

NVATS5A113PLZ

Power MOSFET

–60 V, 29.5 mΩ, –38 A, P-Channel



ON Semiconductor®

www.onsemi.com

Automotive Power MOSFET designed for compact and efficient designs and including high thermal performance.

AEC-Q101 qualified MOSFET and PPAP capable suitable for automotive applications.

Features

- Low On-Resistance
- High Current Capability
- 100% Avalanche Tested
- AEC-Q101 qualified and PPAP capable
- ATPAK package is pin-compatible with DPAK (TO-252)
- Pb-Free, Halogen Free and RoHS compliance

Typical Applications

- Reverse Battery Protection
- Load Switch
- Automotive Front Lighting
- Automotive Body Controllers

SPECIFICATIONS

ABSOLUTE MAXIMUM RATING at $T_a = 25^\circ\text{C}$ (Note 1)

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DS}	–60	V
Gate to Source Voltage	V_{GS}	± 20	V
Drain Current (DC)	I_D	–38	A
Drain Current (Pulse) $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$	I_{DP}	–114	A
Power Dissipation $T_c = 25^\circ\text{C}$	P_D	60	W
Operating Junction and Storage Temperature	T_J, T_{stg}	–55 to +175	$^\circ\text{C}$
Avalanche Energy (Single Pulse) (Note 2)	E_{AS}	95	mJ
Avalanche Current (Note 3)	I_{AV}	–18	A

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.

2 : $V_{DD} = -10 \text{ V}$, $L = 500 \mu\text{H}$, $I_{AV} = -18 \text{ A}$

3 : $L \leq 500 \mu\text{H}$, Single pulse

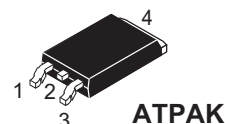
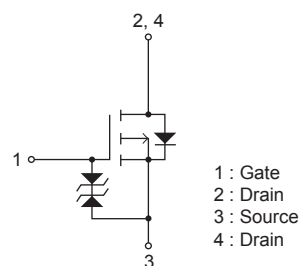
THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Case Steady State ($T_c = 25^\circ\text{C}$)	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
Junction to Ambient (Note 4)	$R_{\theta JA}$	80.1	$^\circ\text{C/W}$

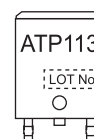
Note 4 : Surface mounted on FR4 board using a 130 mm^2 , 1 oz. Cu pad.

V_{DS}	$R_{DS(on)}$ Max	I_D Max
–60 V	29.5 mΩ @ –10 V	–38 A
	38 mΩ @ –4.5 V	
	44 mΩ @ –4 V	

ELECTRICAL CONNECTION P-Channel



MARKING



ORDERING INFORMATION

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

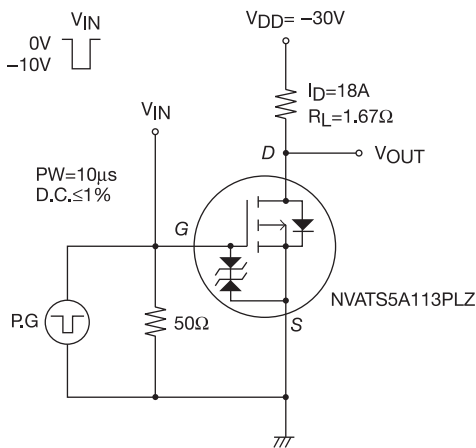
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ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 5)

