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RoHS
Available on commercial versions

P-CHANNEL MOSFET
Qualified per MIL-PRF-19500/562

Qualified Levels: JAN, JANTX, and JANTXV

DESCRIPTION

This 2N6804 switching transistor is military qualified up to the JANTXV level for high-reliability applications. Microsemi also offers numerous other transistor products to meet higher and lower power ratings with various switching speed requirements in both through-hole and surface-mount packages.

Important: For the latest information, visit our website http://www.microsemi.com.

TO-204AA (TO-3) Package

FEATURES

- JEDEC registered 2N6804 number series.
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/562. (See part nomenclature for all available options.)
- RoHS compliant version available (commercial grade only).

APPLICATIONS / BENEFITS

- Low-profile metal can design.
- Military and other high-reliability applications.

MAXIMUM RATINGS @ T_A = +25 ºC unless otherwise stated

Parameters / Test Conditions	Symbol	Value	Unit
Operating & Storage Junction Temperature Range	T_J & T_{stg}	-55 to +150	°C
Thermal Resistance Junction-to-Case	$R_{\Theta JC}$	1.67	°C/W
Total Power Dissipation @ T_A = +25 °C @ T_C = +25 °C (1)	P_T	4 75	W
Drain-Source Voltage, dc	V_{DS}	-100	V
Gate-Source Voltage, dc	V_{GS}	± 20	V
Drain Current, dc @ T_C = +25 ºC (2)	I_{D1}	-11.0	A
Drain Current, dc @ T_C = +100 ºC (2)	I_{D2}	-7.0	A
Off-State Current (Peak Total Value) (3)	I_{DM}	-50	Ω
Source Current	I_S	-11	A

NOTES:
1. Derated linearly by 0.6 W/ºC for T_C > +25 ºC.
2. The following formula derives the maximum theoretical I_D limit. I_D is limited by package and internal wires and may be limited by pin diameter:

$$I_D = \sqrt{\frac{T_J(max) - T_C}{R_{\Theta JC} \times R_{DS(on)} @ T_J(max)}}$$

3. I_{DM} = 4 x I_{D1} as calculated in note 2.

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MECHANICAL and PACKAGING

- CASE: TO-3 metal can.
- TERMINALS: Solder dipped (Sn63/Pb37) over nickel plated alloy 52. RoHS compliant matte-tin plating is also available.
- MARKING: Manufacturer's ID, part number, date code, ESD symbol.
- WEIGHT: Approximately 12.7 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE

JAN 2N6804 (e3)

Reliability Level
JAN = JAN Level
JANTX = JANTX Level
JANTXV = JANTXV Level
Blank = Commercial

JEDEC type number
(see Electrical Characteristics table)

RoHS Compliance
e3 = RoHS compliant (available on commercial grade only)
Blank = non-RoHS compliant

SYMBOLS & DEFINITIONS

Symbol	Definition
di/dt	Rate of change of diode current while in reverse-recovery mode, recorded as maximum value.
I_F	Forward current
R_G	Gate drive impedance
V_{DD}	Drain supply voltage
V_{DS}	Drain source voltage, dc
V_{GS}	Gate source voltage, dc

ELECTRICAL CHARACTERISTICS @ T_A = +25 °C, unless otherwise noted

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Drain-Source Breakdown Voltage V_{GS} = 0 V, I_D = -1.0 mA	$V_{(BR)DSS}$	-100		V
Gate-Source Voltage (Threshold) $V_{DS} \geq V_{GS}$, I_D = -0.25 mA $V_{DS} \geq V_{GS}$, I_D = -0.25 mA, T_J = +125 °C $V_{DS} \geq V_{GS}$, I_D = -0.25 mA, T_J = -55 °C	 $V_{GS(th)1}$ $V_{GS(th)2}$ $V_{GS(th)3}$	 -2.0 -1.0	 -4.0 -5.0	V
Gate Current V_{GS} = ± 20 V, V_{DS} = 0 V V_{GS} = ± 20 V, V_{DS} = 0 V, T_J = +125 °C	 I_{GSS1} I_{GSS2}		 ±100 ±200	nA
Drain Current V_{GS} = 0 V, V_{DS} = -80 V	I_{DSS1}		-25	µA
Drain Current V_{GS} = 0 V, V_{DS} = -80 V, T_J = +125 °C	I_{DSS2}		0.25	mA
Static Drain-Source On-State Resistance V_{GS} = -10 V, I_D = -7 A pulsed	$r_{DS(on)1}$		0.30	Ω
Static Drain-Source On-State Resistance V_{GS} = -10 V, I_D = -11 A pulsed	$r_{DS(on)2}$		0.36	Ω
Static Drain-Source On-State Resistance T_J = +125°C V_{GS} = -10 V, I_D = -7 A pulsed	$r_{DS(on)3}$		0.55	Ω
Diode Forward Voltage V_{GS} = 0 V, I_S = -11.0 A pulsed	V_{SD}		-4.7	V

