NVATS4A101PZ

Power MOSFET
–30 V, 30 mΩ, –27 A, P-Channel

The NVATS4A101PZ is a power MOSFET designed for compact size and high efficiency which can achieve 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 Ta = 25°C (Note 1)

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	–30	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	I_D	–27	A
Drain Current (Pulse) PW ≤ 10 μs, duty cycle ≤ 1%	I_{DP}	–81	A
Power Dissipation Tc = 25°C	P_D	36	W
Operating Junction and Storage Temperature	Tj, Tstg	–55 to +175	°C
Avalanche Energy (Single Pulse) (Note 2)	E_{AS}	25	mJ
Avalanche Current (Note 3)	I_{AV}	–13	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 V, L = 200 μH, I_{AV} = –13 A
3 : L ≤ 200 μH, Single pulse

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Case Steady State (Tc = 25°C)	$R_{\theta JC}$	4.1	°C/W
Junction to Ambient (Note 4)	$R_{\theta JA}$	80.7	°C/W

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

ON Semiconductor®

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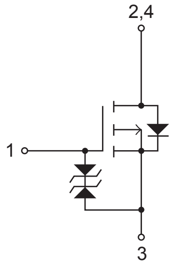
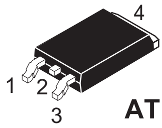
V_{DSS}	R_{DS}(on) Max	I_D Max
–30 V	30 mΩ @ –10 V 51 mΩ @ –4.5 V	–27 A

ELECTRICAL CONNECTION
P-Channel

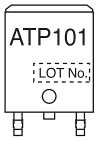


1 : Gate
2 : Drain
3 : Source
4 : Drain



ATPAK

MARKING



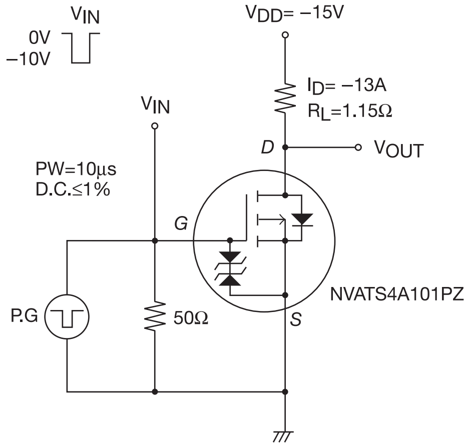
ORDERING INFORMATION
See detailed ordering and shipping information on page 6 of this data sheet.

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

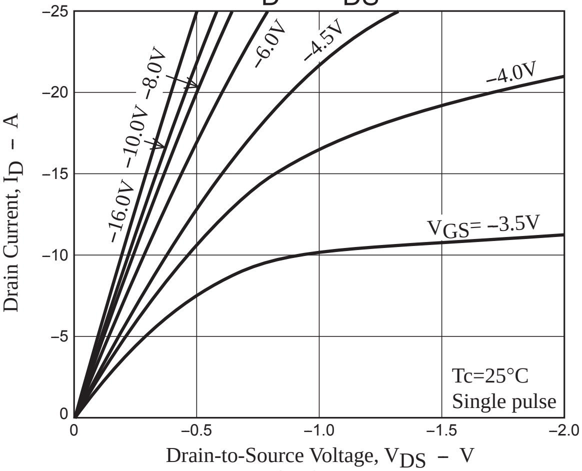
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = –1 mA, V_{GS} = 0 V	–30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = –30 V, V_{GS} = 0 V			–1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±16 V, V_{DS} = 0 V			±10	μA
Gate Threshold 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 = –13 A		17		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D = –13 A, V_{GS} = –10 V		23	30	mΩ
	$R_{DS}(on)2$	I_D = –7 A, V_{GS} = –4.5 V		36	51	mΩ
Input Capacitance	Ciss	V_{DS} = –10 V, f = 1 MHz		875		pF
Output Capacitance	Coss			220		pF
Reverse Transfer Capacitance	Crss			155		pF
Turn-ON Delay Time	$t_d(on)$	See Fig.1		9.2		ns
Rise Time	t_r			70		ns
Turn-OFF Delay Time	$t_d(off)$			80		ns
Fall Time	t_f			70		ns
Total Gate Charge	Qg	V_{DS} = –15 V, V_{GS} = –10 V, I_D = –25 A		18.5		nC
Gate to Source Charge	Qgs			3.2		nC
Gate to Drain “Miller” Charge	Qgd			4.0		nC
Forward Diode Voltage	V_{SD}	I_S = –25A, V_{GS} = 0 V		–0.99	–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.

