

NVMFS5A140PLZ

Advance Information

Power MOSFET

-40 V, 4.2 mΩ, -140 A, Single P-Channel



ON Semiconductor®

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Features

- Small Footprint (5 × 6 mm) for Compact Design
- Low $R_{DS(on)}$ to Minimize Conduction Losses
- NVMFS5A140PLZWF :
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)

Parameter		Symbol	Value	Unit	
Drain to Source Voltage		V_{DSS}	-40	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	-140	A
		$T_C = 25^\circ\text{C}$	P_D	200	W
Power Dissipation $R_{\theta JA}$ (Note 2)	Steady State	$T_A = 25^\circ\text{C}$	I_D	-20	A
		$T_A = 25^\circ\text{C}$	P_D	3.8	W
Pulsed Drain Current	$PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$	I_{DP}	-560	A	
Operating Junction and Storage Temperature		T_J , T_{stg}	-55 to +175	$^\circ\text{C}$	
Source Current (Body Diode)		I_S	-140	A	
Single Pulse Drain to Source Avalanche Energy ($L = 1.0 \text{ mH}$, $I_L(pk) = -29 \text{ A}$)		E_{AS}	420	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.

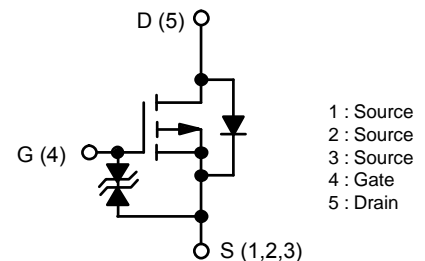
Note 3 : Surface mounted on FR4 board using a 650 mm², 2 oz. Cu pad.

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_{DSS}	$R_{DS(on)}$ Max	I_D Max
-40 V	4.2 mΩ @ -10 V	-140 A
	7.2 mΩ @ -4.5 V	

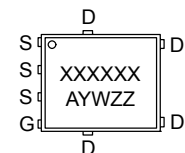
ELECTRICAL CONNECTION



P-Channel MOSFET



MARKING DIAGRAM



XXXXXX= Specific Device Code
5A140L(NVMFS5A140PLZ)
140LWF(NVMFS5A140PLZWF)

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.

NVMFS5A140PLZ

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	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -1\text{ mA}$	-40			V
Zero-Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$	$T_J = 25^\circ\text{C}$		-1.0	μA
		$V_{DS} = -40\text{ V}$	$T_J = 100^\circ\text{C}$		-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	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$	$I_D = -50\text{ A}$		3.2	$\text{m}\Omega$
		$V_{GS} = -4.5\text{ V}$	$I_D = -50\text{ A}$		5.0	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = -10\text{ V}, I_D = -50\text{ A}$		125		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz},$ $V_{DS} = -20\text{ V}$		7,400		pF
Output Capacitance	C_{oss}			1,030		
Reverse Transfer Capacitance	C_{rss}			720		
Total Gate Charge	$Q_{g(tot)}$	$V_{GS} = -10\text{ V}, V_{DS} = -20\text{ V},$ $I_D = -50\text{ A}$		136		nC
Gate to Source Charge	Q_{gs}			26		
Gate to Drain Charge	Q_{gd}			31		

SWITCHING CHARACTERISTICS (Note 7)

Turn-ON Delay Time	$t_{d(on)}$	$V_{GS} = -10\text{ V}, V_{DS} = -20\text{ V},$ $I_D = -50\text{ A}, R_G = 50\ \Omega$		50		ns
Rise Time	t_r			860		
Turn-Off Delay Time	$t_{d(off)}$			540		
Fall Time	t_f			740		

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}	$V_{GS} = 0\text{ V}, di/dt = 100\text{ A}/\mu\text{s},$ $I_S = -50\text{ A}$		108		ns
Reverse Recovery Charge	Q_{rr}			236		nC

