

MOSFET – Power, Single N-Channel 100 V, 14 mΩ, 46 A

NVMFS016N10MCL

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
- AEC-Q101 Qualified and PPAP Capable
- NVMFWS016N10MCL – Wettable Flank Products
- These Devices are Pb-Free, Halogen Free/BFR Free, Beryllium Free and are RoHS Compliant

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V _{DSS}	100	V
Gate-to-Source Voltage		V _{GS}	±20	V
Continuous Drain Current R _{θJC} (Note 1)	Steady State	T _C = 25°C	I _D	46
		T _C = 100°C		32
Power Dissipation R _{θJC} (Note 1)	Steady State	T _C = 25°C	P _D	64
		T _C = 100°C		32
Continuous Drain Current R _{θJA} (Notes 1, 2)	Steady State	T _A = 25°C	I _D	10.9
		T _A = 100°C		7.7
Power Dissipation R _{θJA} (Notes 1, 2)	Steady State	T _A = 25°C	P _D	3.6
		T _A = 100°C		1.8
Pulsed Drain Current	T _A = 25°C, t _p = 10 µs	I _{DM}	243	A
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +175	°C
Source Current (Body Diode)		I _S	49	A
Single Pulse Drain-to-Source Avalanche Energy (I _{L(pk)} = 2.2 A)		E _{AS}	358	mJ
Lead Temperature Soldering Reflow for Soldering Purposes (1/8" from case for 10 s)		T _L	260	°C

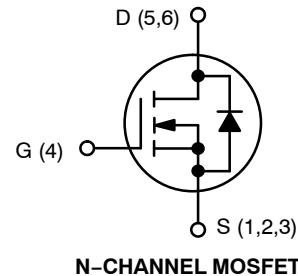
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE RATINGS

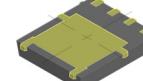
Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State (Note 1)	R _{θJC}	2.35	°C/W
Junction-to-Ambient – Steady State (Note 2)	R _{θJA}	41	

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 1 in² pad size, 1 oz. Cu pad.

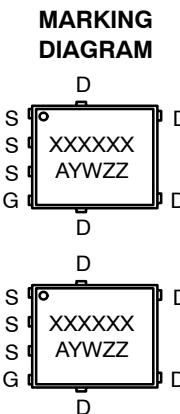
V _{(BR)DSS}	R _{DS(ON) MAX}	I _{D MAX}
100 V	14 mΩ @ 10 V	46 A
	20 mΩ @ 4.5 V	



DFN5
CASE 488AA
STYLE 1



DFNW5
(for WF Version)
CASE 507BA



XXXXXX = Specific Device Code

A = Assembly Location

Y = Year

W = Work Week

ZZ = Lot Traceability

ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 5 of this data sheet.

NVMFS016N10MCL

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		100			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J	I _D = 250 μA, ref to 25°C		60			mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 100 V	T _J = 25°C		1		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

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 64 μA	1		3	V
Threshold Temperature Coefficient	V _{GS(TH)/T_J}	I _D = 250 μA, ref to 25°C		-5.6		mV/°C
Drain-to-Source On Resistance	R _{DSS(on)}	V _{GS} = 10 V, I _D = 11 A		11.5	14	mΩ
		V _{GS} = 4.5 V, I _D = 9 A		16	20	
Forward Transconductance	g _{FS}	V _{DS} = 10 V, I _D = 11 A		42		S
Gate-Resistance	R _G	T _A = 25°C		1.2		Ω

CHARGES & CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = 50 V		1250		pF
Output Capacitance	C _{OSS}			460		
Reverse Transfer Capacitance	C _{RSS}			8		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DS} = 50 V, I _D = 9 A		9.0		nC
Total Gate Charge	Q _{G(TOT)}			19		
Threshold Gate Charge	Q _{G(TH)}			2.1		
Gate-to-Source Charge	Q _{GS}			3.7		
Gate-to-Drain Charge	Q _{GD}			2.0		
Plateau Voltage	V _{GP}			2.8		V

SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 10 V, V _{DS} = 50 V, I _D = 11 A, R _G = 6 Ω		10		ns
Rise Time	t _r			3.4		
Turn-Off Delay Time	t _{d(OFF)}			26		
Fall Time	t _f			4.2		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 11 A	T _J = 25°C		0.84	1.3	V
			T _J = 125°C		0.72		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 6 A			34		ns
Reverse Recovery Charge	Q _{RR}				24		nC
Charge Time	t _a				16		ns
Discharge Time	t _b				17		ns

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. Switching characteristics are independent of operating junction temperatures

TYPICAL CHARACTERISTICS

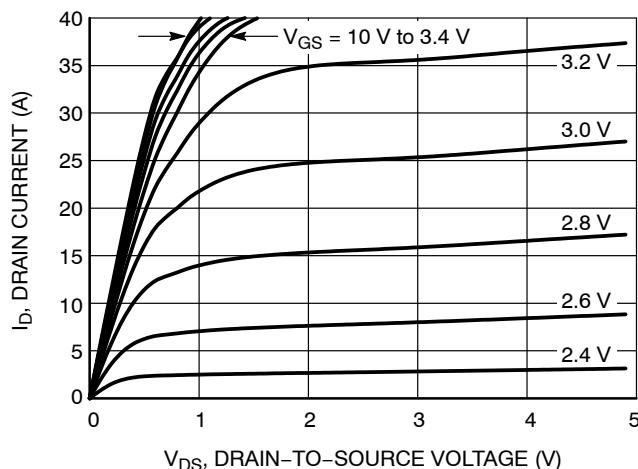


Figure 1. On-Region Characteristics

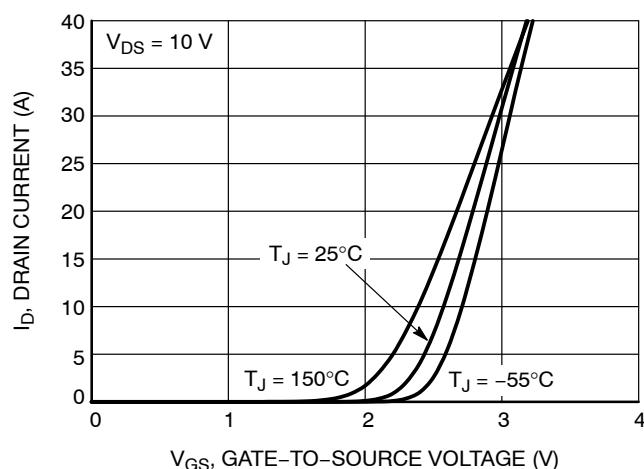


Figure 2. Transfer Characteristics

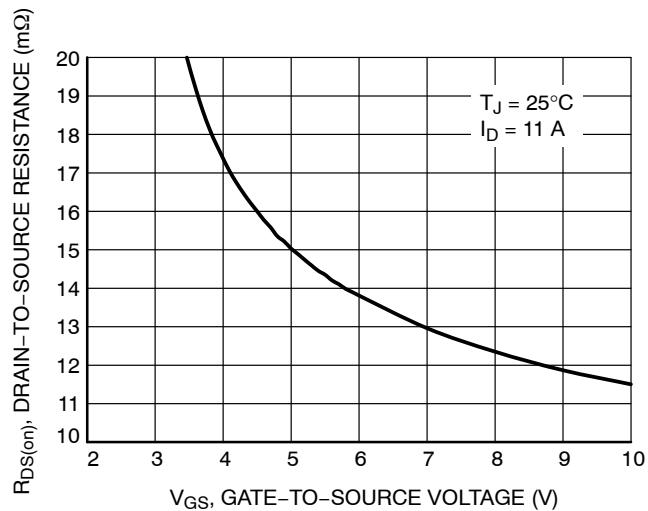


