NTMFS4983NF

Power MOSFET
30 V, 106 A, Single N−Channel, SO−8 FL

Features

- Integrated Schottky Diode
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- CPU Power Delivery
- Synchronous Rectification for DC−DC Converters
- Low Side Switching
- Telecom Secondary Side Rectification

ON Semiconductor®

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
30 V	2.1 mΩ @ 10 V	106 A
	3.1 mΩ @ 4.5 V	

N−CHANNEL MOSFET

D ○ (5, 6)

G ○ (4)

S ○ (1, 2, 3)

**SO−8 FLAT LEAD
CASE 488AA
STYLE 1**

MARKING DIAGRAM


```
4983NF
AYWZZ
```

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

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 $R_{\theta JA}$ (Note 1)	Steady State	T_A = 25°C	I_D	30	A
		T_A = 85°C		22	
Power Dissipation $R_{\theta JA}$ (Note 1)		T_A = 25°C	P_D	3.13	W
Continuous Drain Current $R_{\theta JA} \leq$ 10 sec		T_A = 25°C	I_D	48	A
		T_A = 85°C		34	
Power Dissipation $R_{\theta JA}$, t $\leq$ 10 sec		T_A = 25°C	P_D	7.7	W
Continuous Drain Current $R_{\theta JA}$ (Note 2)		T_A = 25°C	I_D	22	A
		T_A = 85°C		16	
Power Dissipation $R_{\theta JA}$ (Note 2)		T_A = 25°C	P_D	1.7	W
Continuous Drain Current $R_{\theta JC}$ (Note 1)		T_C = 25°C	I_D	106	A
		T_C = 85°C		76	
Power Dissipation $R_{\theta JC}$ (Note 1)		T_C = 25°C	P_D	38	W
Pulsed Drain Current	t_p=10μs	T_A = 25°C	I_{DM}	320	A
Current limited by package		T_A = 25°C	$I_{Dmaxpkg}$	100	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to +150	°C
Source Current (Body Diode)			I_S	54	A
Drain to Source dV/dt			dV/dt	6	V/ns
Single Pulse Drain−to−Source Avalanche Energy (V_{DD} = 50 V, V_{GS} = 10 V, I_L = 45 A_{pk}, L = 0.1 mH, R_G = 25 Ω)			EAS	101	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.
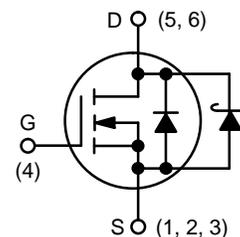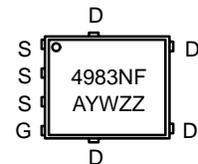
ORDERING INFORMATION

Device	Package	Shipping†
NTMFS4983NFT1G	SO−8FL (Pb−Free)	1500 / Tape & Reel
NTMFS4983NFT3G	SO−8FL (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.

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

NTMFS4983NF

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction−to−Case (Drain)	$R_{\theta JC}$	3.3	°C/W
Junction−to−Ambient − Steady State (Note 1)	$R_{\theta JA}$	40	
Junction−to−Ambient − Steady State (Note 2)	$R_{\theta JA}$	74	
Junction−to−Ambient − t ≤ 10 sec	$R_{\theta JA}$	16.3	

1. Surface−mounted on FR4 board using 1 sq−in pad, 2 oz Cu.
2. Surface−mounted on FR4 board using the minimum recommended pad size of 100 mm^2.