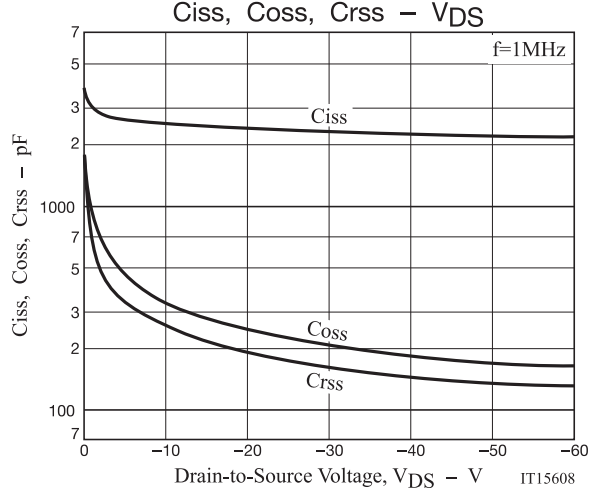
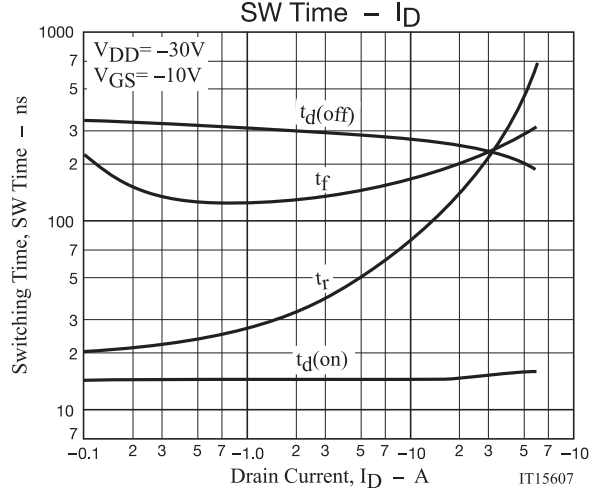
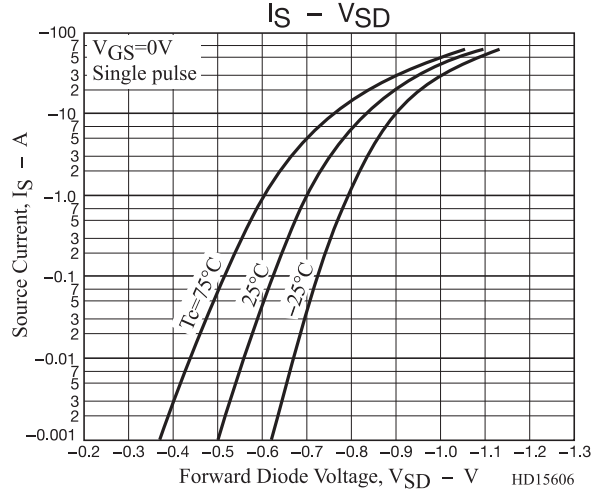
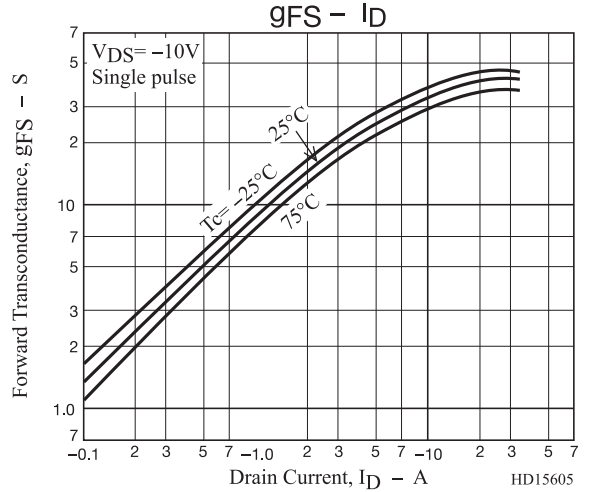
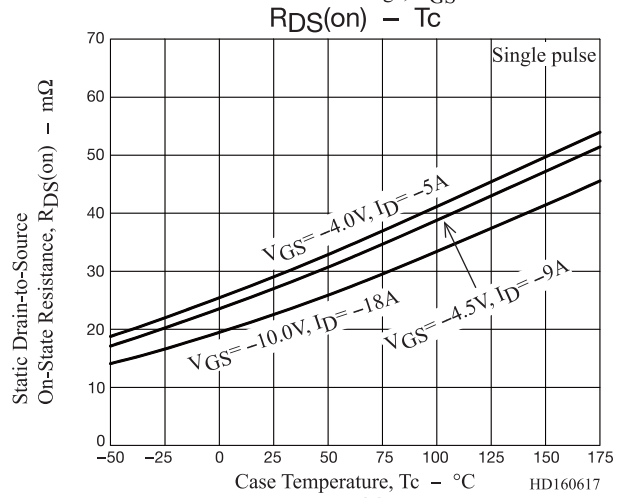
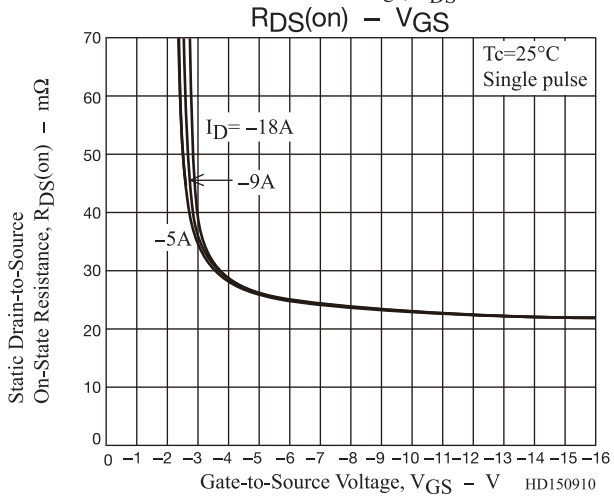
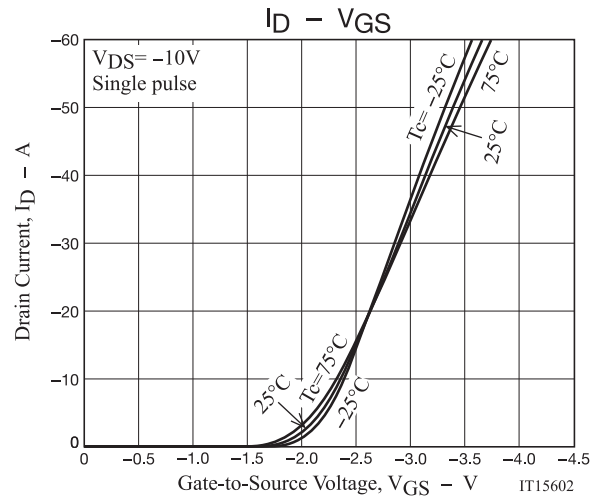
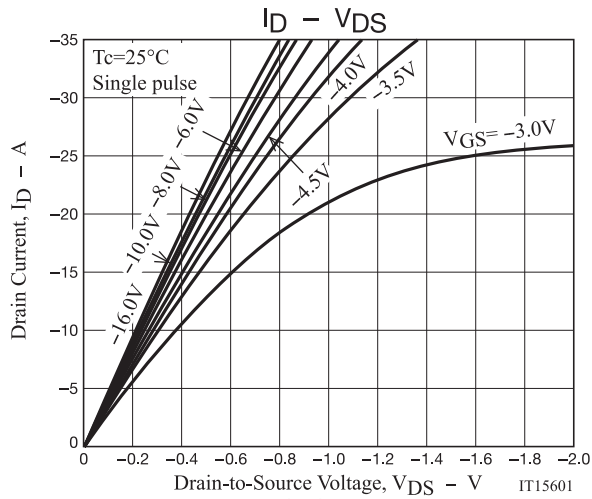
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	V(BR)DSS	I _D = -1 mA, V _{GS} = 0 V	-60			V
Zero-Gate Voltage Drain Current	I _{DSS}	V _{DS} = -60 V, V _{GS} = 0 V			-1	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V			±10	μA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = -10 V, I _D = -1 mA	-1.2		-2.6	V
Forward Transconductance	g _{FS}	V _{DS} = -10 V, I _D = -18 A		37		S
Static Drain to Source On-State Resistance	R _{DS(on)}	I _D = -18 A, V _{GS} = -10 V		22.5	29.5	mΩ
		I _D = -9 A, V _{GS} = -4.5 V		27	38	mΩ
		I _D = -5 A, V _{GS} = -4 V		29	44	mΩ
Input Capacitance	C _{iss}	V _{DS} = -20 V, f = 1 MHz		2,400		pF
Output Capacitance	C _{oss}			250		pF
Reverse Transfer Capacitance	C _{rss}			195		pF
Turn-ON Delay Time	t _{d(on)}	See Fig. 1		15		ns
Rise Time	t _r			125		ns
Turn-OFF Delay Time	t _{d(off)}			250		ns
Fall Time	t _f			200		ns
Total Gate Charge	Q _g	V _{DS} = -30 V, V _{GS} = -10 V, I _D = -35 A		55		nC
Gate to Source Charge	Q _{gs}			7.5		nC
Gate to Drain "Miller" Charge	Q _{gd}			12		nC
Forward Diode Voltage	V _{SD}	I _S = -35 A, V _{GS} = 0 V		-0.98	-1.5	V

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.

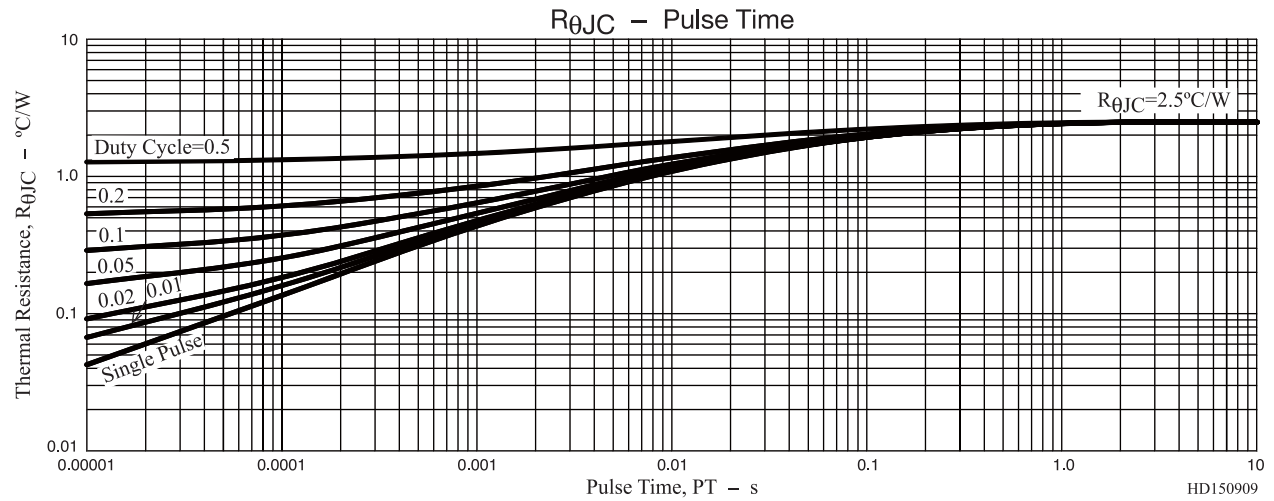
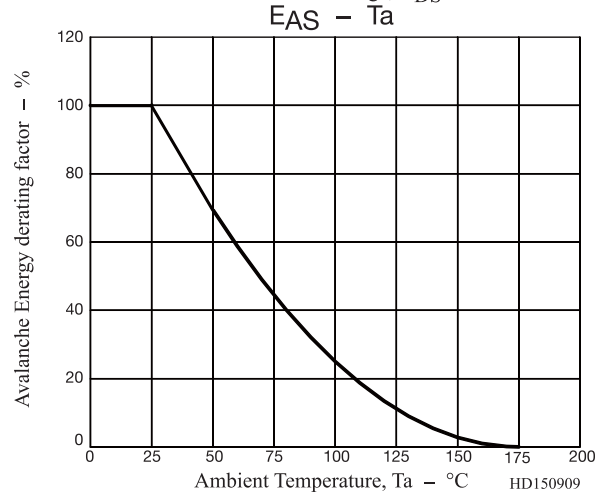