Figure 3. On-Resistance vs. Gate-to-Source Voltage

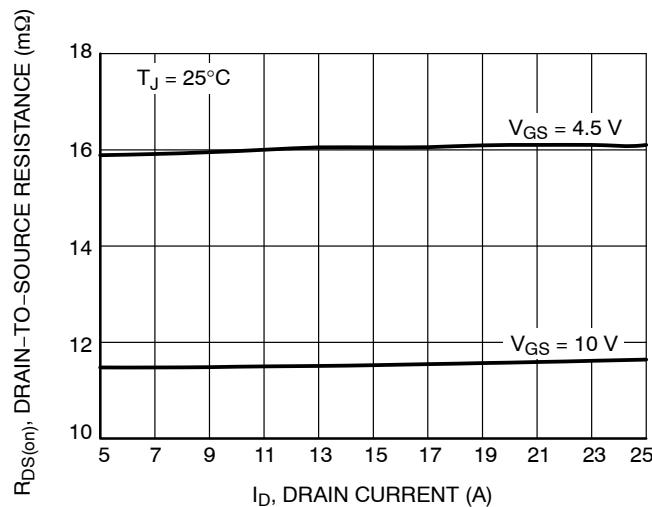


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

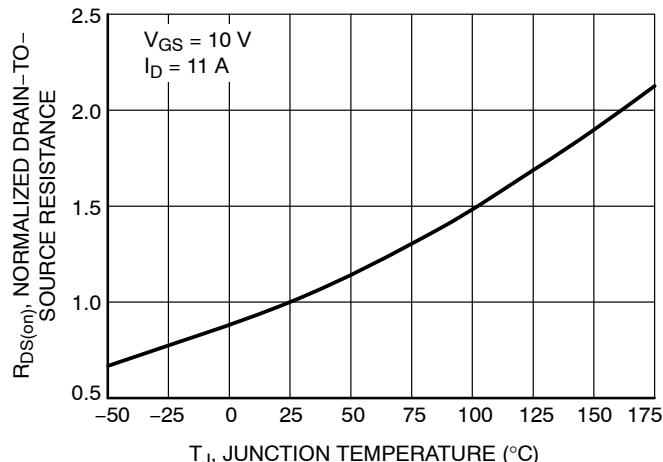


Figure 5. On-Resistance Variation with Temperature

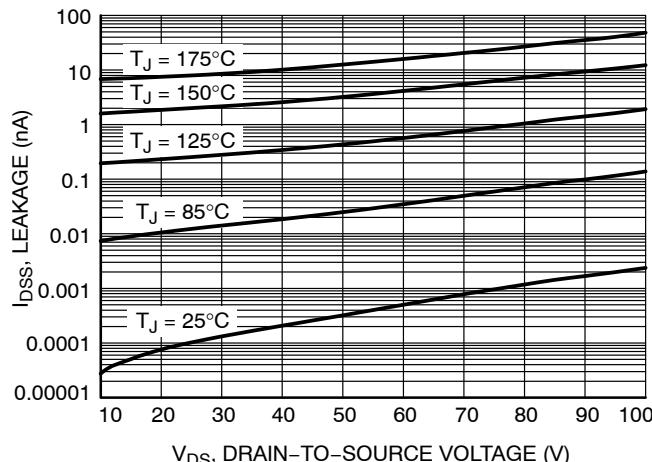


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

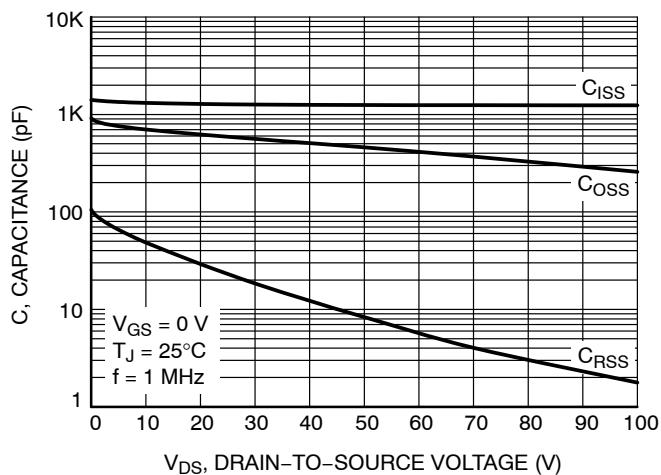


Figure 7. Capacitance Variation