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 = 1.0 mA		30			V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 10 mA, referenced to 25°C			15		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 24 V	T_J = 25°C			500	μA
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 = 1.0 mA		1.2	1.7	2.3	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	I_D = 10 mA, referenced to 25°C			5.0		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 30 A		1.6	2.1	mΩ
			I_D = 15 A		1.6		
		V_{GS} = 4.5 V	I_D = 30 A		2.5	3.1	
			I_D = 15 A		2.5		
Forward Transconductance	g_{FS}	V_{DS} = 1.5 V, I_D = 15 A			60		S
CHARGES AND CAPACITANCES							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 15 V			3250		pF
Output Capacitance	C_{OSS}				1340		
Reverse Transfer Capacitance	C_{RSS}				90		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 15 V; I_D = 30 A			22.6		nC
Threshold Gate Charge	$Q_{G(TH)}$				2.9		
Gate−to−Source Charge	Q_{GS}				7.0		
Gate−to−Drain Charge	Q_{GD}				6.9		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DS} = 15 V, I_D = 30 A			47.9		nC
SWITCHING CHARACTERISTICS (Note 4)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 4.5 V, V_{DS} = 15 V, I_D = 15 A, R_G = 3.0 Ω			13.5		ns
Rise Time	t_r				24.9		
Turn−Off Delay Time	$t_{d(OFF)}$				28.7		
Fall Time	t_f				10.7		

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

NTMFS4983NF

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

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS (Note 4)							
Turn–On Delay Time	$t_{d(ON)}$	V_{GS} = 10 V, V_{DS} = 15 V, I_D = 15 A, R_G = 3.0 Ω			9.4		ns
Rise Time	t_r				16.7		
Turn–Off Delay Time	$t_{d(OFF)}$				35.2		
Fall Time	t_f				7.4		
DRAIN–SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 2 A	T_J = 25°C		0.4	0.7	V
			T_J = 125°C		0.32		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dI_S/dt = 100 A/μs, I_S = 2 A			45		ns
Charge Time	t_a				23		
Discharge Time	t_b				22		
Reverse Recovery Charge	Q_{RR}				50		nC
PACKAGE PARASITIC VALUES							
Source Inductance	L_S	T_A = 25°C			0.65		nH
Drain Inductance	L_D				0.20		
Gate Inductance	L_G				1.5		
Gate Resistance	R_G				1.0		Ω

