RoHS
Available on commercial versions

P-CHANNEL MOSFET

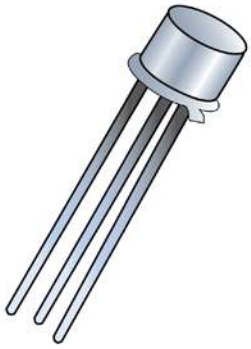
Qualified per MIL-PRF-19500/564

Qualified Levels:
JAN, JANTX, JANTXV and JANS

DESCRIPTION

This 2N6849 switching transistor is military qualified up to the JANS level for high-reliability applications. This device is also available in a low profile U surface mount package. 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-205AF (TO-39) Package

FEATURES

- JEDEC registered 2N6849 number.
- JAN, JANTX, JANTXV and JANS qualifications are available per MIL-PRF-19500/564. (See part nomenclature for all available options.)
- RoHS compliant versions available (commercial grade only).

APPLICATIONS / BENEFITS

- Lightweight top-hat design with flexible terminals offers a variety of mounting flexibility.
- Military and other high-reliability applications.

Also available in:

U-18 LCC package
(surface mount)
2N6849U

MAXIMUM RATINGS @ T_A = +25ºC 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	$R_{\theta JC}$	5.0	°C/W
Total Power Dissipation @ T_A = +25 °C @ T_C = +25 °C (1)	P_T	0.8 25	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}	-6.5	A
Drain Current, dc @ T_C = +100 ºC (2)	I_{D2}	-4.1	A
Off-State Current (Peak Total Value) (3)	I_{DM}	-25	A (pk)
Source Current	I_S	-6.5	A

Notes:
1. Derate linearly 0.2 W/°C for T_C > +25 °C.
2. The following formula derives the maximum theoretical I_D limit. I_D is also limited by package and internal wires and may be limited due to 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.

MSC – Lawrence
6 Lake Street,
Lawrence, MA 01841
Tel: 1-800-446-1158 or
(978) 620-2600
Fax: (978) 689-0803

MSC – Ireland
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

Website:
www.microsemi.com

MECHANICAL and PACKAGING

- CASE: Hermetically sealed, kovar base, nickel cap.
- TERMINALS: Tin/lead solder dip nickel plate or RoHS compliant pure tin plate (commercial grade only).
- MARKING: Part number, date code, manufacturer's ID.
- WEIGHT: Approximately 1.064 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE

JAN 2N6849 (e3)

Reliability Level
JAN = JAN Level
JANTX = JANTX Level
JANTXV = JANTXV Level
JANS = JANS 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 = -4.1 A pulsed	$r_{DS(on)1}$		0.30	Ω
Static Drain-Source On-State Resistance V_{GS} = -10 V, I_D = -6.5 A pulsed	$r_{DS(on)2}$		0.32	Ω
Static Drain-Source On-State Resistance T_J = +125°C V_{GS} = -10 V, I_D = -4.1 A pulsed	$r_{DS(on)3}$		0.54	Ω
Diode Forward Voltage V_{GS} = 0 V, I_D = -6.5 A pulsed	V_{SD}		-4.3	V

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Gate Charge:				
On-State Gate Charge V_{GS} = -10 V, I_D = -6.5 A, V_{DS} = -50 V	$Q_{g(on)}$		34.8	nC
Gate to Source Charge V_{GS} = -10 V, I_D = -6.5 A, V_{DS} = -50 V	Q_{gs}		6.8	nC
Gate to Drain Charge V_{GS} = -10 V, I_D = -6.5 A, V_{DS} = -50 V	Q_{gd}		23.1	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 = -6.5 A, V_{GS} = -10 V, R_G = 7.5 Ω, V_{DD} = -40 V	$t_{d(on)}$		60	ns
Rinse time I_D = -6.5 A, V_{GS} = -10 V, R_G = 7.5 Ω, V_{DD} = -40 V	t_r		140	ns
Turn-off delay time I_D = -6.5 A, V_{GS} = -10 V, R_G = 7.5 Ω, V_{DD} = -40 V	$t_{d(off)}$		140	ns
Fall time I_D = -6.5 A, V_{GS} = -10 V, R_G = 7.5 Ω, V_{DD} = -40 V	t_f		140	ns
Diode Reverse Recovery Time di/dt ≤ -100 A/µs, V_{DD} ≤ -50 V, I_F = -6.5 A	t_{rr}		250	ns