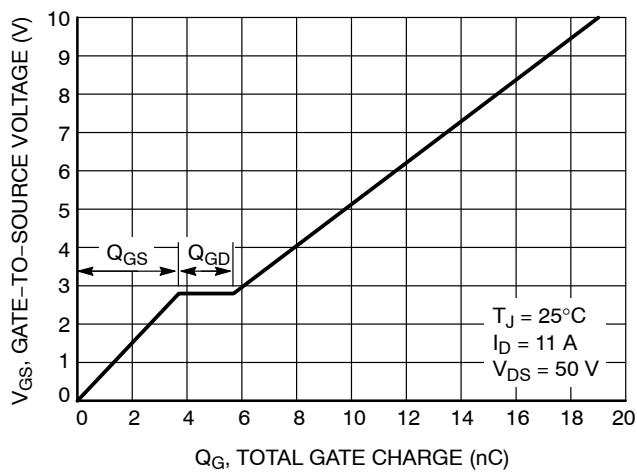


Figure 8. Gate-to-Source Voltage vs. Total Charge

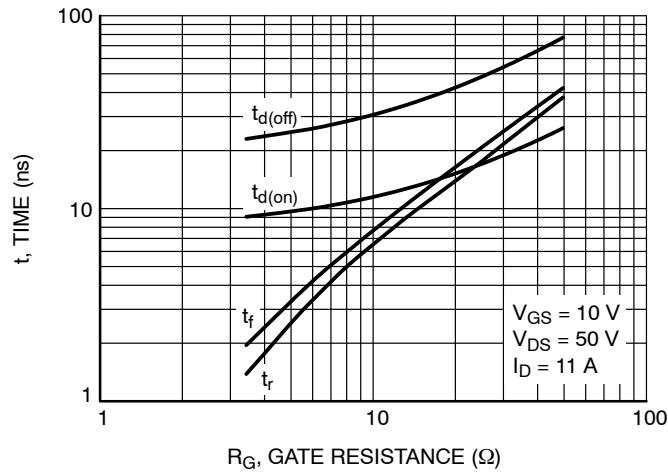


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

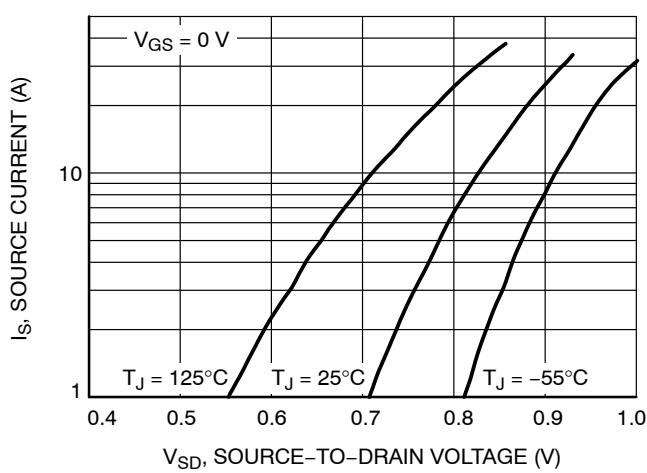


Figure 10. Diode Forward Voltage vs. Current

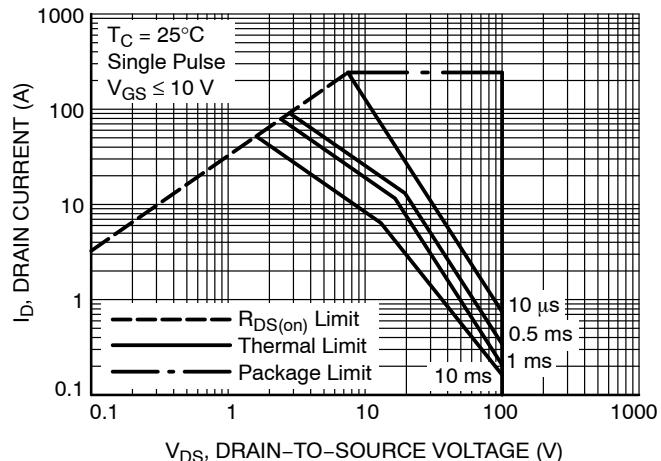


Figure 11. Maximum Rated Forward Biased Safe Operating Area

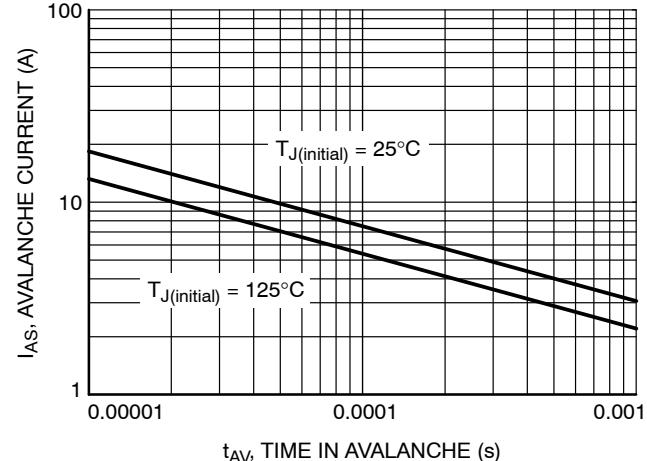