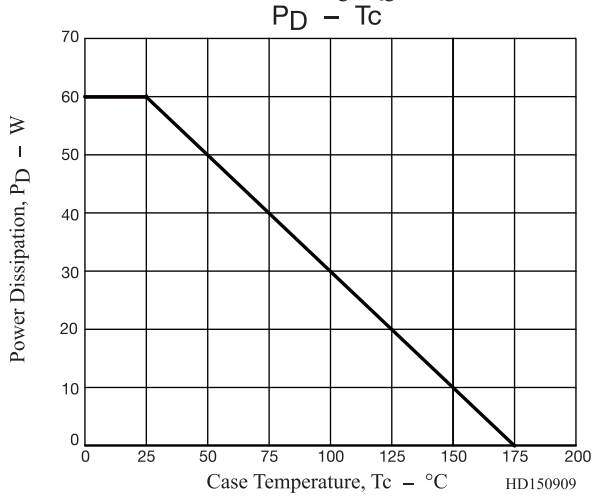
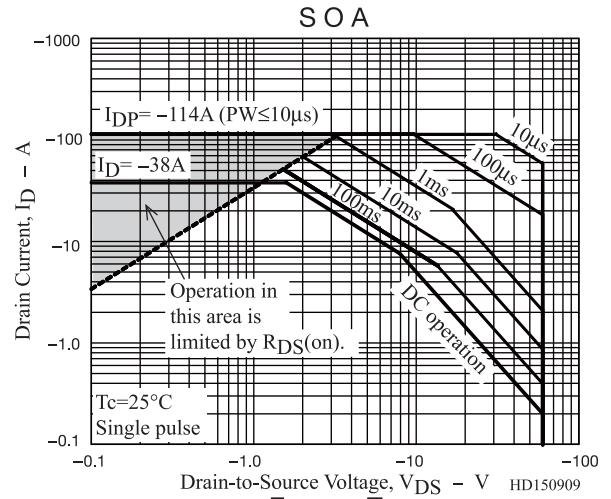
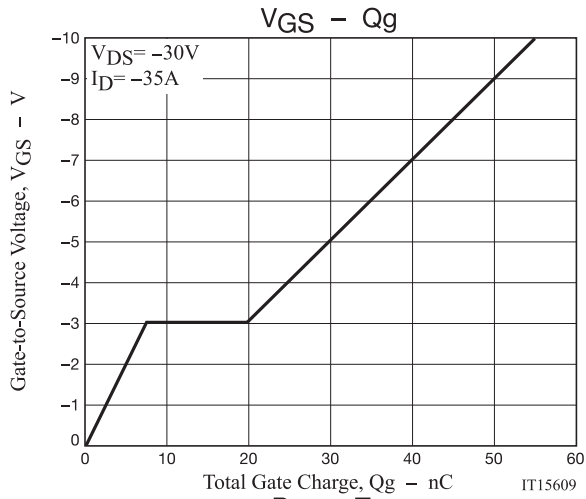
Fig.1 Switching Time Test Circuit



