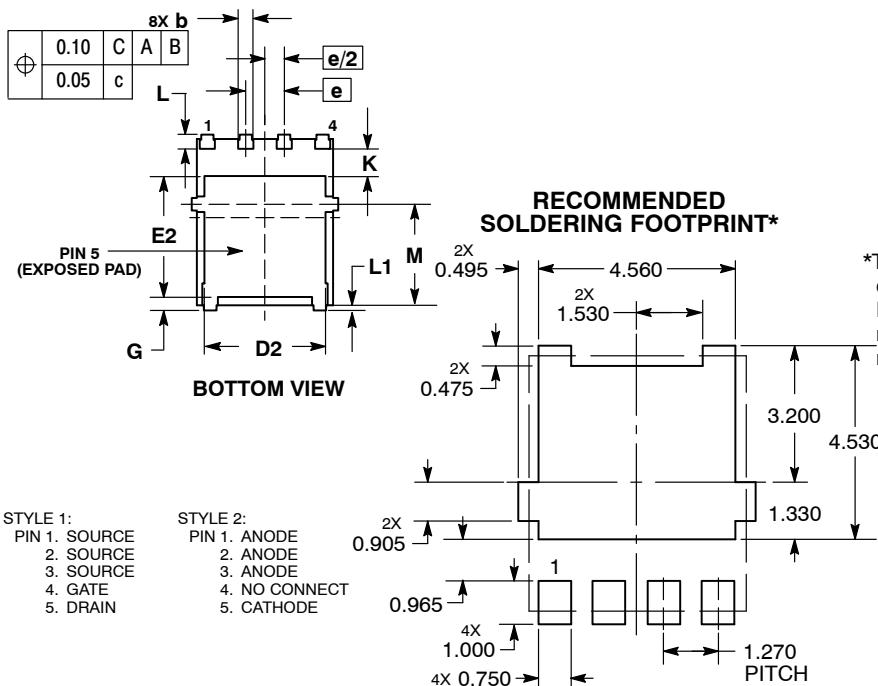


DETAIL A

SEATING PLANE



DETAIL A

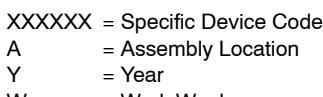


STYLE 1:
PIN 1. SOURCE
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN

STYLE 2:
PIN 1. ANODE
2. ANODE
3. ANODE
4. NO CONNECT
5. CATHODE

DIMENSIONS: MILLIMETERS

*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.



XXXXXX = Specific Device Code

A = Assembly Location

Y = Year

W = Work Week

ZZ = Lot Traceability

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

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

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