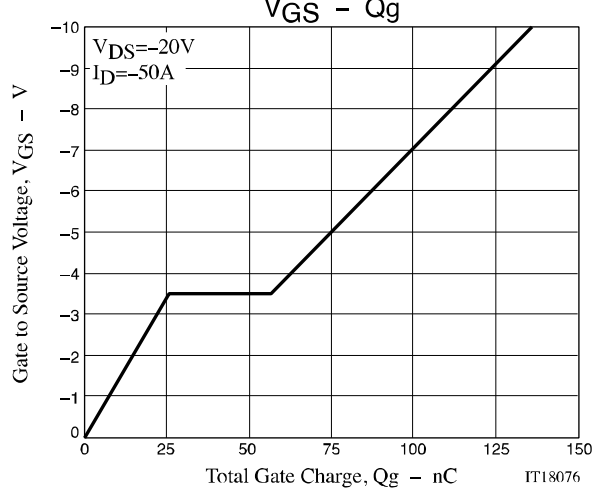
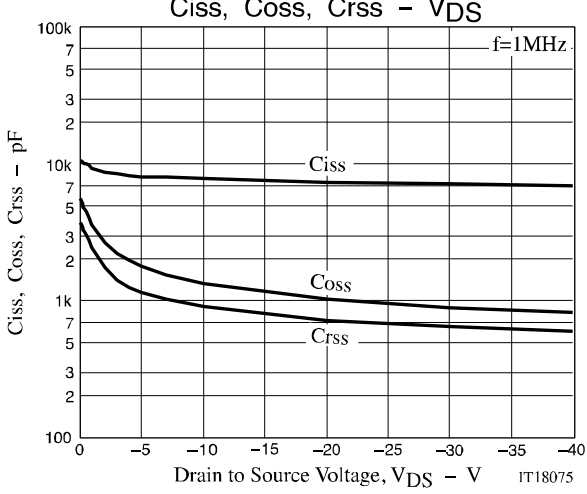
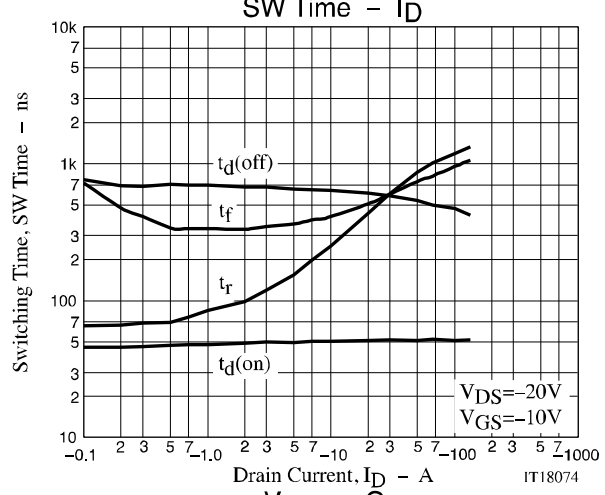
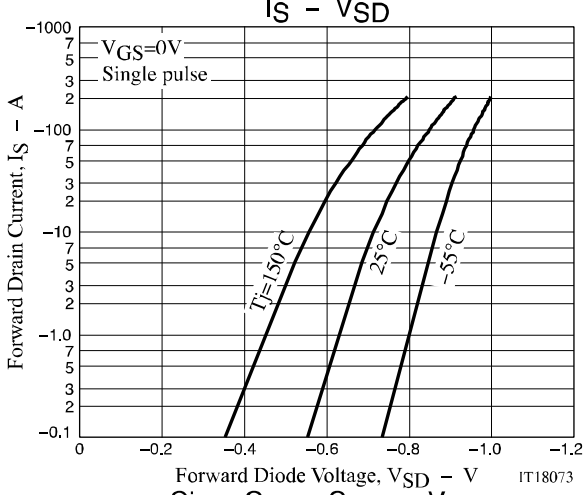
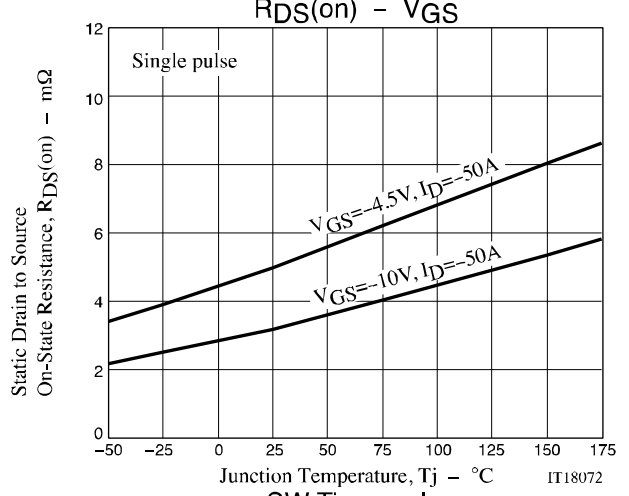