Figure 12. Maximum Drain Current vs. Time in Avalanche

TYPICAL CHARACTERISTICS

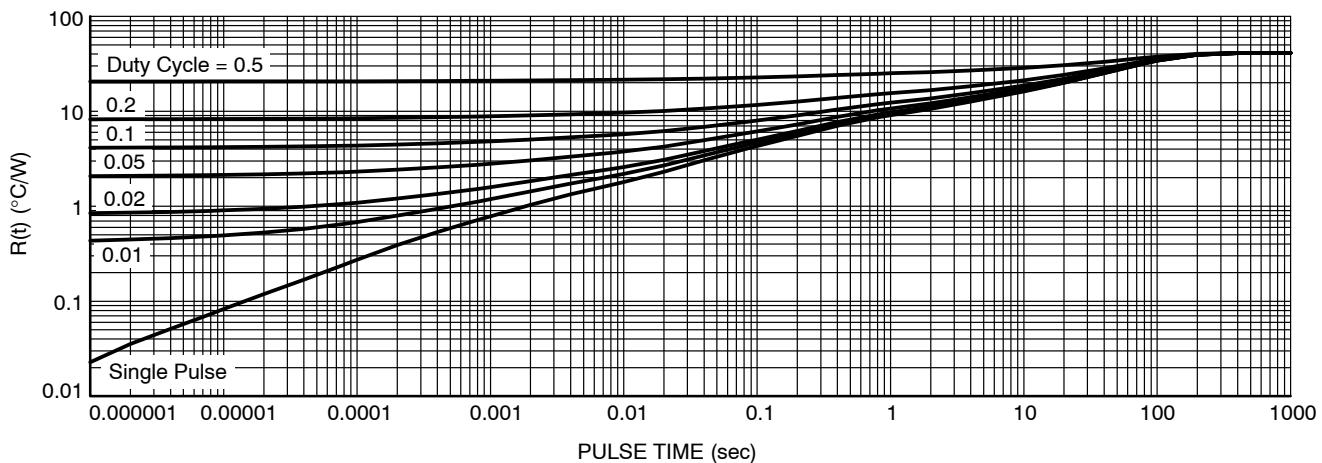


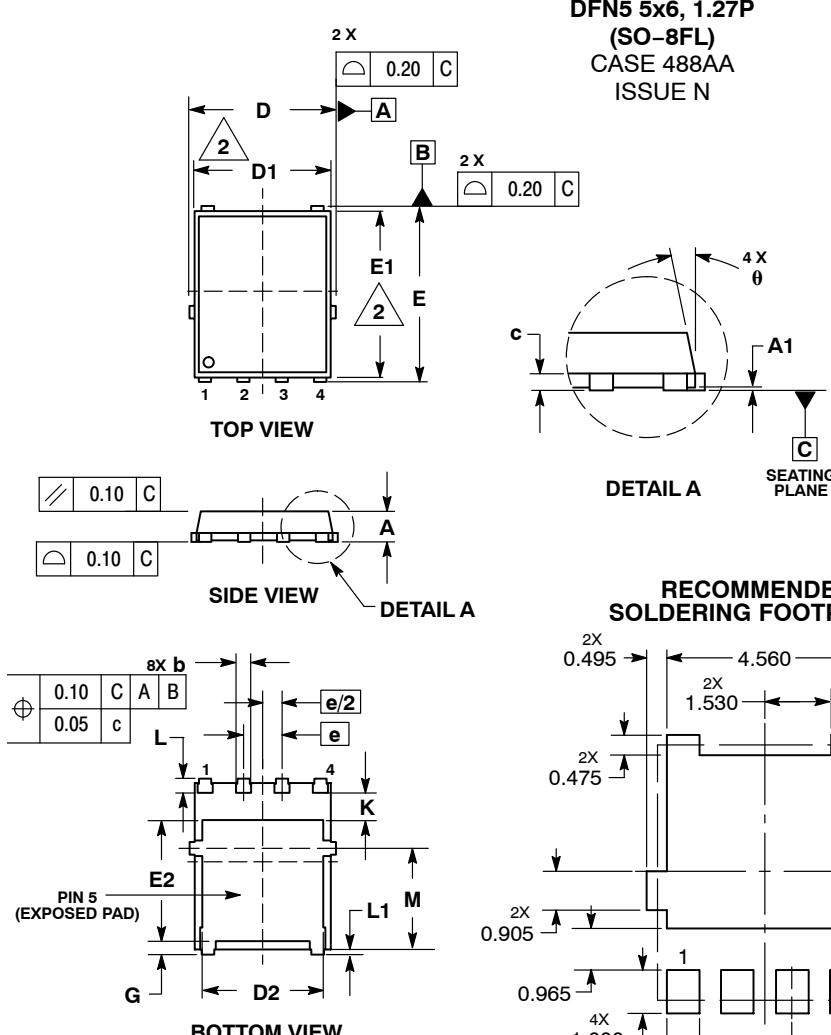
Figure 13. Transient Thermal Impedance

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NVMFS016N10MCLT1G	016L10	DFN5 (Pb-Free)	1500 / Tape & Reel
NVMFWS016N10MCLT1G	016W10	DFN5 (Wettable Flank, 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.