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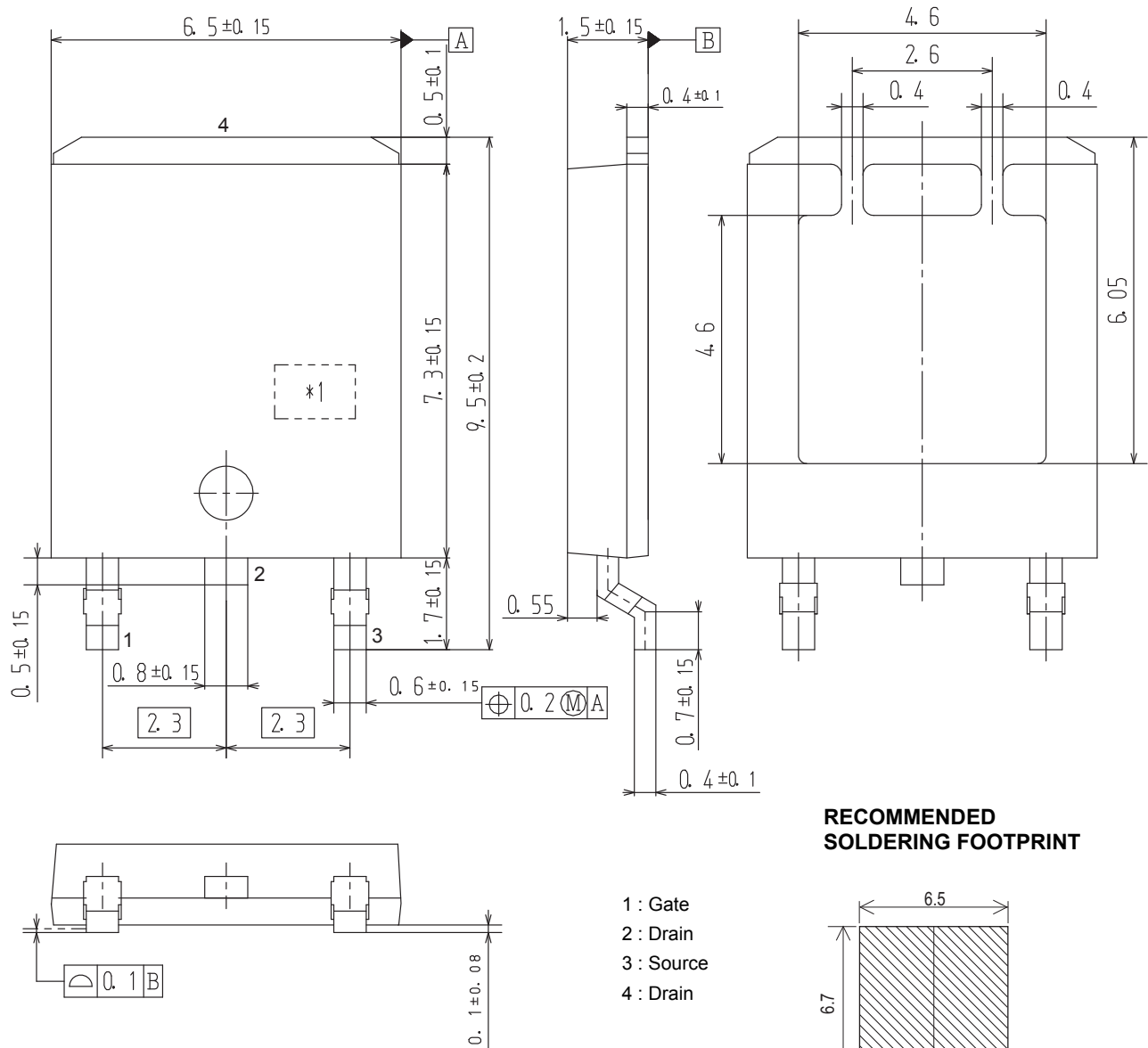
PACKAGE DIMENSIONS

unit : mm

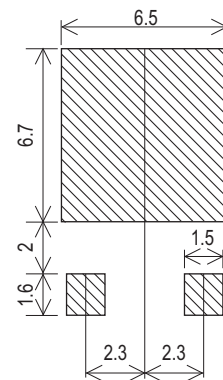
DPAK (Single Gauge) / ATPAK

CASE 369AM

ISSUE O



RECOMMENDED SOLDERING FOOTPRINT



NVATS5A113PLZ

ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
NVATS5A113PLZT4G	ATP113	DPAK(Single Gauge) / ATPAK (Pb-Free / Halogen Free)	3,000 / 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. http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF

Note on usage : Since the NVATS5A113PLZ is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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