

NVMFS5A160PLZ

Advance Information

Power MOSFET

–60 V, 7.7 mΩ, –100 A, Single P-Channel



ON Semiconductor®

www.onsemi.com

Features

- Small Footprint (5 × 6 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- NVMFS5A160PLZWF :
Wettable Flank Option for Enhanced Optical Inspection
- AEC-Q101 Qualified and PPAP Capable
- Pb-Free and RoHS compliance

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS at $T_J = 25^\circ\text{C}$ unless otherwise noted
(Notes 1, 2, 3, 4)

Notes 1, 2, 3, 4)

Parameter			Symbol	Value	Unit
Drain to Source Voltage			V_{DSS}	−60	V
Gate to Source Voltage			V_{GS}	±20	V
Continuous Drain Current $R_{\theta JC}$ (Notes 2, 4)	Steady State	$T_C = 25^{\circ}\text{C}$	I_D	−100	A
Power Dissipation $R_{\theta JC}$ (Note 2)		$T_C = 25^{\circ}\text{C}$	P_D	200	W
Continuous Drain Current $R_{\theta JA}$ (Notes 2, 3, 4)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	−15	A
Power Dissipation $R_{\theta JA}$ (Notes 2, 3)		$T_A = 25^{\circ}\text{C}$	P_D	3.8	W
Pulsed Drain Current	$PW \leq 10 \mu s$, duty cycle $\leq 1\%$		I_{DP}	−400	A
Operating Junction and Storage Temperature			T_J , T_{stg}	−55 to +175	$^{\circ}\text{C}$
Source Current (Body Diode)			I_S	−100	A
Single Pulse Drain to Source Avalanche Energy ($L = 1.0 \text{ mH}$, $I_L(pk) = -26 \text{ A}$)			E_{AS}	335	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	$^{\circ}\text{C}$

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction to Case Steady State	$R_{\theta JC}$	0.75	$^\circ\text{C/W}$
Junction to Ambient Steady State (Note 3)	$R_{\theta JA}$	39	

Note 1 : 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.

Note 2 : The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

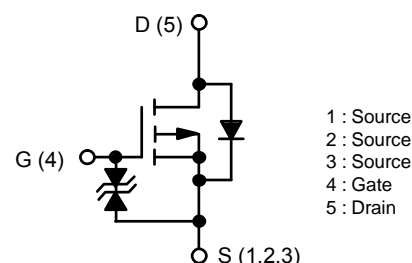
Note 3 : Surface mounted on FR4 board using a 650 mm², 2 oz. Cu pad.

Note 4 : Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

This document contains information on a new product. Specifications and information herein are subject to change without notice.

V_{DS}	$R_{DS(on)}$ Max	I_D Max
–60 V	7.7 mΩ @ –10 V	–100 A
	10.5 mΩ @ –4.5 V	

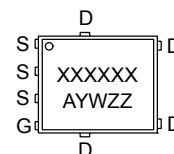
ELECTRICAL CONNECTION



P-Channel MOSFET



MARKING DIAGRAM



XXXXXX= Specific Device Code
5A160L(NVMFS5A160PLZ)
160LWF(NVMFS5A160PLZWF)

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

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

NVMFS5A160PLZ

ELECTRICAL CHARACTERISTICS at $T_J = 25^\circ\text{C}$ unless otherwise specified (Note 5)

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	

OFF CHARACTERISTICS

Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -1\text{ mA}$	-60			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$	$T_J = 25^\circ\text{C}$		-1.0	μA
		$V_{DS} = -60\text{ V}$	$T_J = 100^\circ\text{C}$		-100	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$			± 10	μA

ON CHARACTERISTICS (Note 6)