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

NTMFS4983NF

TYPICAL PERFORMANCE CURVES
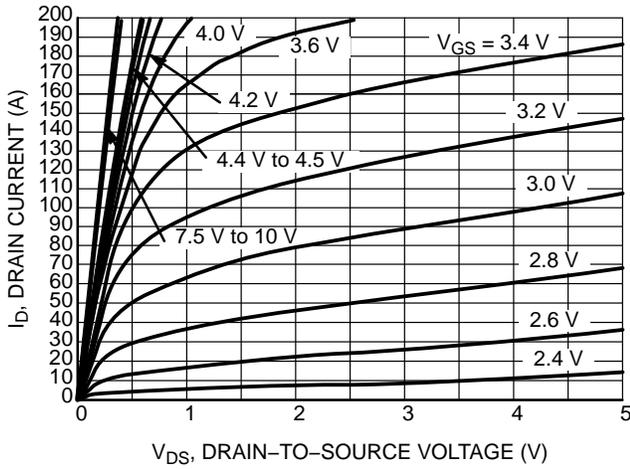
Figure 1. On–Region Characteristics
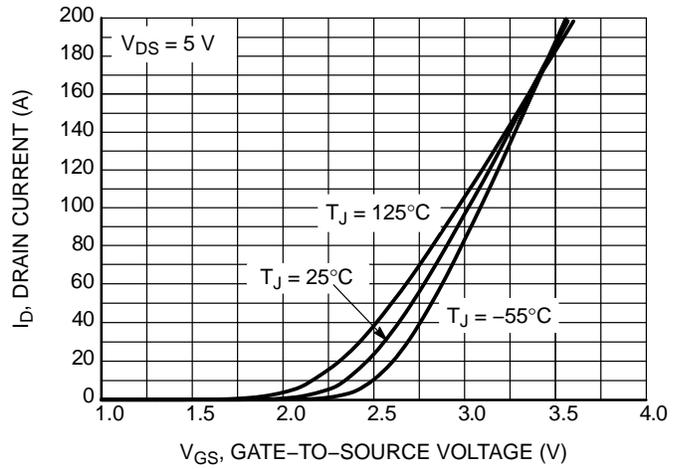
Figure 2. Transfer Characteristics
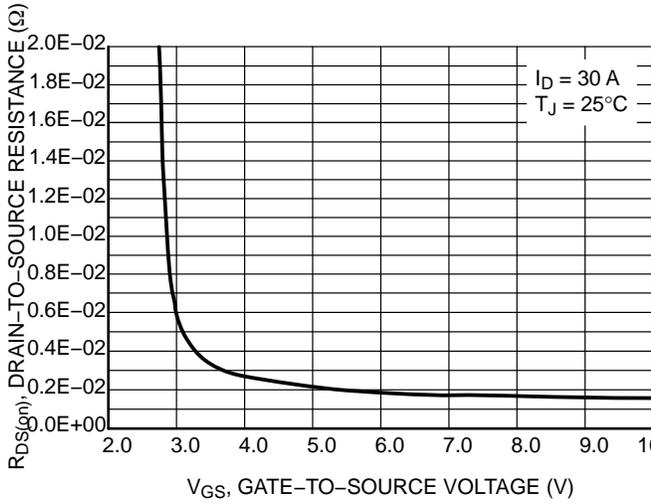
Figure 3. On–Resistance vs. Gate–to–Source Voltage
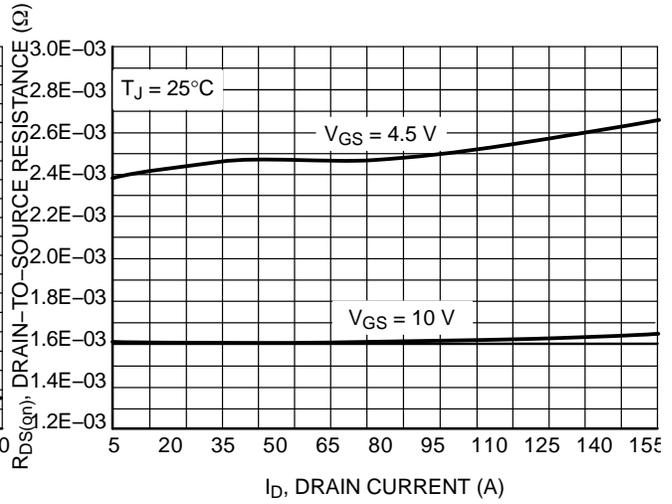
Figure 4. On–Resistance vs. Drain Current and Gate Voltage