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Gate Charge:				
On-State Gate Charge V_{GS} = -10 V, I_D = -11 A, V_{DS} = -50 V	$Q_{g(on)}$		29.0	nC
Gate to Source Charge V_{GS} = -10 V, I_D = -11 A, V_{DS} = -50 V	Q_{gs}		7.1	nC
Gate to Drain Charge V_{GS} = -10 V, I_D = -11 A, V_{DS} = -50 V	Q_{gd}		21.0	nC

ELECTRICAL CHARACTERISTICS @ T_A = +25 °C, unless otherwise noted (continued)

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Turn-on delay time I_D = -11 A, V_{GS} = -10 V, R_G = 7.5 Ω, V_{DD} = -35 V	$t_{d(on)}$		60	ns
Rinse time I_D = -11 A, V_{GS} = -10 V, R_G = 7.5 Ω, V_{DD} = -35 V	t_r		140	ns
Turn-off delay time I_D = -11 A, V_{GS} = -10 V, R_G = 7.5 Ω, V_{DD} = -35 V	$t_{d(off)}$		140	ns
Fall time I_D = -11 A, V_{GS} = -10 V, R_G = 7.5 Ω, V_{DD} = -35 V	t_f		140	ns
Diode Reverse Recovery Time di/dt ≤ 100 A/µs, V_{DD} ≤ -50 V, I_F = -11 A	t_{rr}		250	ns