GRAPHS

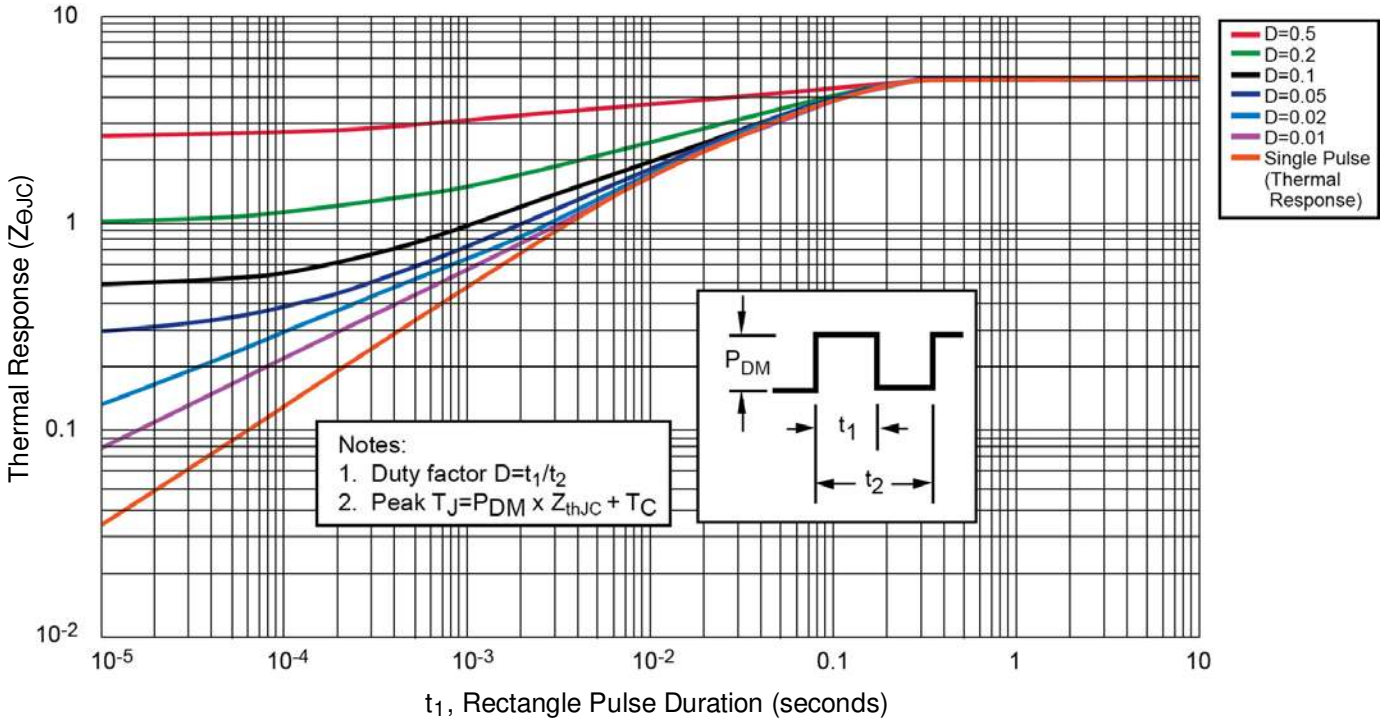


FIGURE 1 – Normalized Transient Thermal Impedance

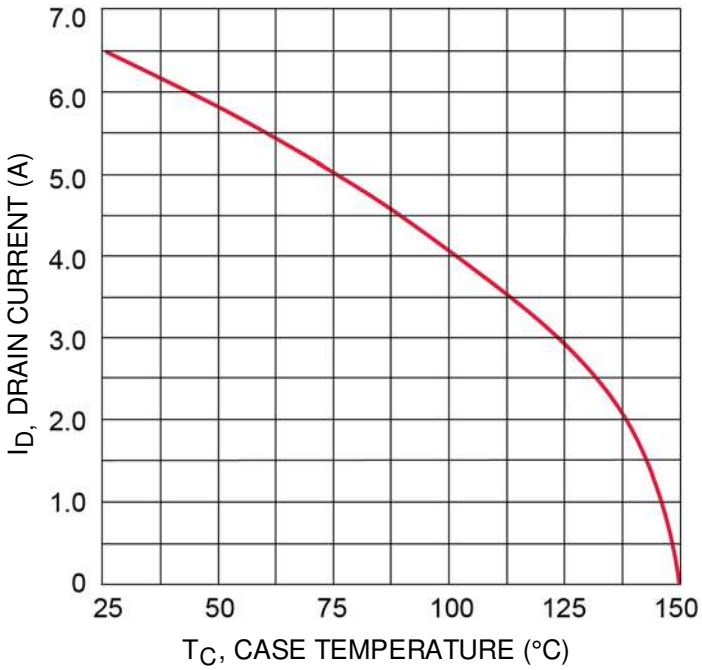


FIGURE 2 – Maximum Drain Current vs Case Temperature

GRAPHS (continued)