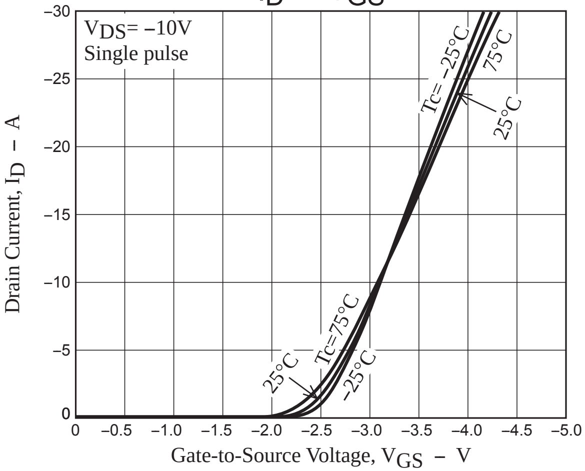
Fig.1 Switching Time Test Circuit



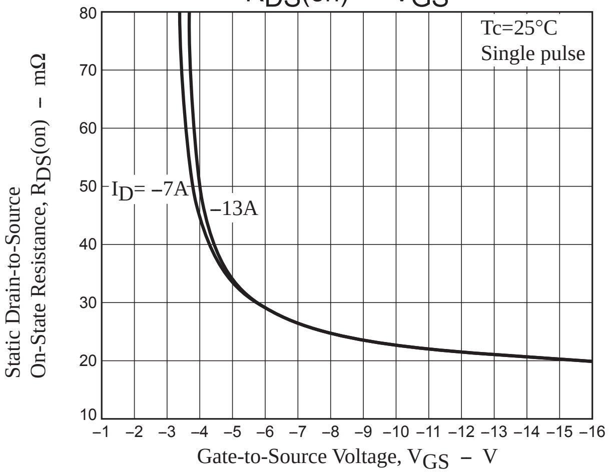
I_D – V_{DS}



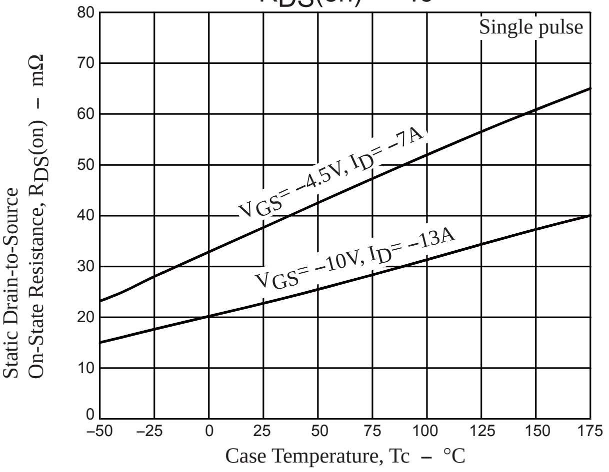
I_D – V_{GS}



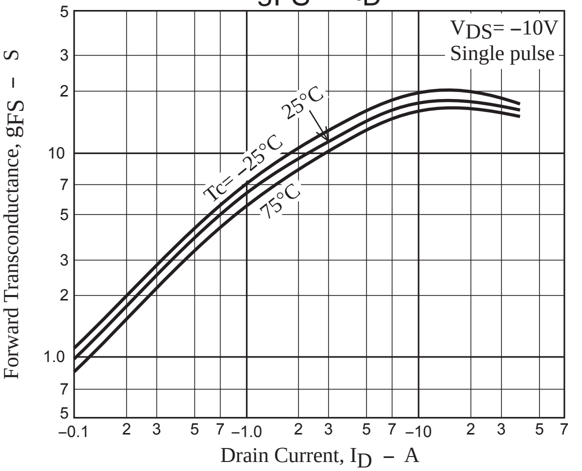
R_{DS}(on) – V_{GS}



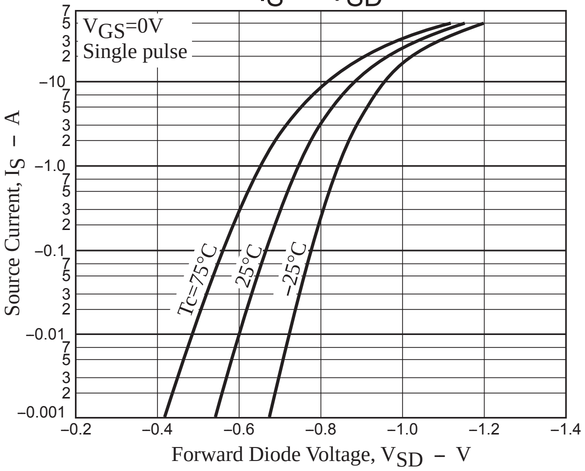
R_{DS}(on) – Tc



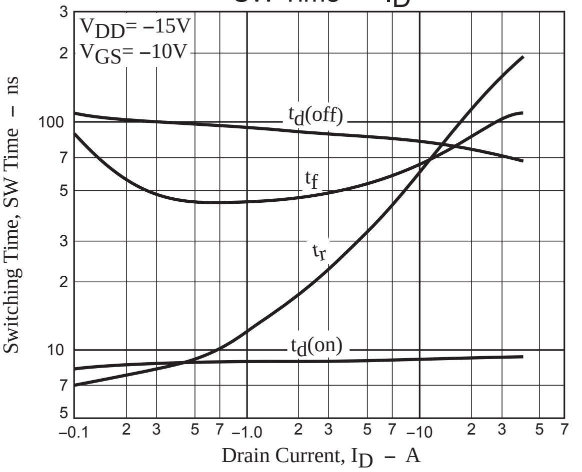