GRAPHS

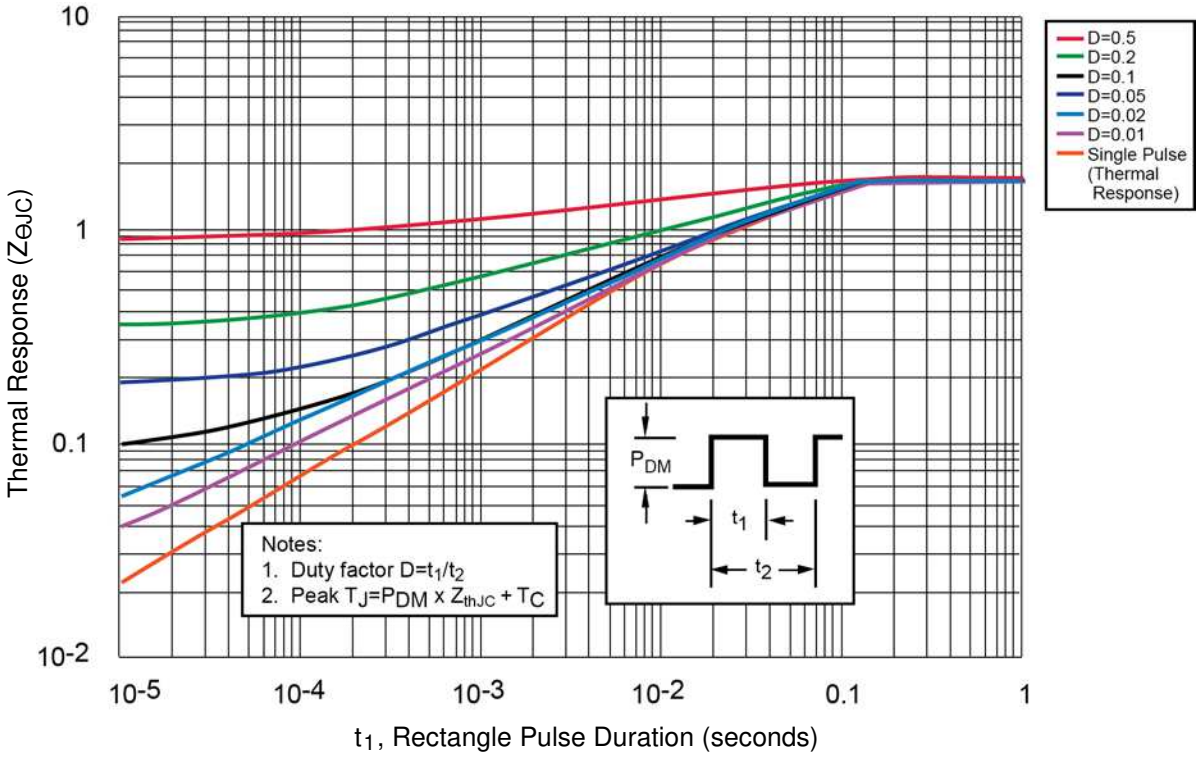


FIGURE 1
Transient Thermal impedance

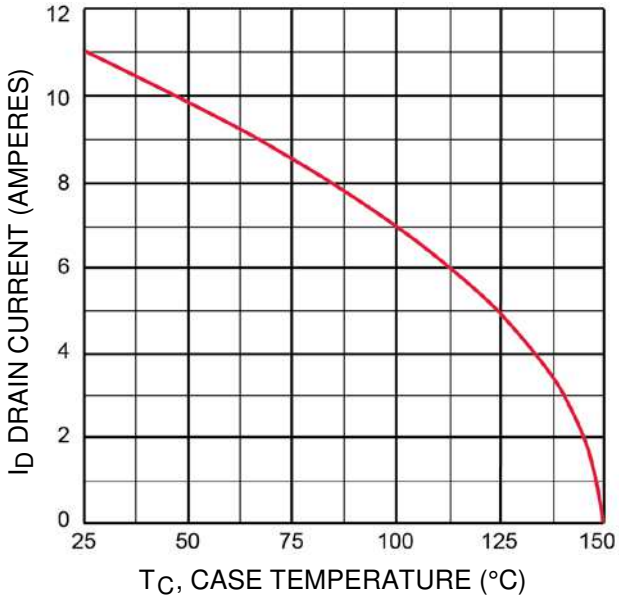


FIGURE 2
Maximum Drain Current vs Case Temperature

GRAPHS (continued)