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = -10\text{ V}, I_D = -1\text{ mA}$	-1.2		-2.6	V
Drain to Source On Resistance	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$	$I_D = -50\text{ A}$		5.8	$\text{m}\Omega$
		$V_{GS} = -4.5\text{ V}$	$I_D = -50\text{ A}$		7.3	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = -10\text{ V}, I_D = -50\text{ A}$		125		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz},$ $V_{DS} = -20\text{ V}$		7,700		pF
Output Capacitance	C_{oss}			720		
Reverse Transfer Capacitance	C_{rss}			540		
Total Gate Charge	$Q_{g(tot)}$	$V_{GS} = -10\text{ V}, V_{DS} = -36\text{ V},$ $I_D = -50\text{ A}$		160		nC
Gate to Source Charge	Q_{gs}			24		
Gate to Drain Charge	Q_{gd}			45		

SWITCHING CHARACTERISTICS (Note 7)

Turn-ON Delay Time	$t_{d(on)}$	$V_{GS} = -10\text{ V}, V_{DS} = -36\text{ V},$ $I_D = -50\text{ A}, R_G = 50\ \Omega$		50		ns
Rise Time	t_r			690		
Turn-Off Delay Time	$t_{d(off)}$			645		
Fall Time	t_f			643		

DRAIN SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = -50\text{ A}$		-0.83	-1.5	V
Reverse Recovery Time	t_{rr}	$V_{GS} = 0\text{ V}, di/dt = 100\text{ A}/\mu\text{s},$ $I_S = -50\text{ A}$		93		ns
Reverse Recovery Charge	Q_{rr}			218		nC

