

# NTMFS1D7P02P8Z

## Product Preview

### Power MOSFET

#### P-Channel, SO8-FL, -20 V Single

#### Features

- Advanced SO8-FL Package (5x6mm) with Excellent Thermal Conduction
- Ultra-Low  $R_{DS(on)}$  to Improve System Efficiency
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### Typical Applications

- Power Load Switch
- Battery Management and Protection

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		$V_{DSS}$	-20	V	
Gate-to-Source Voltage		$V_{GS}$	$\pm 12$	V	
Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State	$T_C = 25^\circ\text{C}$	$I_D$	226	A
		$T_C = 85^\circ\text{C}$		163	
Power Dissipation $R_{\theta JC}$ (Note 2)	Steady State	$T_A = 25^\circ\text{C}$	$P_D$	139	W
		$T_A = 85^\circ\text{C}$			
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	$T_A = 25^\circ\text{C}$	$I_D$	34	A
		$T_A = 85^\circ\text{C}$		25	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)	Steady State	$T_A = 25^\circ\text{C}$	$P_D$	3.2	W
Pulsed Drain Current	$T_A = 25^\circ\text{C}, t_p = 10 \mu\text{s}$	$I_{DM}$	-TBD	A	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$	
Lead Temperature Soldering Reflow for Soldering Purposes (1/8" from case for 10 s)		$T_L$	260	$^\circ\text{C}$	

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.

1. Surface-mounted on FR4 board using 1 in<sup>2</sup> pad size, 2 oz Cu pad.
2. The entire application environment impacts the thermal resistance values shown. They are not constants and are only valid for the particular conditions noted. Actual continuous current will be limited by thermal & electro-mechanical application board design.  $R_{\theta CA}$  is determined by the user's board design.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

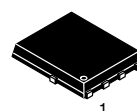
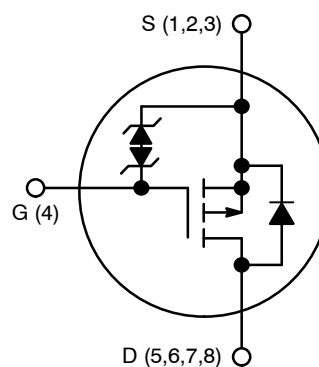


ON Semiconductor®

[www.onsemi.com](http://www.onsemi.com)

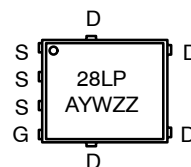
$V_{(BR)DSS}$	$R_{DS(ON) MAX}$	$I_D MAX$
-20 V	1.7 m $\Omega$ @ -4.5 V	-226 A
	2.8 m $\Omega$ @ -2.5 V	

#### P-CHANNEL MOSFET



DFN5  
(SO-8FL)  
CASE 488AA  
STYLE 1

#### MARKING DIAGRAM



- 28LP = Specific Device Code
- A = Assembly Location
- Y = Year
- W = Work Week
- ZZ = Lot Traceability

#### ORDERING INFORMATION

Device	Package	Shipping†
NTMFS1D7P02P8ZT1G	SO8-FL (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 Specification Brochure, BRD8011/D.

# NTMFS1D7P02P8Z

## THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Case – Steady State (Note 3)	$R_{\theta JC}$	0.9	°C/W
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	30	

3. Surface-mounted on FR4 board using the minimum recommended pad size, or 2 mm<sup>2</sup>, 1 oz Cu.

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
-----------	--------	----------------	-----	-----	-----	------

### OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0 V, I_D = -250 \mu A$	-20			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = -250 \mu A$ , ref to 25°C		TBD		mV/°C
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0 V, V_{DS} = -16 V$	$T_J = 25^\circ C$		1	μA
			$T_J = 85^\circ C$		TBD	
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 12 V$			±10	±μA

### ON CHARACTERISTICS (Note 4)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250 \mu A$	-0.5		-1.5	V
Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	$I_D = -250 \mu A$ , ref to 25°C		TBD		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = -4.5 V, I_D = -20 A$		1.3	1.7	mΩ
			$V_{GS} = -2.5 V, I_D = -20 A$		2.0	
Forward Transconductance	$g_{FS}$	$V_{DS} = -5 V, I_D = -20 A$		TBD		