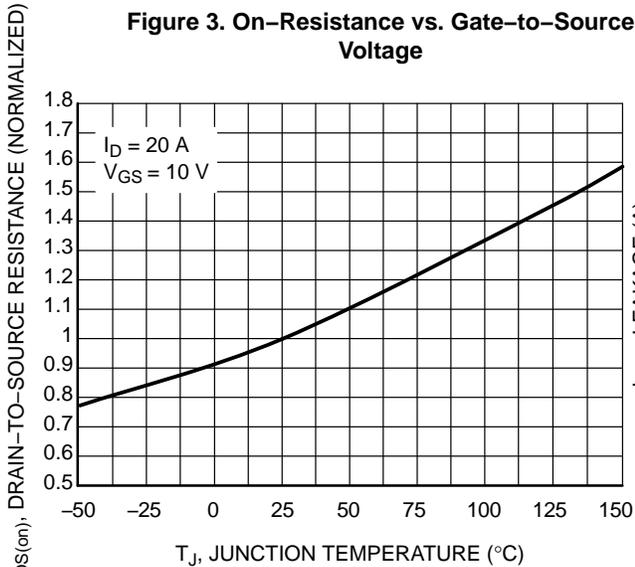
Figure 5. On–Resistance Variation with Temperature
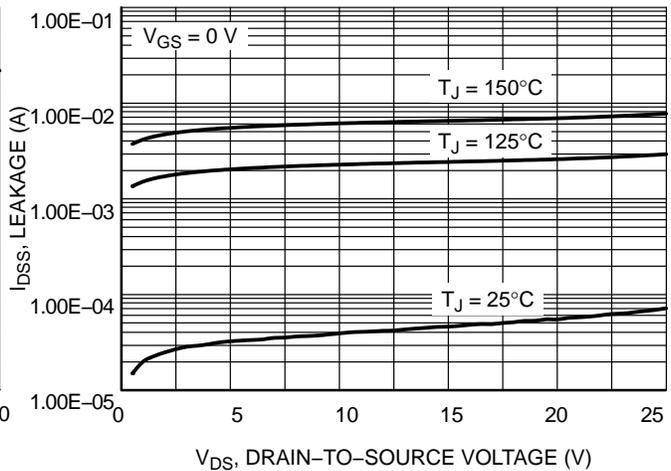
Figure 6. Drain–to–Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES
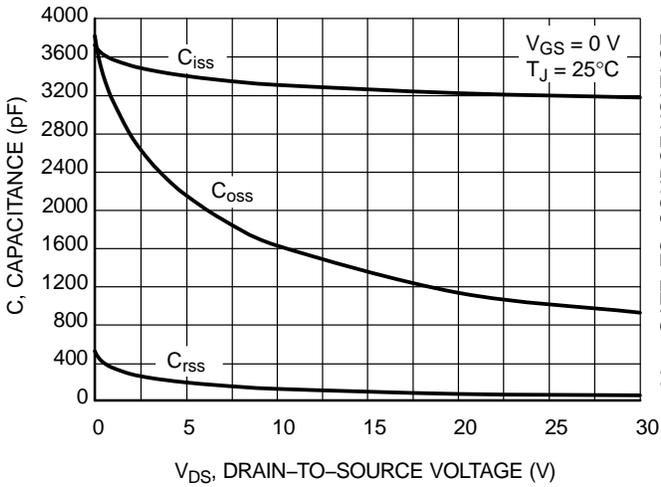
Figure 7. Capacitance Variation
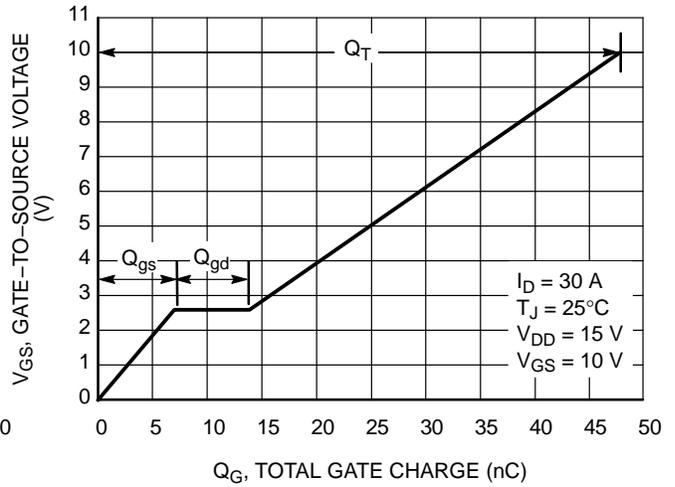
**Figure 8. Gate–to–Source and
Drain–to–Source Voltage vs. Total Charge**