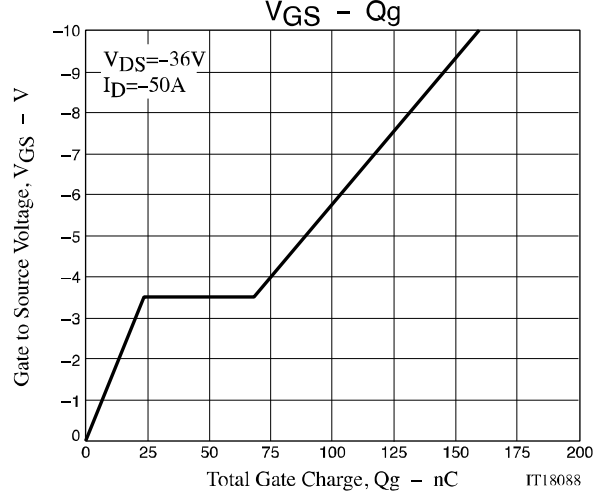
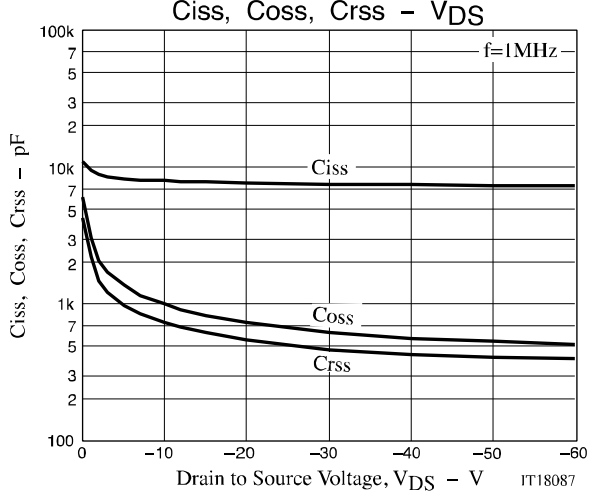
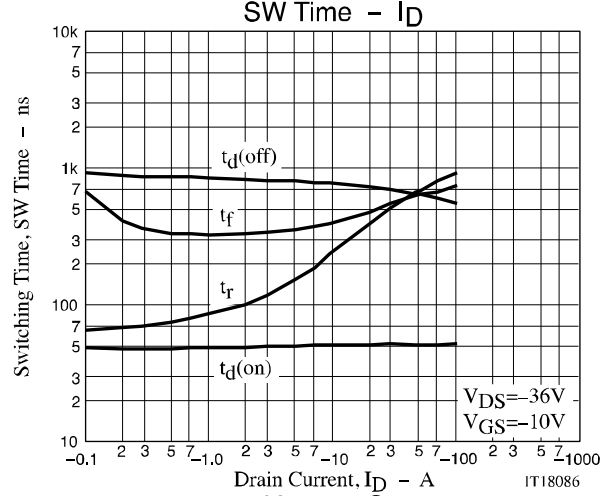
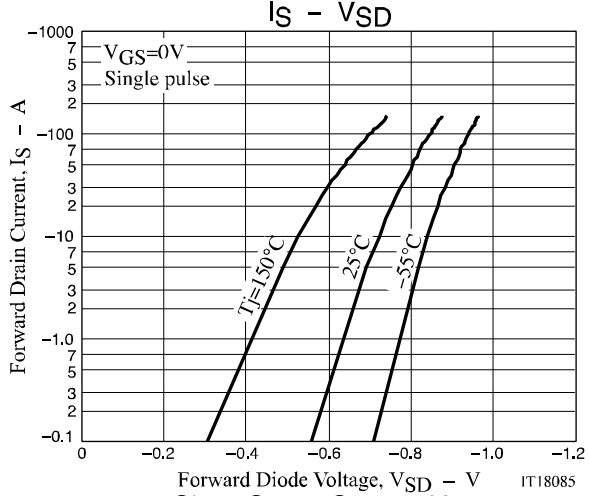
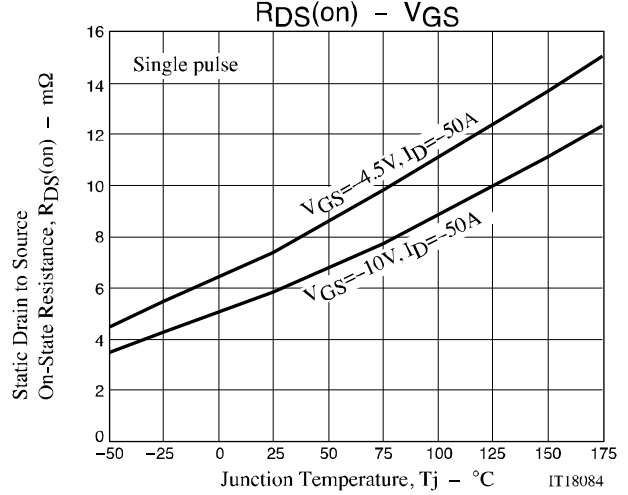