g_{FS} – I_D



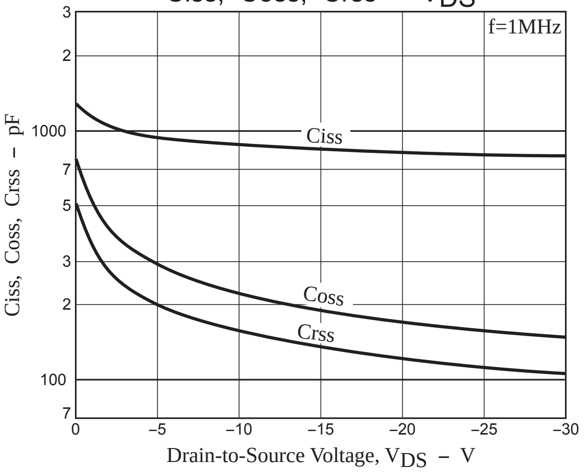
I_S – V_{SD}



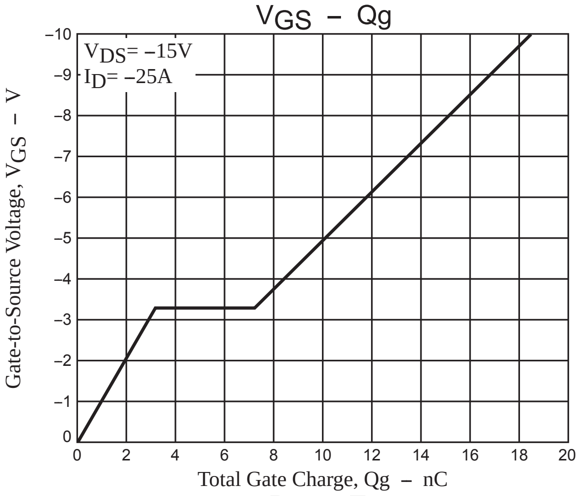
SW Time – I_D



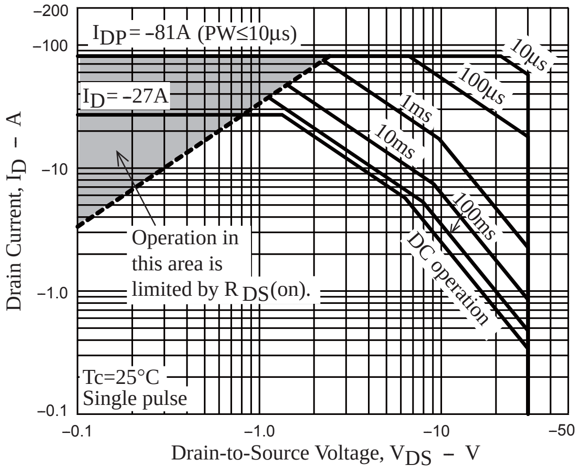
Ciss, Coss, Crss – V_{DS}



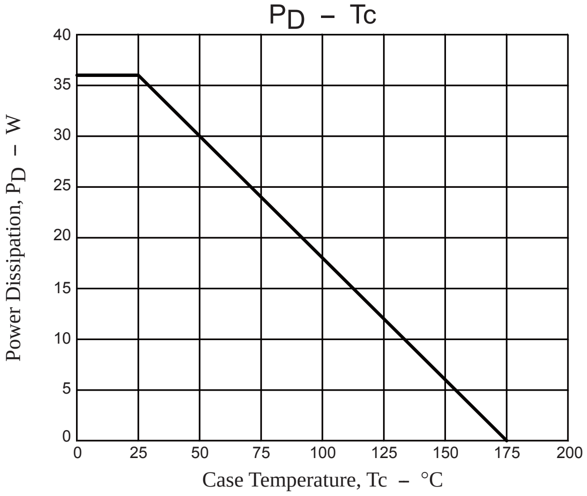
V_{GS} – Qg



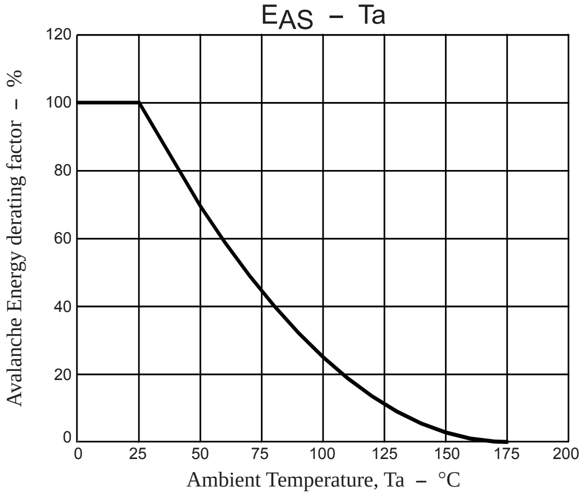
S O A



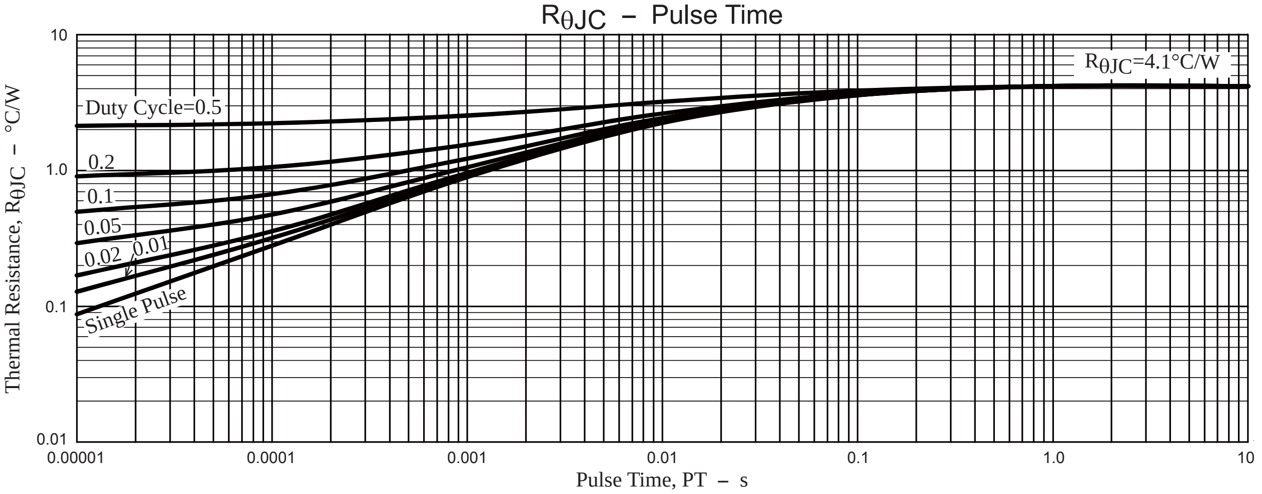