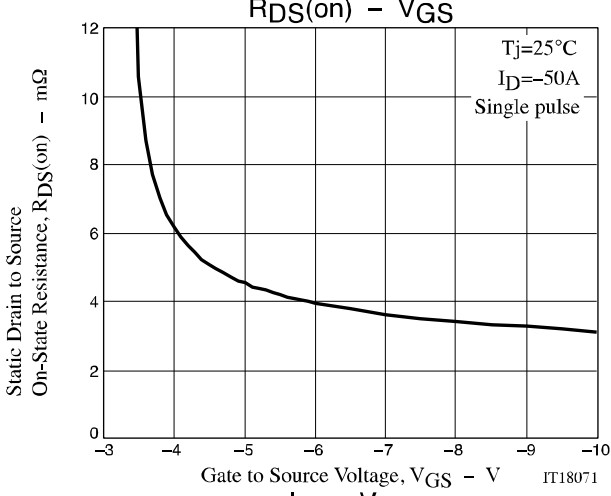
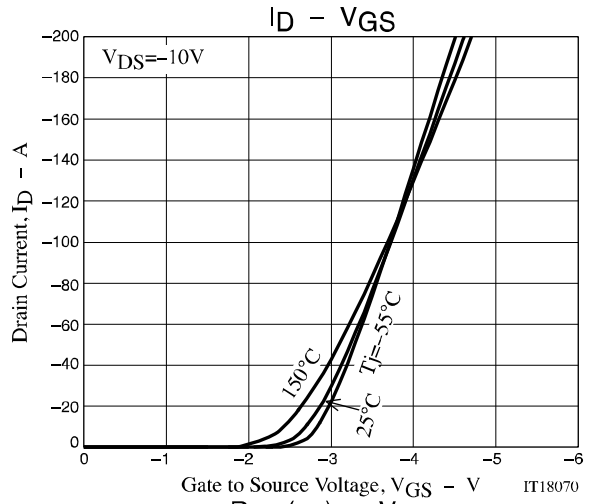
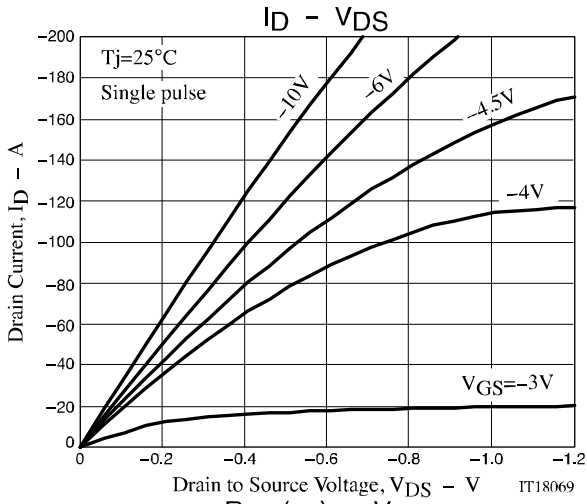
Note 5 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted.