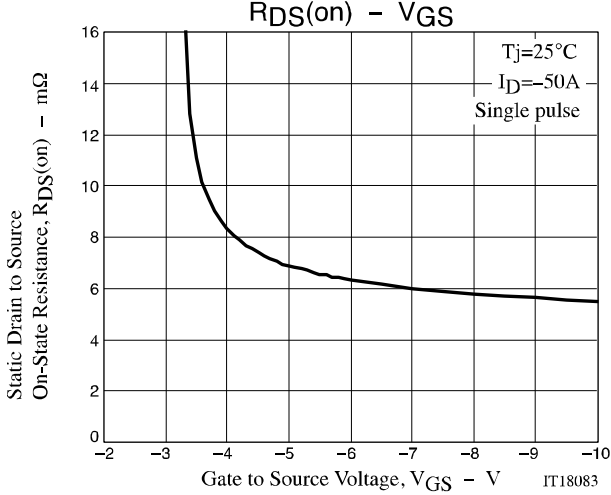
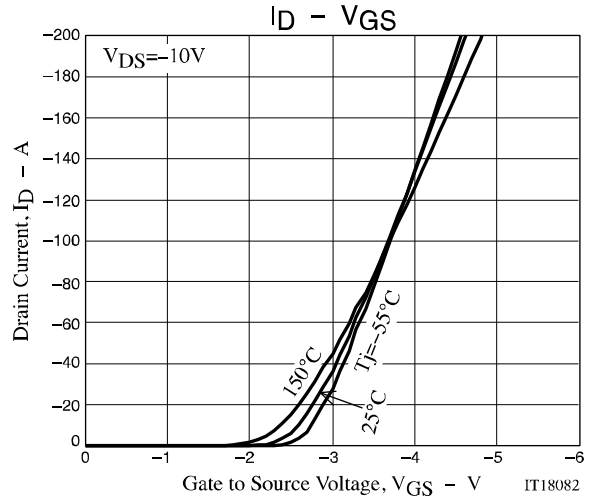
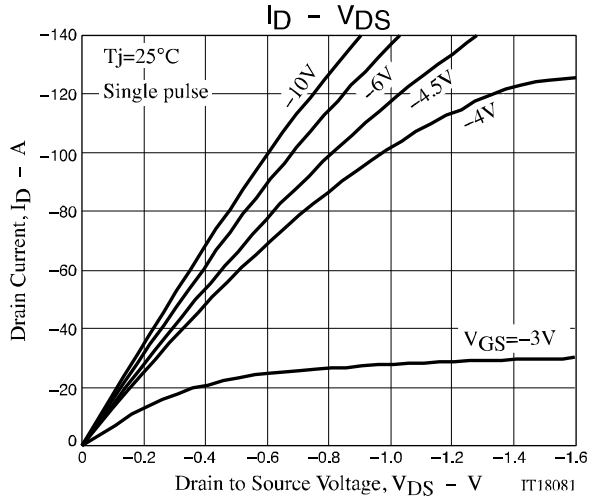
Note 5 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted.

Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

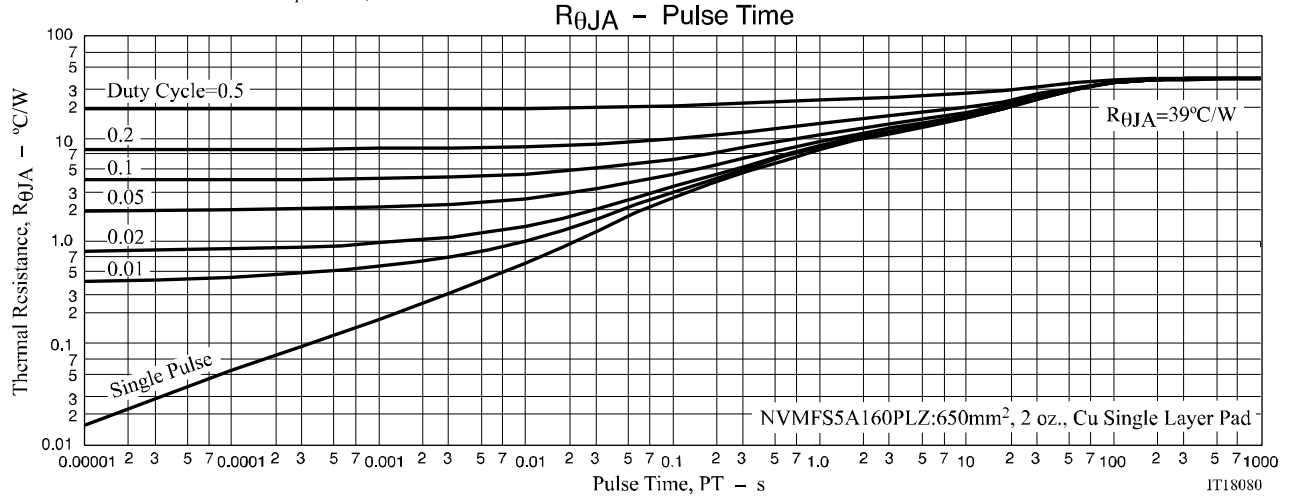
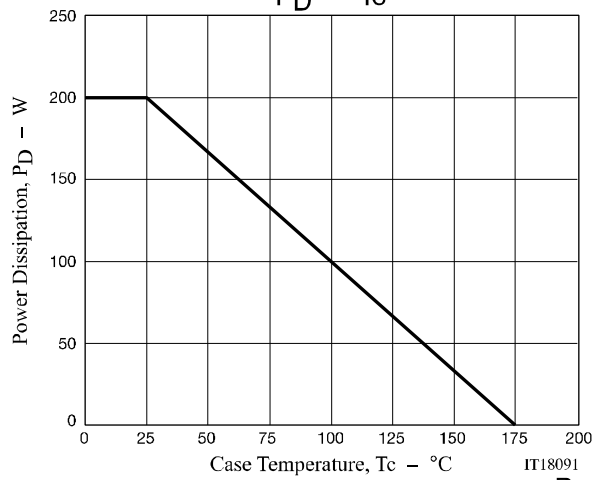
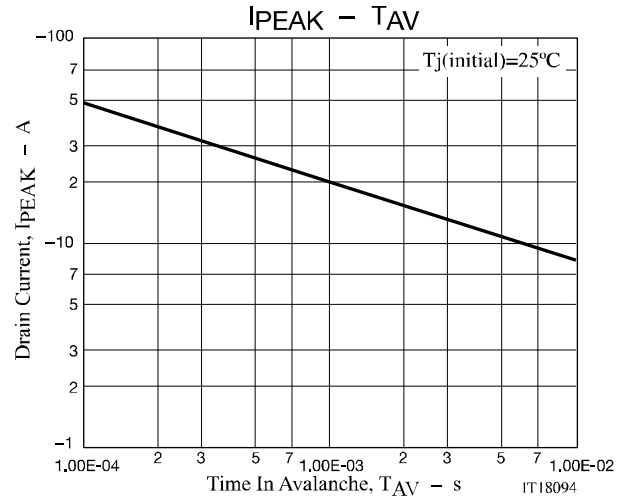
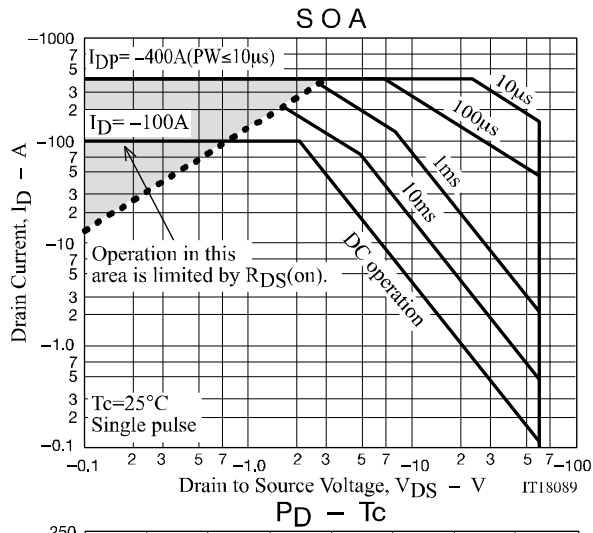
Note 6 : Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

Note 7 : Switching characteristics are independent of operating junction temperatures.