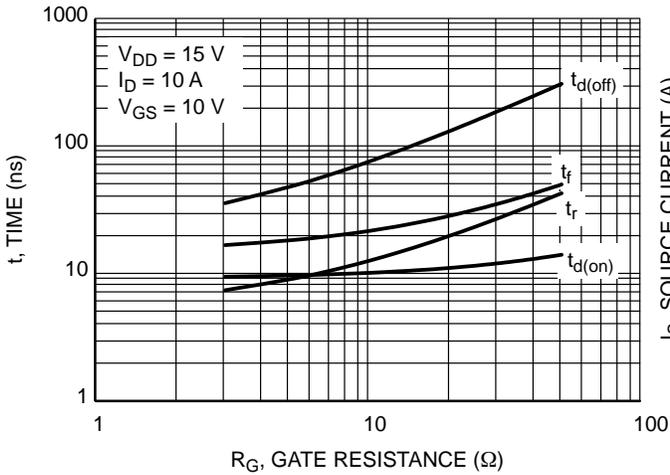
**Figure 9. Resistive Switching Time
Variation vs. Gate Resistance**
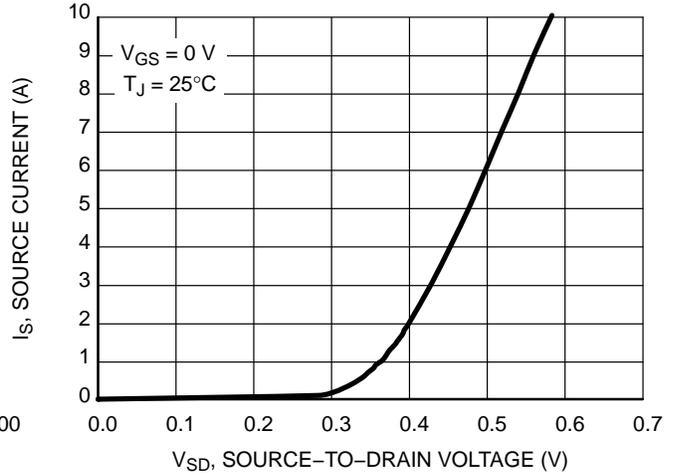
Figure 10. Diode Forward Voltage vs. Current
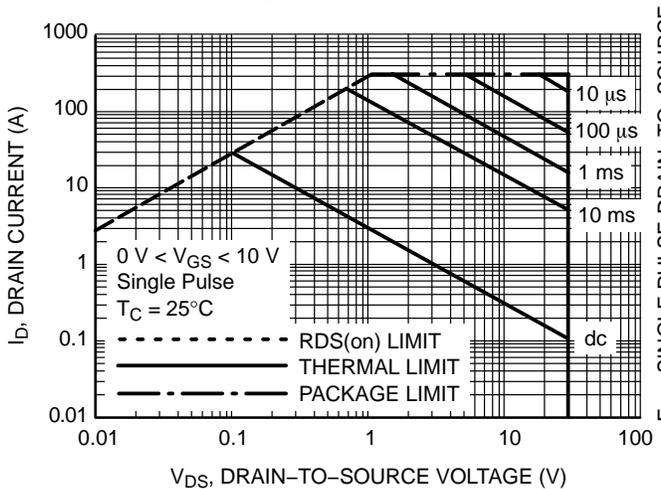
**Figure 11. Maximum Rated Forward Biased
Safe Operating Area**
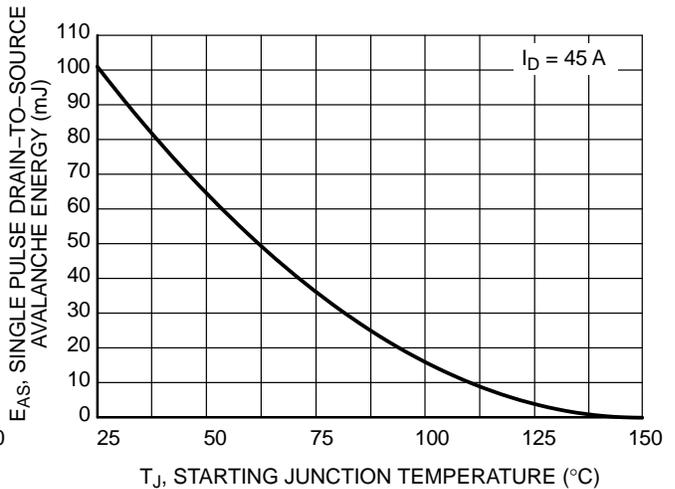
**Figure 12. Maximum Avalanche Energy vs.
Starting Junction Temperature**