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

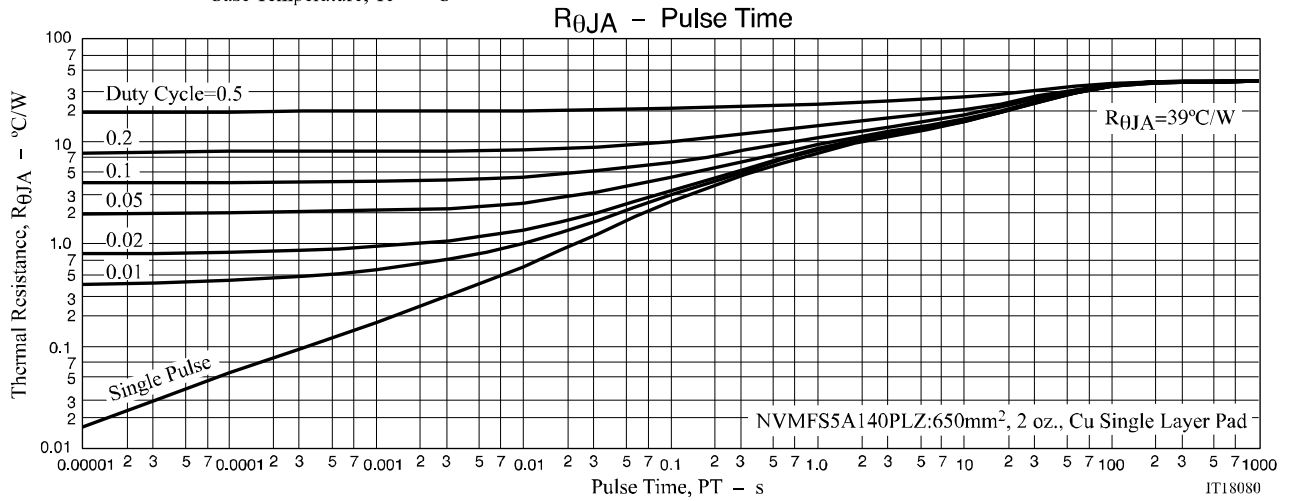
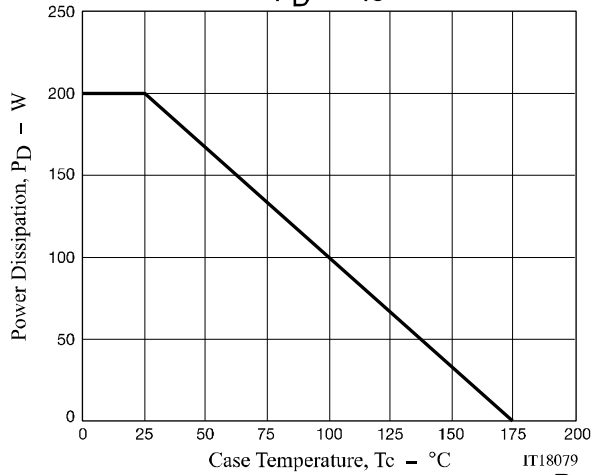
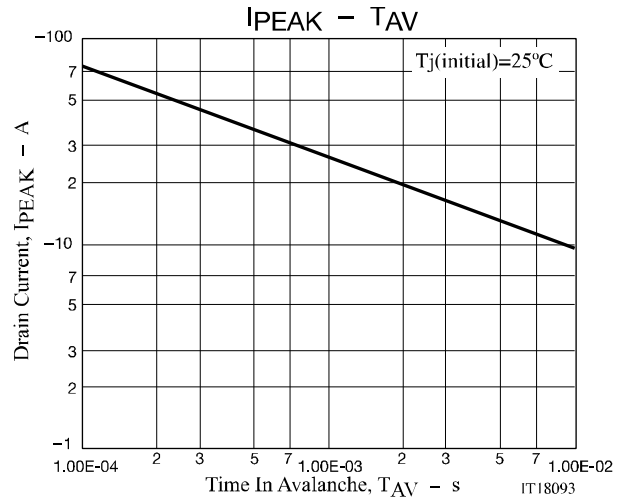
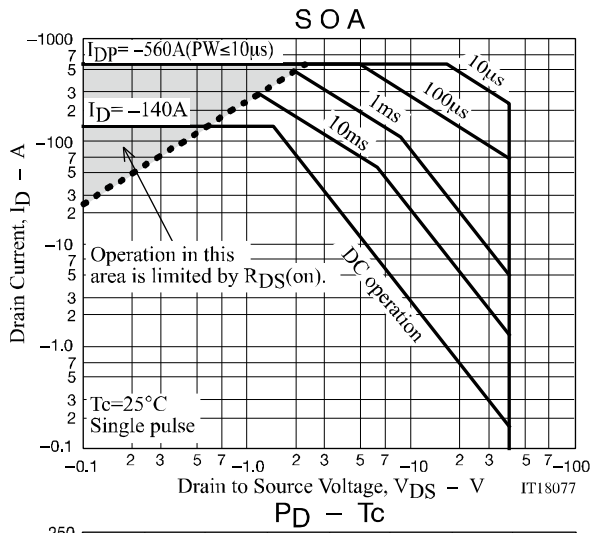
Note 6 : Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