NVMFS5A160PLZ



NVMFS5A160PLZ

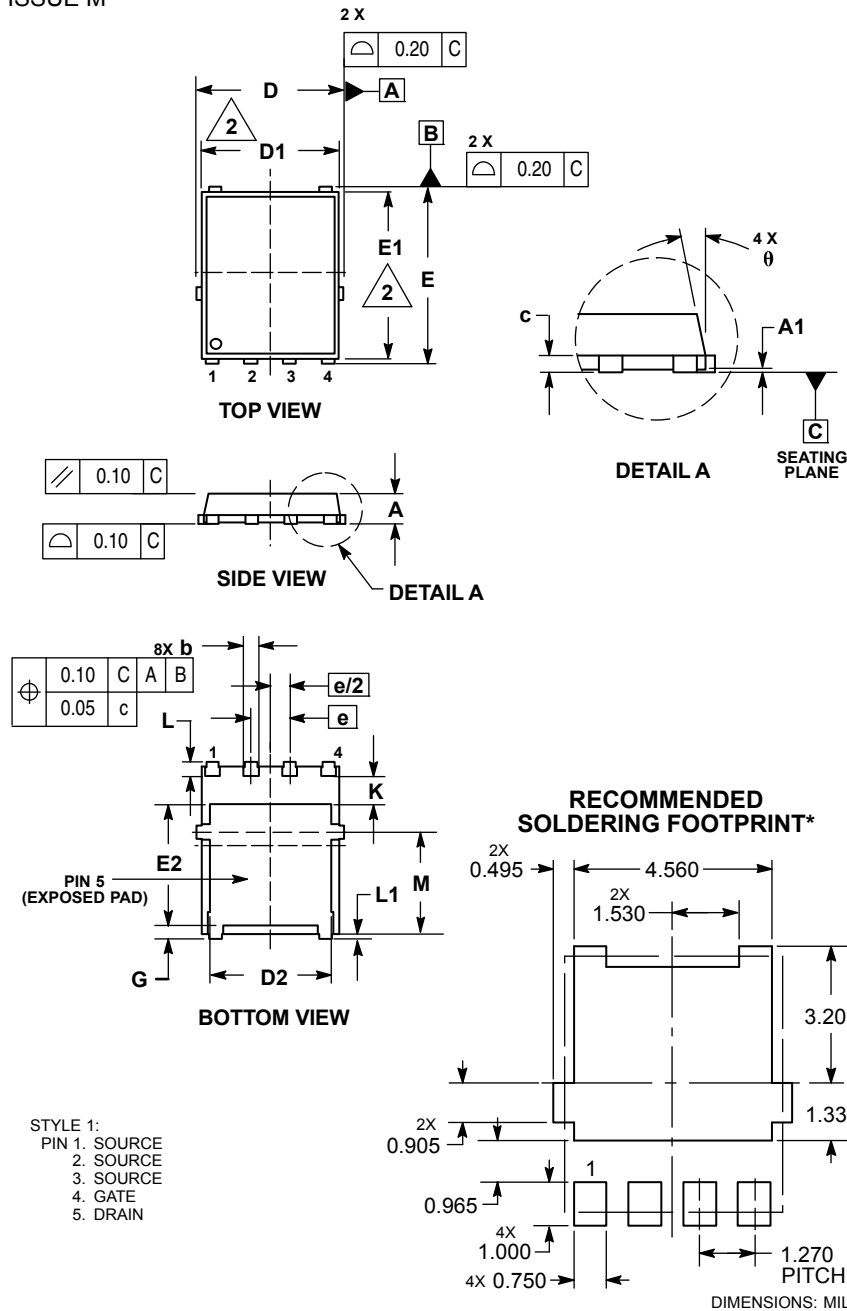


NVMFS5A160PLZ

PACKAGE DIMENSIONS

unit : mm

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



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.

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 °

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

NVMFS5A160PLZ

ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
NVMFS5A160PLZT1G	5A160L	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free)	1,500 / Tape & Reel
NVMFS5A160PLZWFT1G	160LWF	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free, Wettable Flanks)	
NVMFS5A160PLZT3G	5A160L	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free)	5,000 / Tape & Reel
NVMFS5A160PLZWFT3G	160LWF	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free, Wettable Flanks)	

† 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. http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF

Note on usage : Since the NVMFS5A160PLZ is a MOSFET product, please avoid using this device in the vicinity of highly charged objects. Please contact sales for use except the designated application.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.