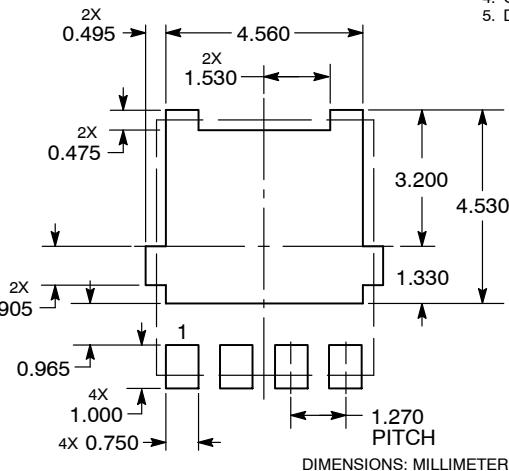
PACKAGE DIMENSIONS



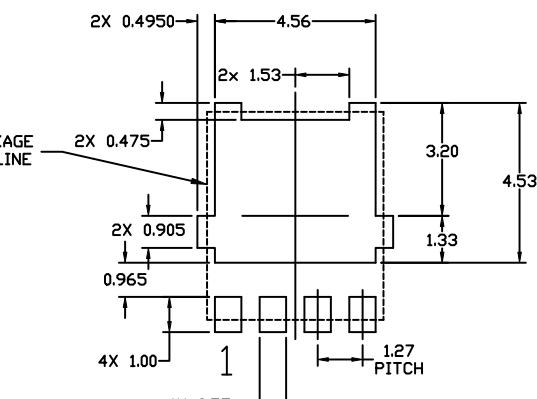
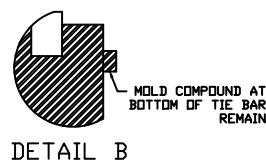
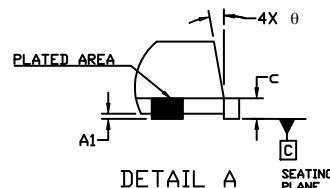
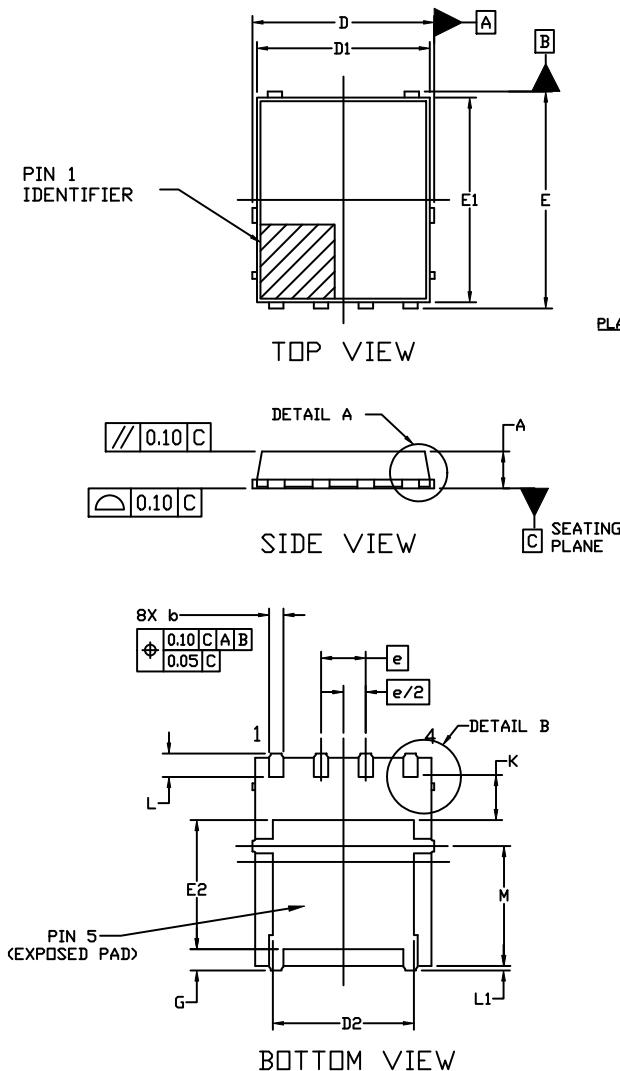
*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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
Ø	0 °	---	12 °

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



PACKAGE DIMENSIONS

DFNW5 5x6 (FULL-CUT SO8FL WF)
CASE 507BA
ISSUE ARECOMMENDED
MOUNTING FOOTPRINT

* 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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