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

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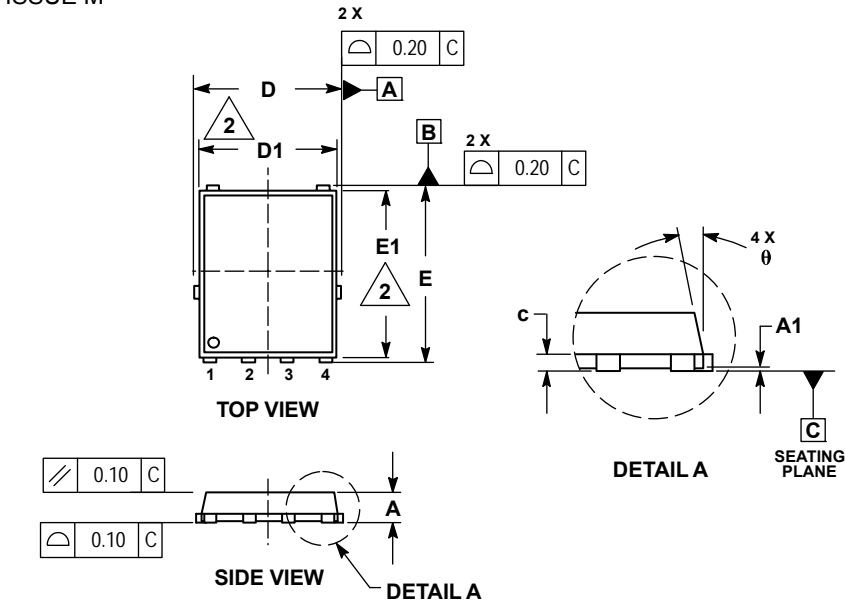


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PACKAGE DIMENSIONS

unit : mm

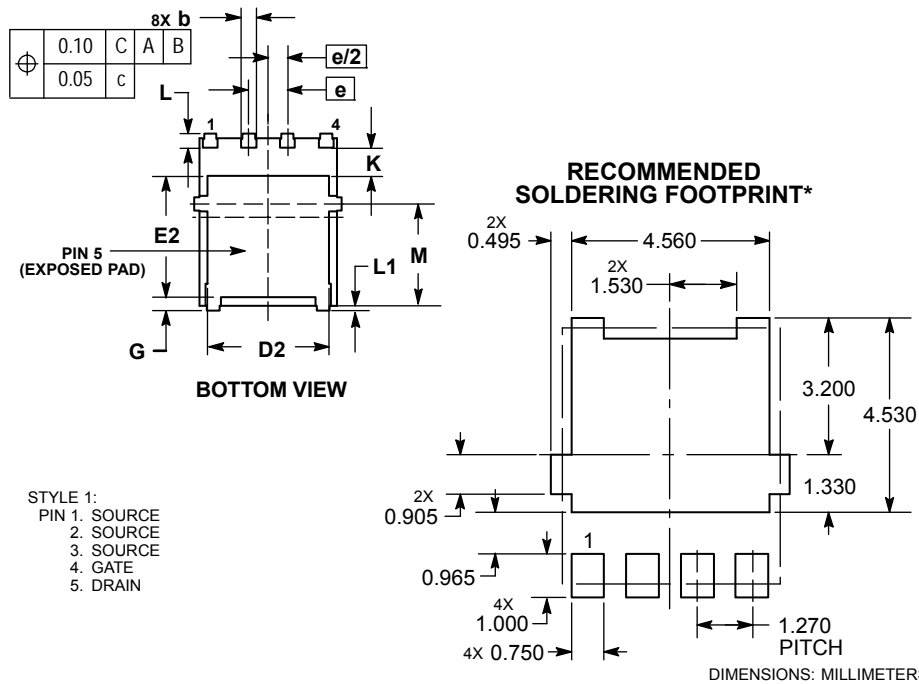
DFN5 5x6, 1.27P
(SO-8FL)
CASE 488AA
ISSUE M



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.

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 °



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

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

NVMFS5A140PLZ

ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
NVMFS5A140PLZT1G	5A140L	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free)	1,500 / Tape & Reel
NVMFS5A140PLZWFT1G	140LWF	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free, Wettable Flanks)	
NVMFS5A140PLZT3G	5A140L	DFN5 5x6, 1.27P (SO-8FL) (Pb-Free)	5,000 / Tape & Reel
NVMFS5A140PLZWFT3G	140LWF	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 NVMFS5A140PLZ 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.

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