TYPICAL PERFORMANCE CURVES

Figure 13. Thermal Response

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®

SCALE 2:1

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

DATE 25 JUN 2018
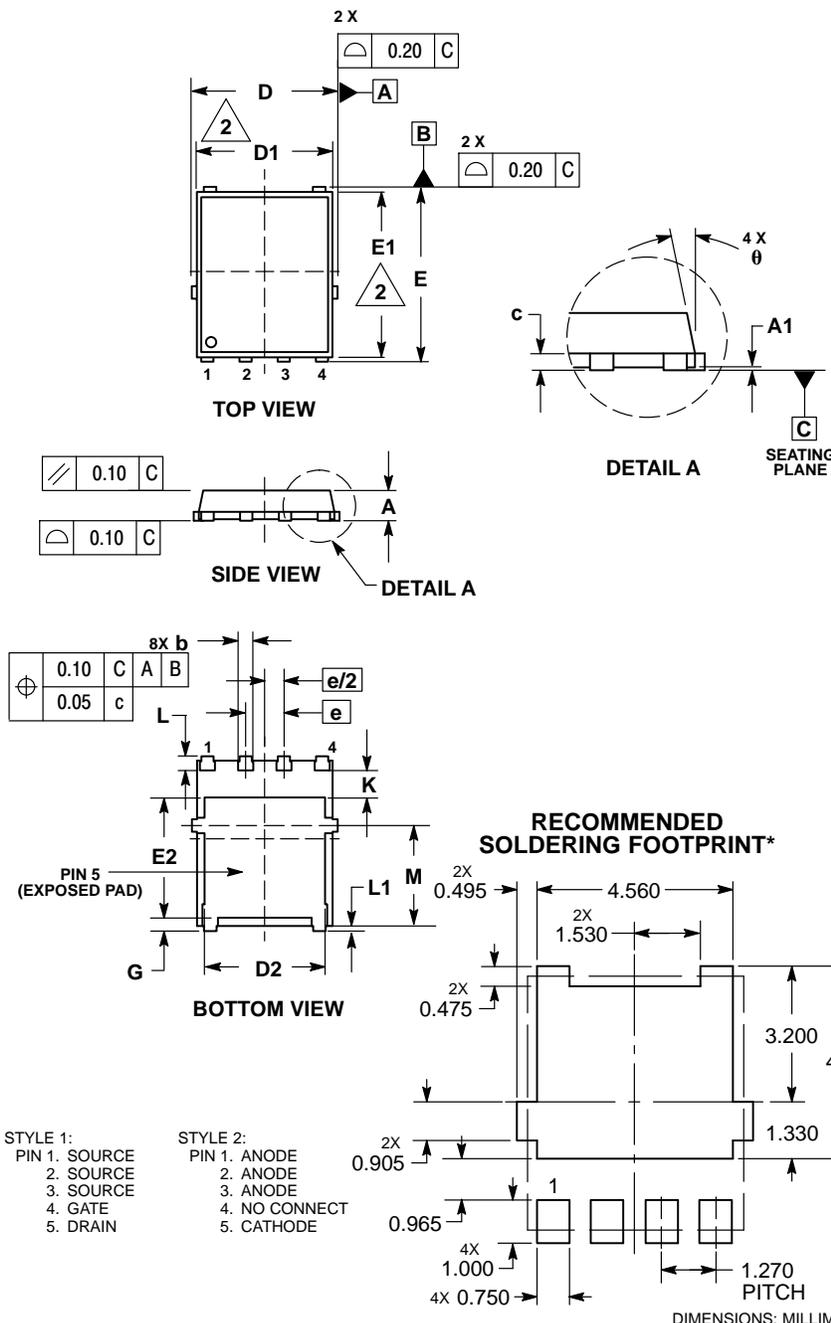
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	–––	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
e	1.27 BSC		
G	0.51	0.575	0.71
K	1.20	1.35	1.50
L	0.51	0.575	0.71
L1	0.125 REF		
M	3.00	3.40	3.80
θ	0 °	–––	12 °

2 X

| ⌒ | 0.20 | C |

A

D

D1

B

2 X

| ⌒ | 0.20 | C |

E1

E

4 X
θ

c

A1

DETAIL A

C

SEATING PLANE

TOP VIEW

| ∥ | 0.10 | C |
| ⌒ | 0.10 | C |

A

SIDE VIEW

DETAIL A

8X **b**

| ⊕ | 0.10 | C | A | B |
| | 0.05 | c | | |

L

e/2

e

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

0.965

4X
1.000

4X 0.750

1.270
PITCH

DIMENSIONS: MILLIMETERS

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.

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 ON Semiconductor 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**

PUBLICATION ORDERING INFORMATION

◊