NTAT6H406N

MOSFET – N-Channel

80 V, 2.9 mΩ, 175 A

Features

- Low On−Resistance
- High Current Capability
- 100% Avalanche Tested
- ATPAK Package is Pin−compatible with DPAK (TO−252)
- Pb−Free, Halogen Free and RoHS Compliance

Typical Applications

- Multi Lib Protection
- Motor Control

Specifications

Table 1. ABSOLUTE MAXIMUM RATING at T_A = 25°C

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	80	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	I_D	175	A
Drain Current (Pulse) PW ≤ 10 ms, Duty Cycle ≤ 1%	I_{DP}	600	A
Power Dissipation T_C = 25°C	P_D	90	W
Operating Junction and Storage Temperature	T_J, T_{STG}	−55 to +150	°C
Single Pulse Drain to Source Avalanche Energy (L = 0.1 mH, $I_{L(pk)}$ = 55 A)	E_{AS}	151	mJ
Lead Temperature for Soldering Purposes, 3 mm from Case for 10 seconds	T_L	260	°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.

Table 2. THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Case Steady State (T_C = 25°C)	$R_{\theta JC}$	1.38	°C/W
Junction to Ambient (Note 1)	$R_{\theta JA}$	77.2	°C/W

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

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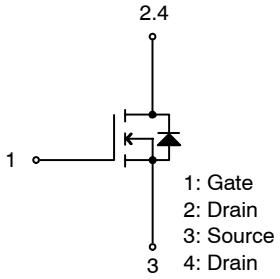
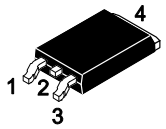
V_{DSS}	R_{DS} (on) Max	I_D Max
80 V	2.9 mΩ @ 10V	175 A

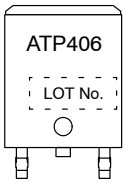
ELECTRICAL CONNECTION
N−Channel





DPAK / ATPAK
CASE 369AM

MARKING DIAGRAM



ORDERING INFORMATION

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

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Table 3. ELECTRICAL CHARACTERISTICS at T_A = 25°C

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 1 mA, V_{GS} = 0 V	80			V
Zero−Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80 V, V_{GS} = 0 V			10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA
Gate Threshold Voltage	$V_{GS}(th)$	V_{DS} = 10 V, I_D = 1 mA	2.0		4.0	V
Forward Transconductance	g_{FS}	V_{DS} = 10 V, I_D = 50 A		185		S
Static Drain to Source On−State Resistance	$R_{DS}(on)$	I_D = 50 A, V_{GS} = 10 V		2.2	2.9	mΩ
Input Capacitance	C_{ISS}	V_{DS} = 40 V, f = 1 MHz		8040		pF
Output Capacitance	C_{OSS}			1120		pF
Reverse Transfer Capacitance	C_{RSS}			40		pF
Turn−ON Delay Time	$t_d(on)$	V_{GS} = 10 V, V_{DS} = 48 V, I_D = 50 A, R_G = 50 Ω,		77		ns
Rise Time	t_r			420		ns
Turn−OFF Delay Time	$t_d(off)$			310		ns
Fall Time	t_f			155		ns
Total Gate Charge	Q_G	V_{DS} = 48 V, V_{GS} = 10 V, I_D = 50 A		110		nC
Gate to Source Charge	Q_{GS}			32.4		nC
Gate to Drain “Miller” Charge	Q_{GD}			31.8		nC
Forward Diode Voltage	V_{SD}	I_S = 100 A, V_{GS} = 0 V		0.9	1.5	V
Reverse Recovery Time	t_{RR}	I_S = 50 A, V_{GS} = 0 V, d_I/dt = 100 A/μs		90		ns
Reverse Recovery Charge	Q_{RR}			126		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.

TYPICAL CHARACTERISTICS

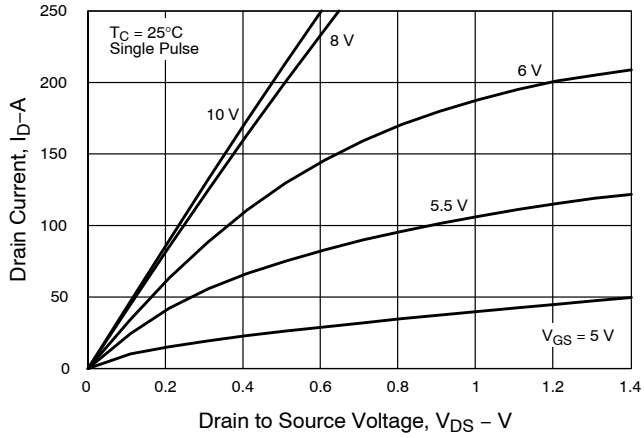

Figure 1. On−Region Characteristics

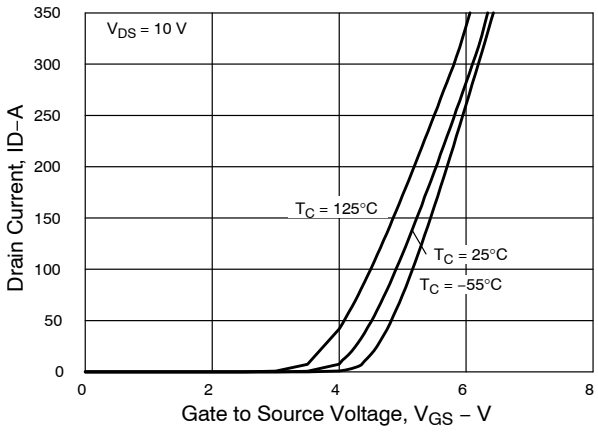

Figure 2. Transfer Characteristics

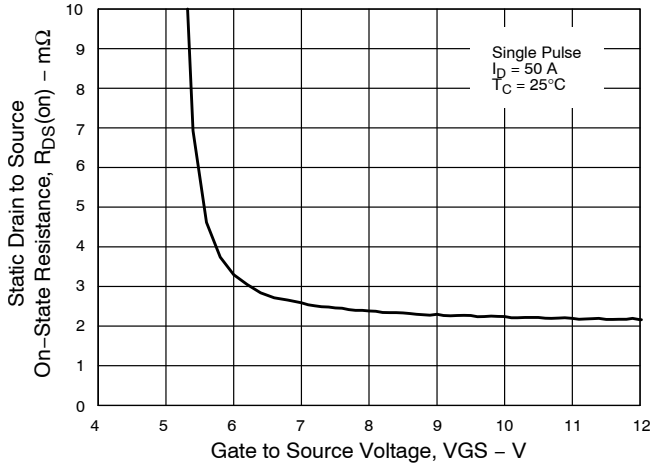

Figure 3. On−Resistance vs. Gate to Source Voltage

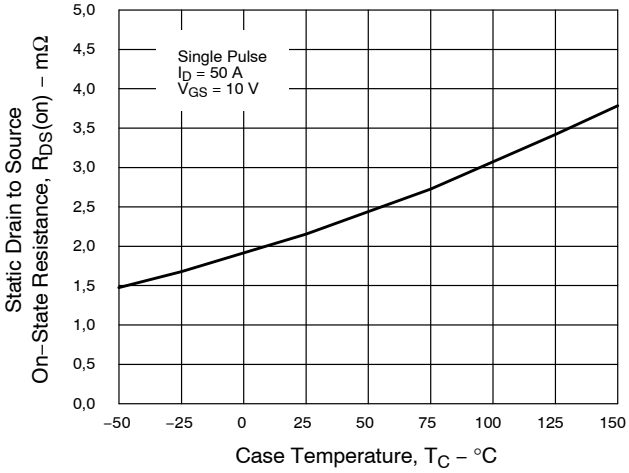

Figure 4. On−Resistance vs. Case Temperature

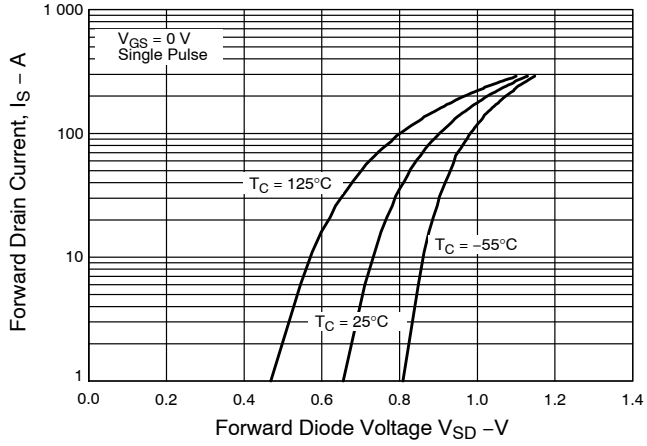

Figure 5. Diode Forward Voltage vs. Current

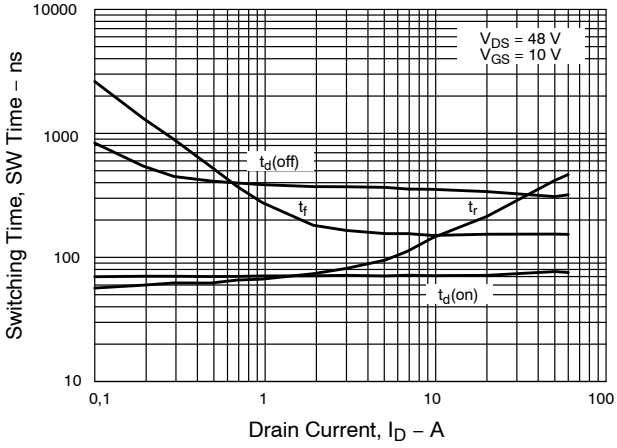

Figure 6. Switching Time vs. Drain Current

TYPICAL CHARACTERISTICS (continued)

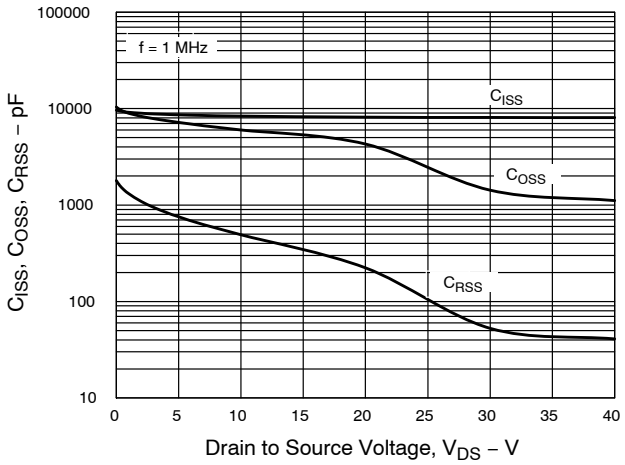

Figure 7. Capacitance Variation

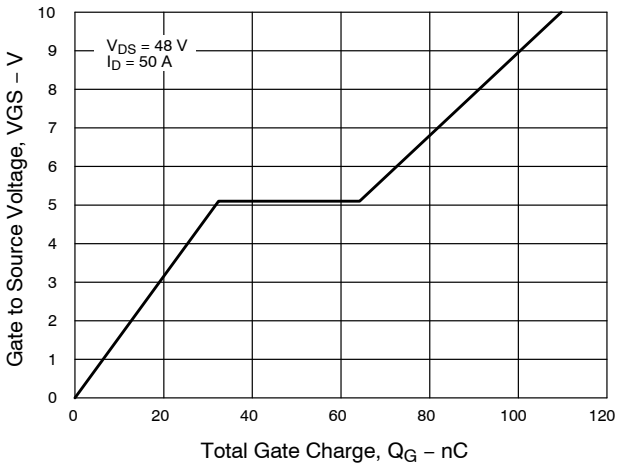

Figure 8. Gate to Source Voltage vs. Total Charge

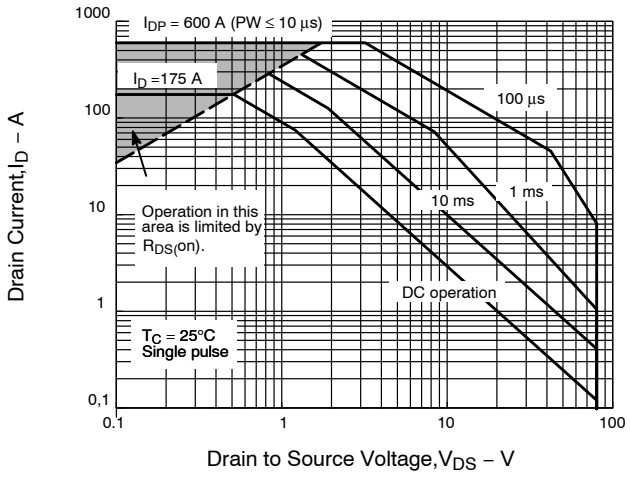

Figure 9. Safe Operating Area

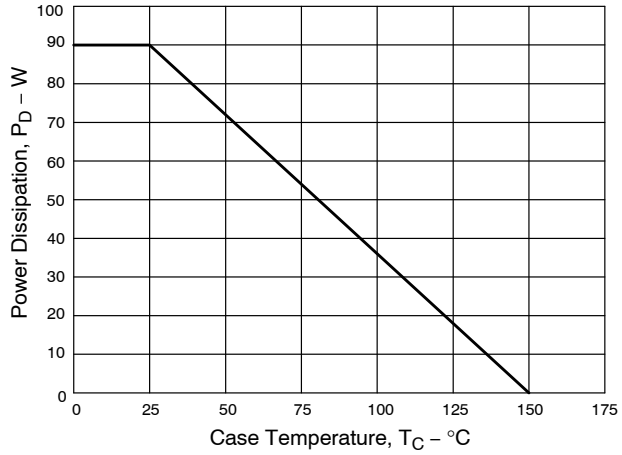

Figure 10. Power Dissipation vs. Case Temperature

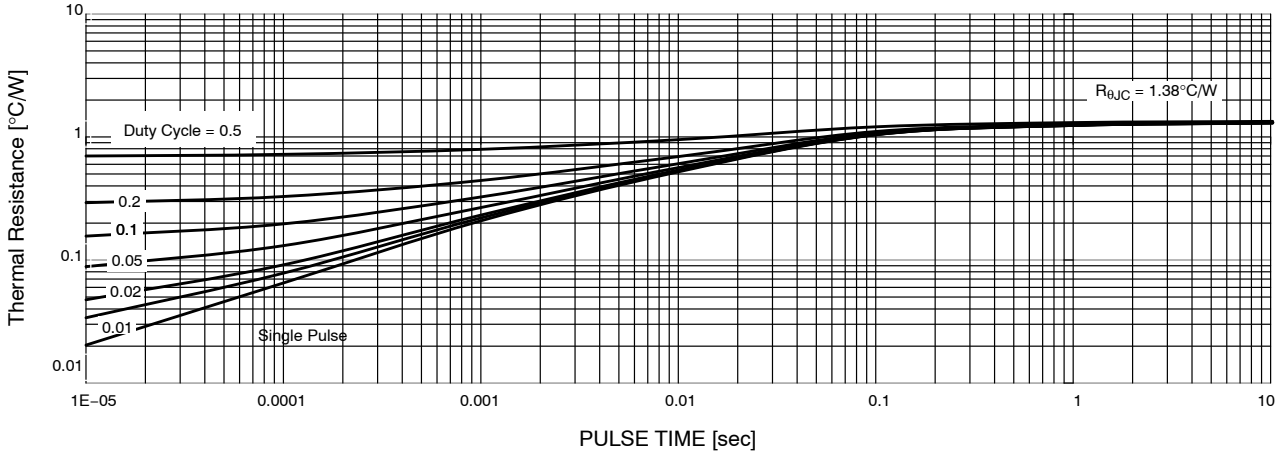

Figure 11. Thermal Response

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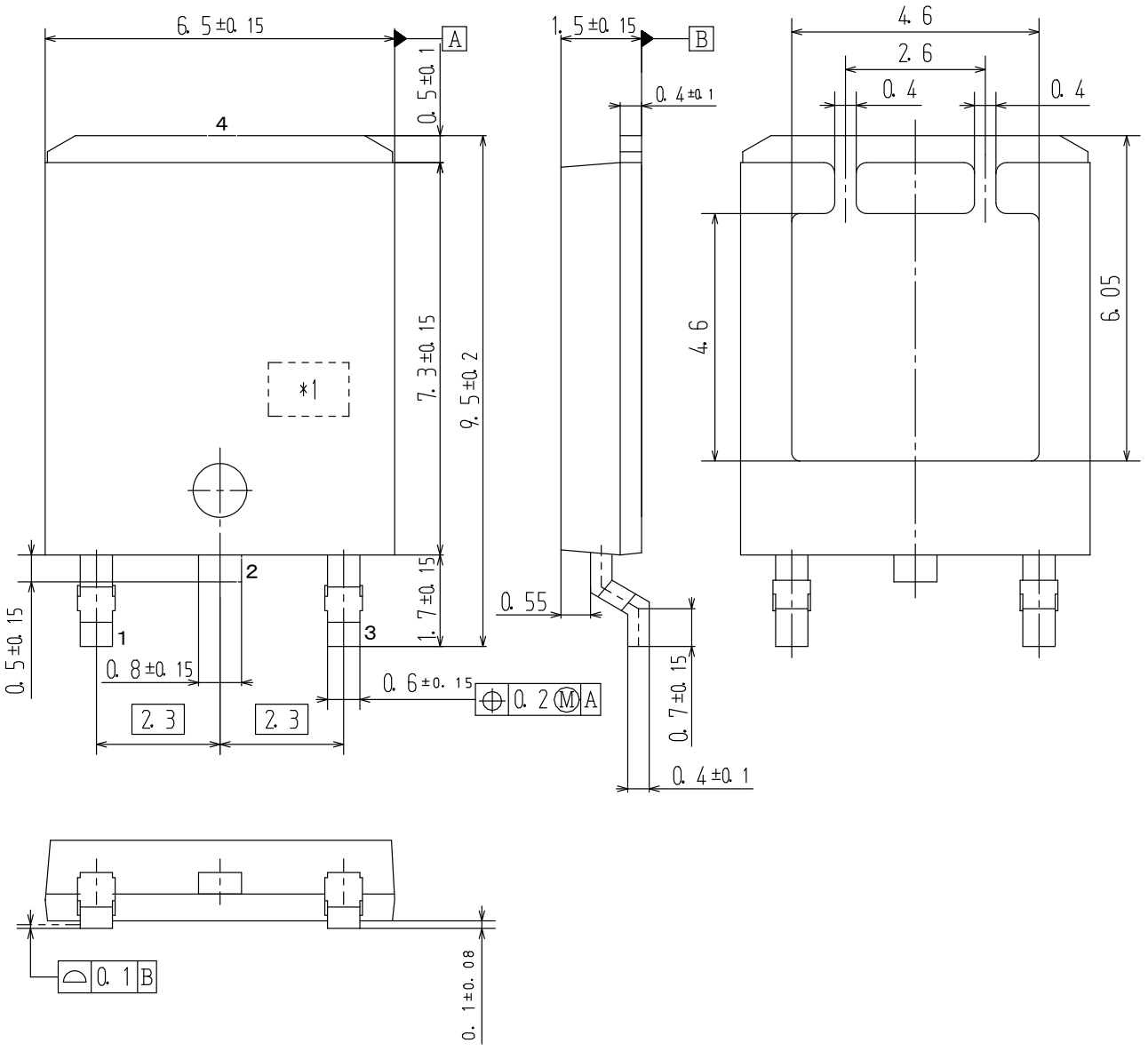

Pin2 is idle pin with electrical designation only carried

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