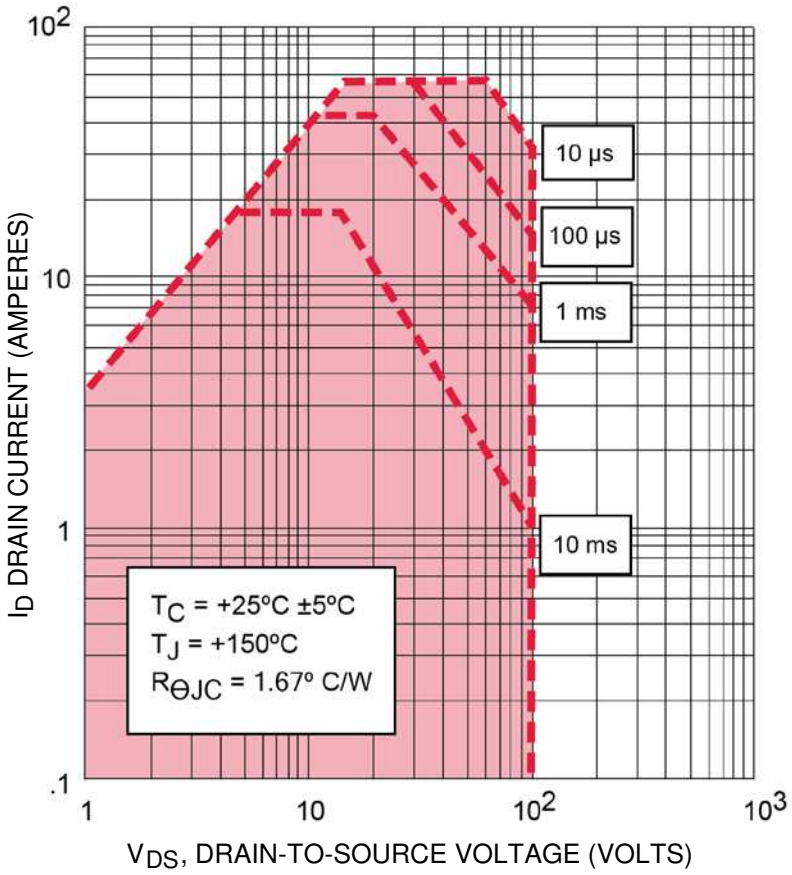
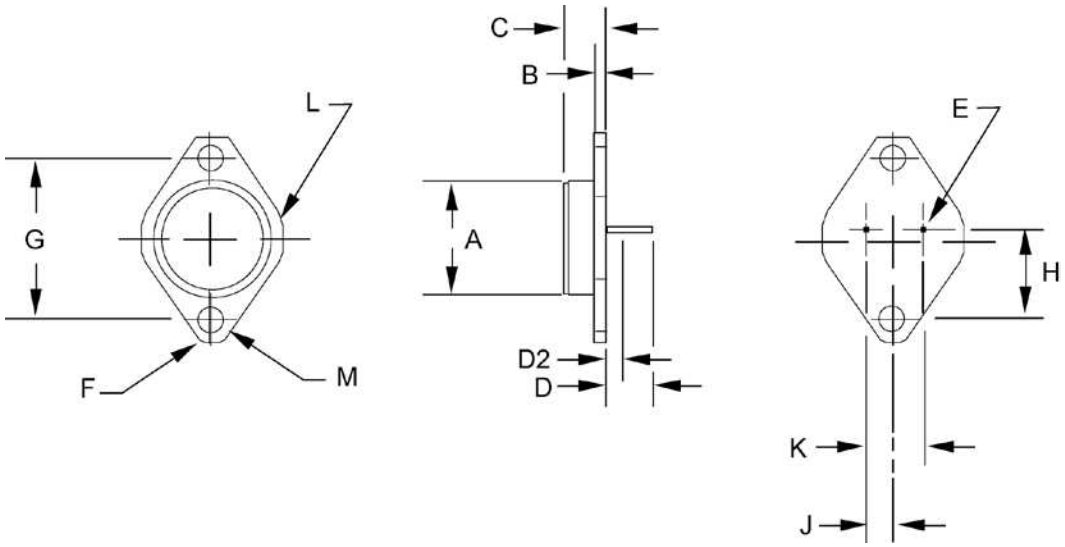


FIGURE 3
Safe Operating Area

PACKAGE DIMENSIONS



NOTE:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. These dimensions should be measured at points .050 inch (1.27 mm) and .055 inch (1.40 mm) below seating plane. When gauge is not used measurement will be made at the seating plane.
4. The seating plane of the header shall be flat within .001 inch (0.03 mm) concave to .004 inch (0.10 mm) convex inside a .930 inch (23.62 mm) diameter circle on the center of the header and flat within .001 inch (0.03 mm) concave to .006 inch (0.15 mm) convex overall.
5. Mounting holes shall be deburred on the seating plane side.
6. Drain is electrically connected to the case.
7. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

DIM	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	-	.875	-	22.23	
B	.060	.135	1.52	3.43	
C	.250	.360	6.35	9.15	3
D	.312	.500	7.92	12.70	
D2	-	.050	-	1.27	
E	.038	.043	0.97	1.10	DIA.
F	.131	.188	3.33	4.78	Radius
G	1.177	1.197	29.90	30.40	
H	.655	.675	16.64	17.15	
J	.205	.225	5.21	5.72	3
K	.420	.440	10.67	11.18	3
L	.495	.525	12.57	13.34	Radius
M	.151	.161	3.84	4.09	DIA.

SCHEMATIC