P_D – Tc



E_{AS} – Ta

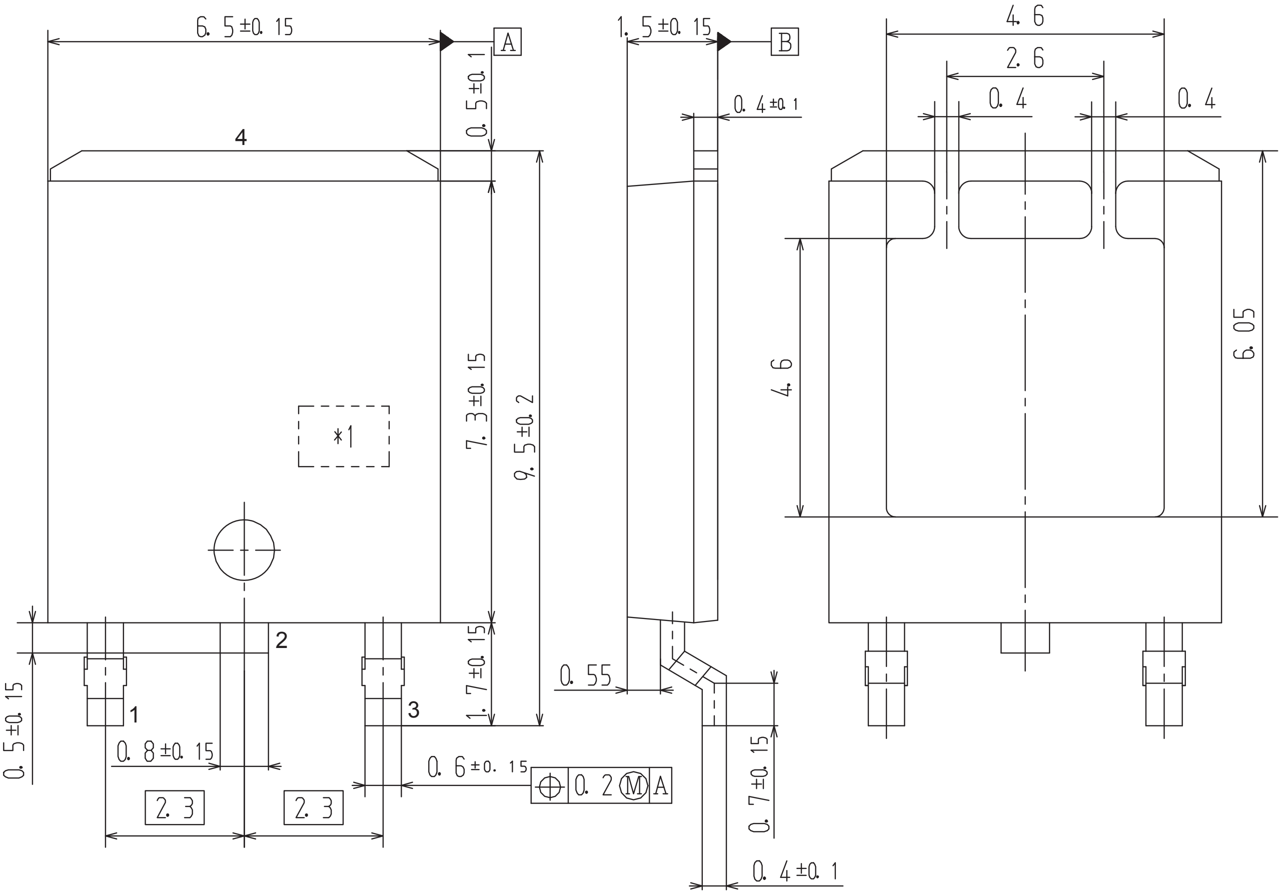


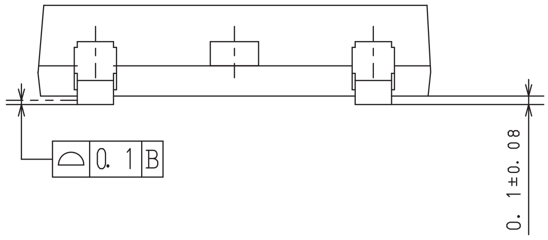
$R_{\theta JC}$ – Pulse Time



PACKAGE DIMENSIONS
unit : mm

DPAK (Single Gauge) / ATPAK
CASE 369AM
ISSUE O



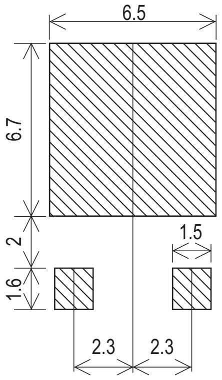


Pin2 is idle pin with electrical designation only carried

*1:Lot indication

1 : Gate
2 : Drain
3 : Source
4 : Drain

RECOMMENDED SOLDERING FOOTPRINT



ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
NVATS4A101PZT4G	ATP101	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 NVATS4A101PZ is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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