### CHARGES & CAPACITANCES

Input Capacitance	$C_{ISS}$	$V_{GS} = 0 V, f = 1 MHz, V_{DS} = -10 V$		17305		pF
Output Capacitance	$C_{OSS}$			3156		
Reverse Capacitance	$C_{RSS}$			2855		
Total Gate Charge	$Q_G(TOT)$	$V_{GS} = -4.5 V, V_{DS} = -10 V, I_D = -20 A$		188		
Threshold Gate Charge	$Q_G(TH)$			TBD		
Gate-to-Drain Charge	$Q_{GD}$			62.8		
Gate-to-Source Charge	$Q_{GS}$			27.1		

### SWITCHING CHARACTERISTICS, V<sub>GS</sub> = 4.5 V (Note 4)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = -4.5 V, V_{DD} = -10 V, I_D = -20 A, R_G = 6 \Omega$		TBD		ns
Rise Time	$t_{r(ON)}$			TBD		
Turn-Off Delay Time	$t_{d(OFF)}$			TBD		
Fall Time	$t_f$			TBD		

### SOURCE-TO-DRAIN DIODE CHARACTERISTICS

Forward Diode Voltage	$V_{SD}$	$V_{GS} = 0 V, I_S = -20 A$	$T_J = 25^\circ C$		TBD	TBD	V
			$T_J = 125^\circ C$		TBD		
Reverse Recovery Time	$t_{RR}$	$V_{GS} = 0 V, di/dt = 100 A/\mu s, I_S = -20 A$			TBD		ns
Reverse Recovery Charge	$Q_{RR}$				TBD		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. Switching characteristics are independent of operating junction temperatures.

# NTMFS1D7P02P8Z

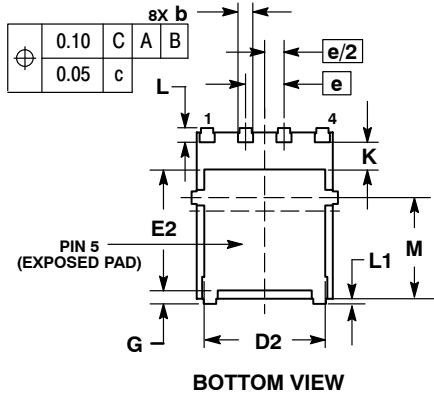
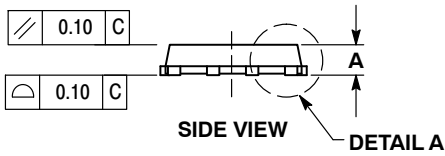
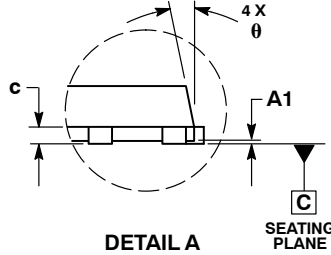
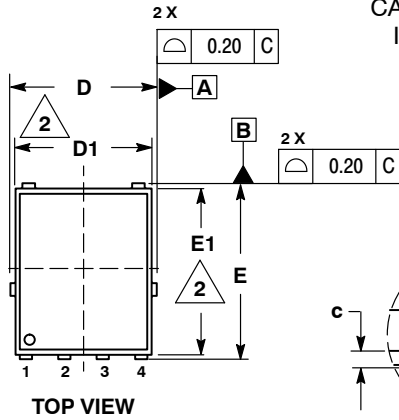
## PACKAGE DIMENSIONS

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

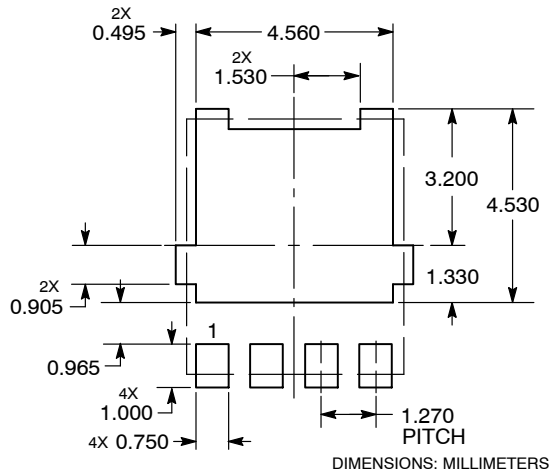
NOTES:

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 °



### RECOMMENDED SOLDERING FOOTPRINT\*



STYLE 1:

- PIN 1. SOURCE
- SOURCE
- SOURCE
- GATE
- 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.

ON Semiconductor and 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-Marketing.pdf](http://www.onsemi.com/site/pdf/Patent-Marketing.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.

### PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada  
Europe, Middle East and Africa Technical Support:  
Phone: 421 33 790 2910

ON Semiconductor Website: [www.onsemi.com](http://www.onsemi.com)

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative