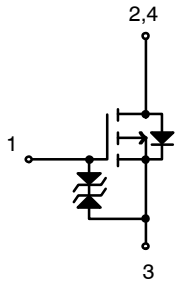
MOSFET – Power, P-Channel

-60 V, 6.5 mΩ, -100 A

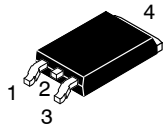
ATP304

V_{DSS}	$R_{DS(ON)}$ MAX	I_D MAX
−60 V	6.5 mΩ @ −10 V	−100 A
	8.9 mΩ @ −4.5 V	



1 Gate
2 Drain
3 Source
4 Drain

ELECTRICAL CONNECTION P−CHANNEL



DPAK (Single Gauge) / ATPAK
CASE 369AM

Features

- ON−Resistance $R_{DS(on)1}$ = 5.0 mΩ (typ)
- Input Capacitance Ciss = 13000 pF (typ)
- 4.5 V Drive
- This Device is Pb−Free, Halogen Free and RoHS Compliant

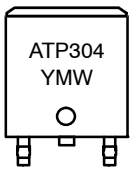
MAXIMUM RATINGS (Ta = 25°C) (Note 1)

Parameter	Symbol	Value	Unit
Drain−to−Source Voltage	V_{DSS}	−60	V
Gate−to−Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	I_D	−100	A
Drain Current (Pulse) PW ≤ 10 μs, duty cycle ≤ 1%	I_{DP}	−400	A
Allowable Power Dissipation Tc = 25°C	P_D	90	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	−55 to +150	°C
Avalanche Energy (Single Pulse) (Note 1)	E_{AS}	656	mJ
Avalanche Current (Note 2)	I_{AV}	−75	A

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. V_{DD} = −36 V, L = 100 μH, I_{AV} = −75 A (Figure 1)
2. L ≤ 100 μH, Single pulse

MARKING DIAGRAM



ATP304 = Specific Device Code
Y = Year of Production
M = Assembly Operation Month
W = Work Week in the Month

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition	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	–	–	−10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = +16 V, V_{DS} = 0 V	–	–	+10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS} = −10 V, I_D = −1 mA	−1.2	–	−2.6	V
Forward Transfer Admittance	| yfs |	V_{DS} = −10 V, I_D = −50 A	–	100	–	S
Static Drain to Source On−State Resistance	R_{DS}(on)1	I_D = −50 A, V_{GS} = −10 V	–	5.0	6.5	mΩ
	R_{DS}(on)2	I_D = −50 A, V_{GS} = −4.5 V	–	6.4	8.9	mΩ
Input Capacitance	Ciss	V_{DS} = −20 V, f = 1 MHz	–	13000	–	pF
Output Capacitance	Coss		–	1080	–	pF
Reverse Transfer Capacitance	Crss		–	760	–	pF
Turn−ON Delay Time	t_d(on)	(Figure 2)	–	80	–	ns
Rise Time	t_r		–	650	–	ns
Turn−OFF Delay Time	t_d(off)		–	780	–	ns
Fall Time	t_f		–	460	–	ns
Total Gate Charge	Qg	V_{DS} = −36 V, V_{GS} = −10 V, I_D = −100 A	–	250	–	nC
Gate to Source Charge	Qgs		–	55	–	nC
Gate to Drain “Miller” Charge	Qgd		–	50	–	nC
Diode Forward Voltage	V_{SD}	I_S = −100 A, V_{GS} = 0 V	–	−1.0	−1.5	V
Reverse Recovery Time	t_{rr}	(Figure 3)	–	90	–	ns
Reverse Recovery Charge	Q_{rr}	I_S = −100 A, V_{GS} = 0 V, di/dt = −100 A / μs	–	245	–	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.

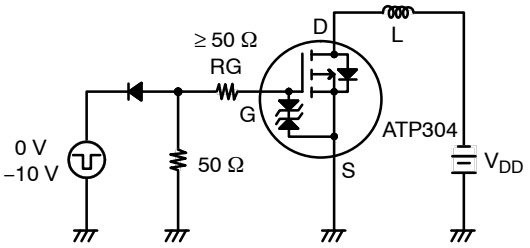


Figure 1. Unclamped Inductive Switching Test Circuit

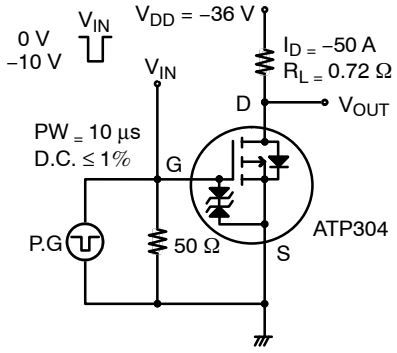


Figure 2. Switching Time Test Circuit

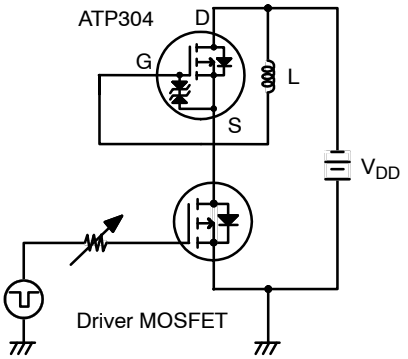


Figure 3. Reserve Recovery Time Test Circuit

TYPICAL CHARACTERISTICS

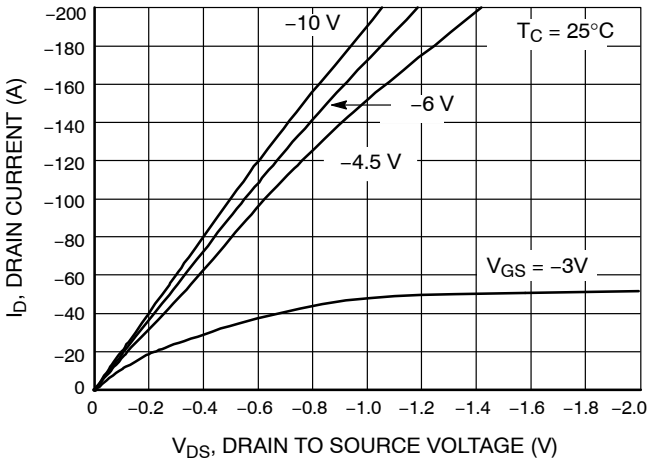


Figure 4. I_D – V_{DS}

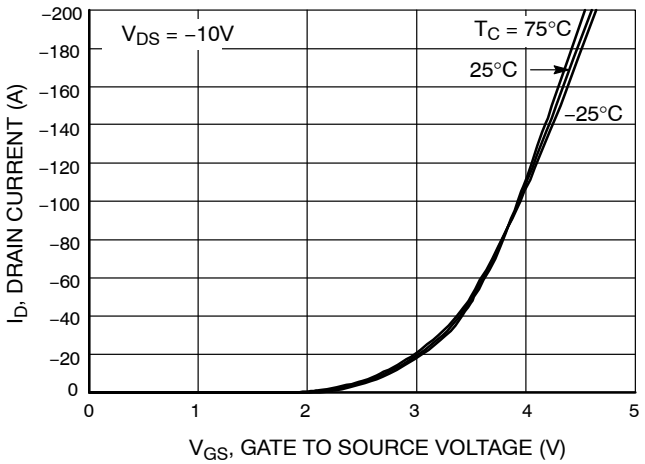


Figure 5. I_D – V_{GS} (off)

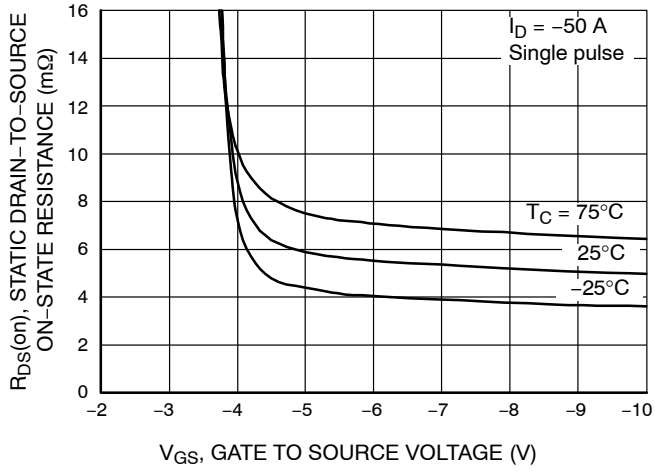


Figure 6. R_{DS}(on) – V_{GS}

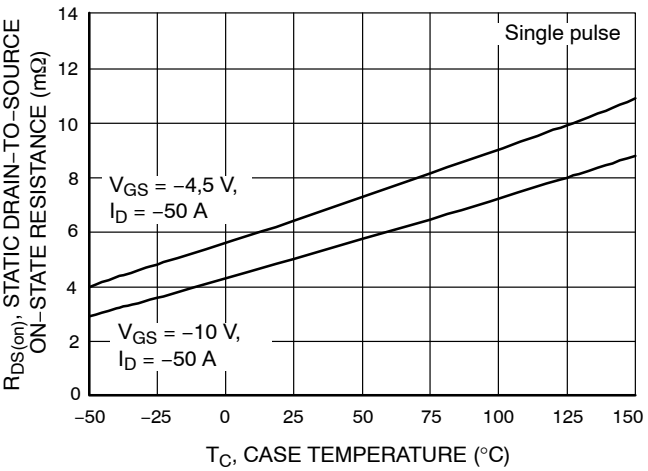


Figure 7. R_{DS}(on) – T_C

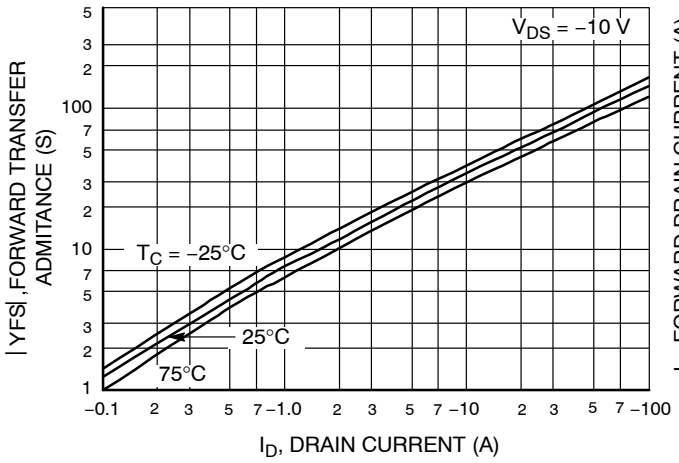


Figure 8. | yfs | – I_D

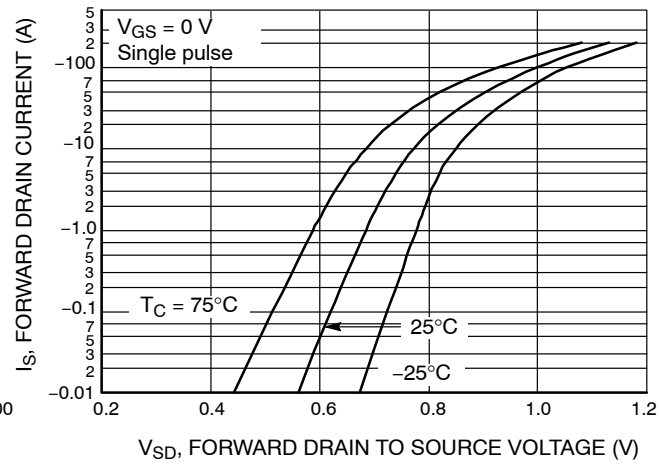


Figure 9. I_S – V_{SD}

TYPICAL CHARACTERISTICS (CONTINUED)

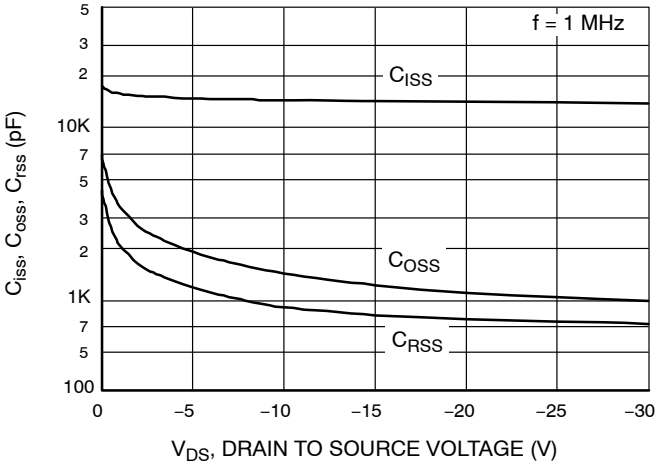


Figure 10. C_{iss}, C_{oss}, C_{rss} – V_{DS}

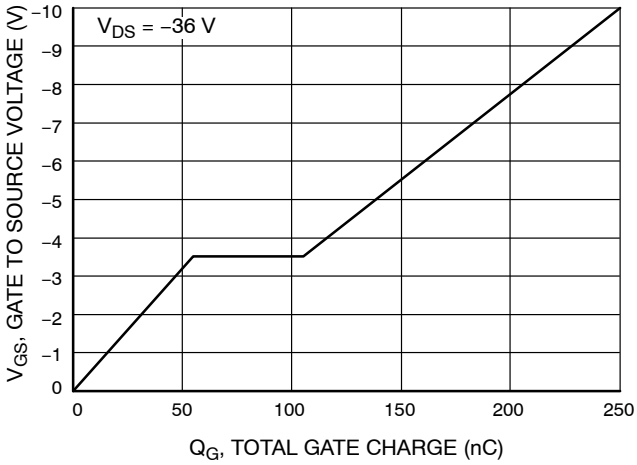


Figure 11. Q_g _ V_{GS}

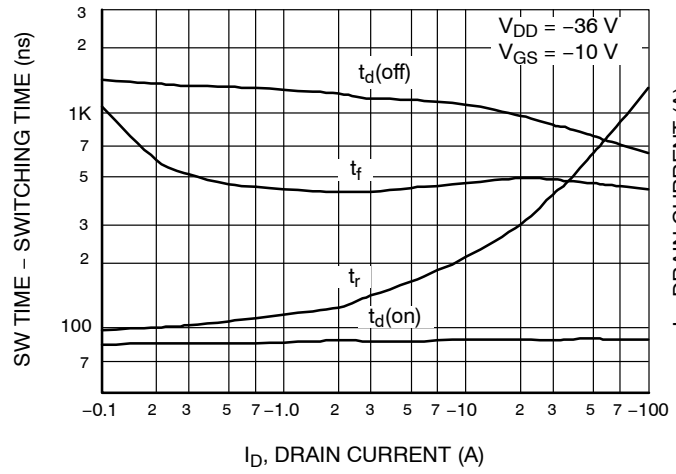


Figure 12. SW Time – I_D

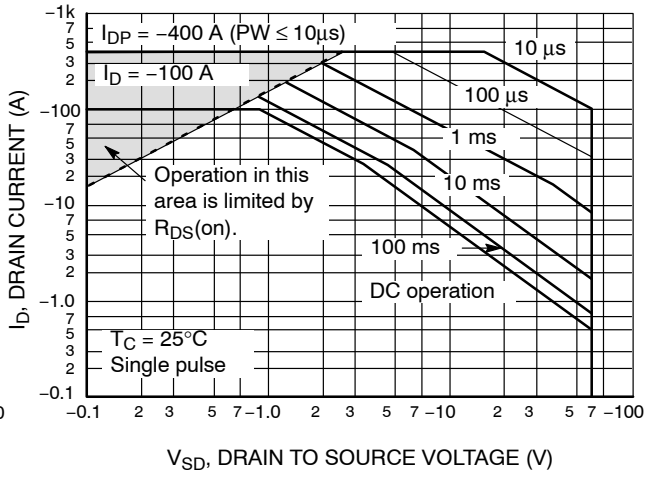


Figure 13. SOA

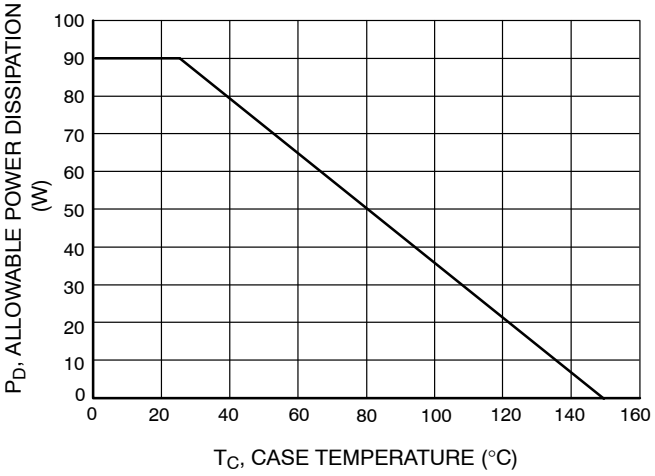


Figure 14. P_D – T_C

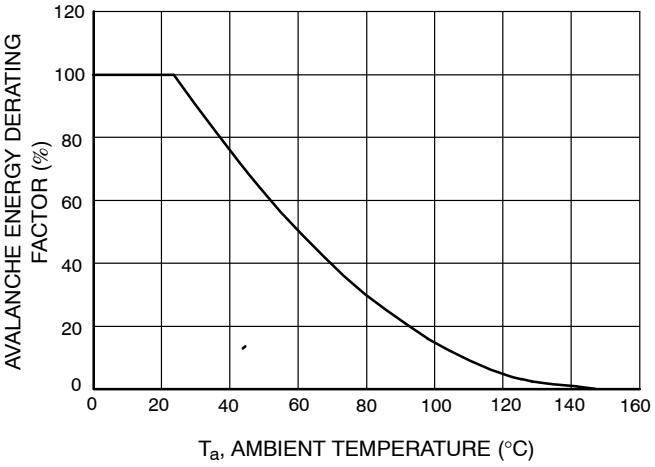


Figure 15. E_{AS} – T_a

TYPICAL CHARACTERISTICS (CONTINUED)

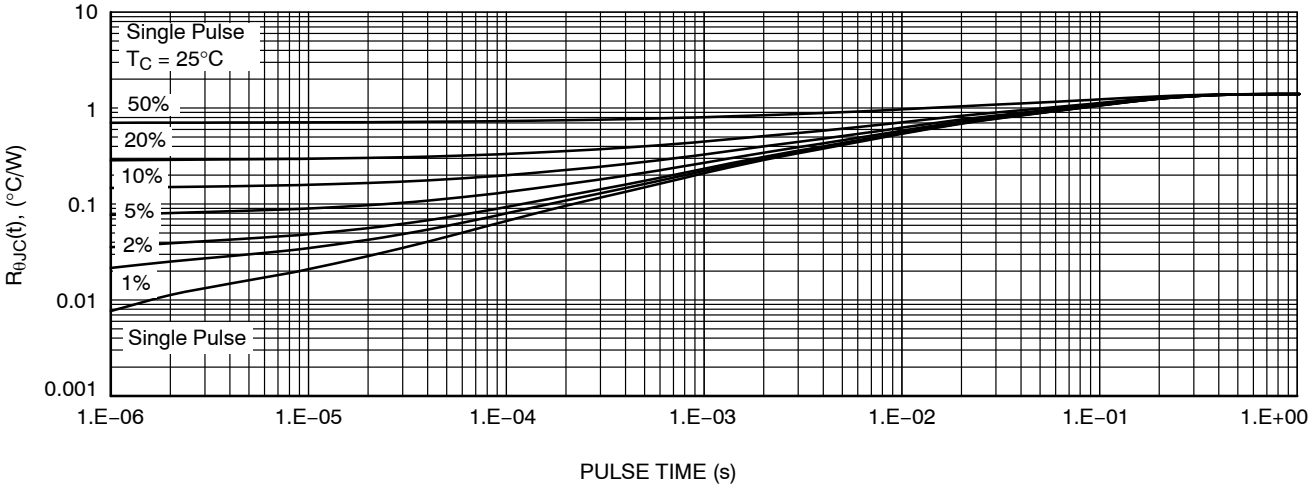


Figure 16. Thermal Response

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
ATP304−TL−H	ATP304	DPAK (Single Gauge) / ATPAK (Pb−Free / Halogen Free)	3000/ 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.

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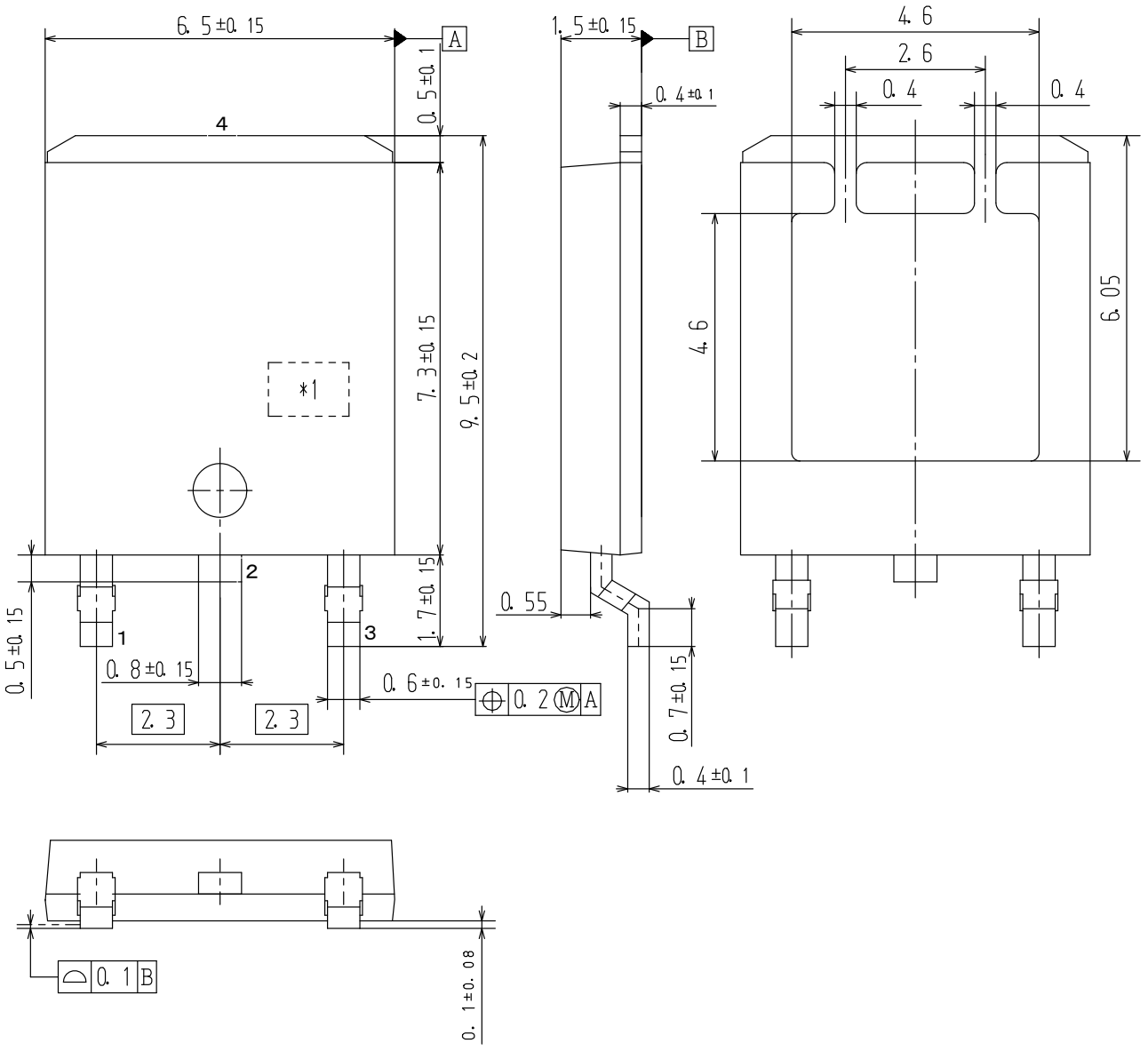
ISSUE O

DATE 29 FEB 2012



Pin2 is idle pin with electrical designation only carried

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DESCRIPTION:	**DPAK (SINGLE GAUGE) / ATPAK**		**PAGE 1 OF 1**

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