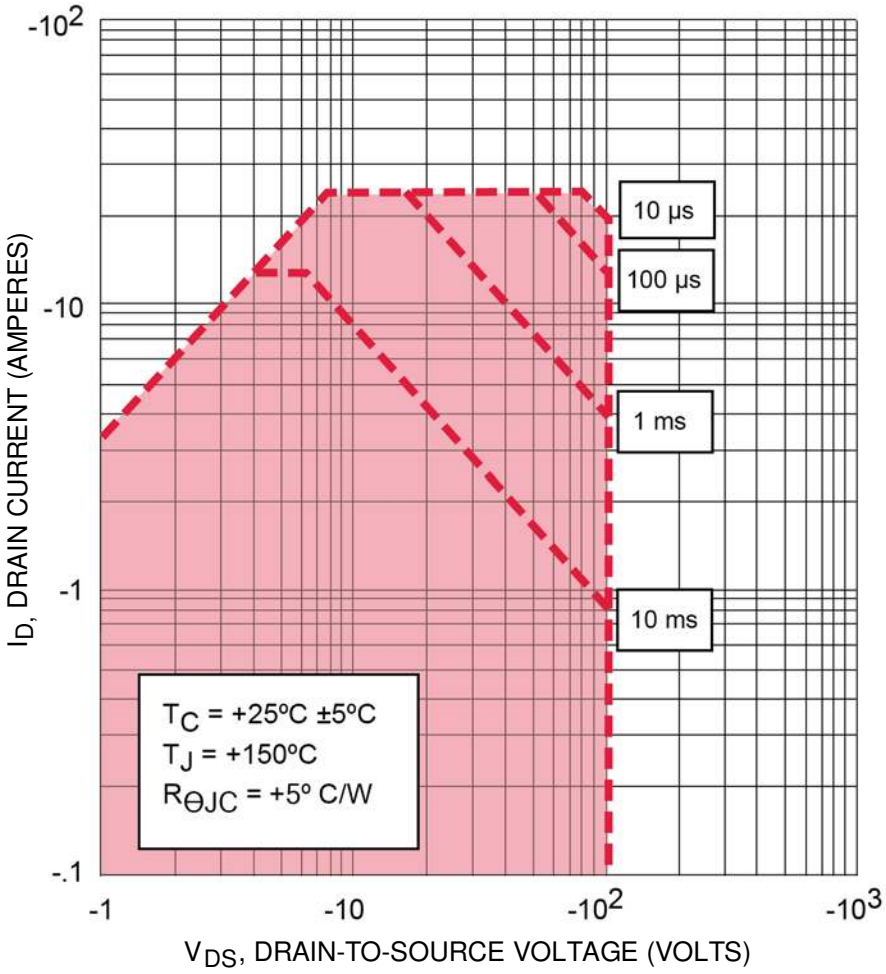
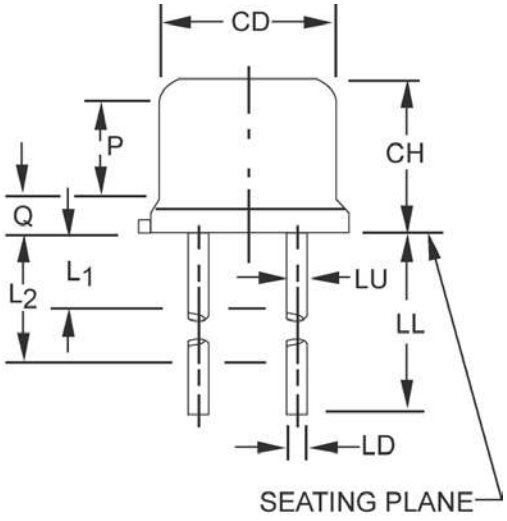
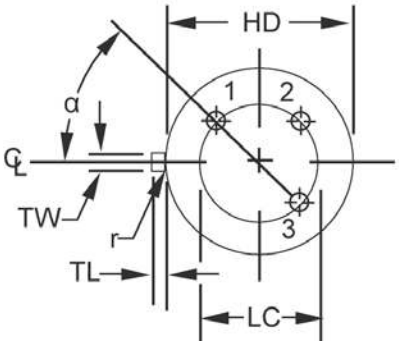


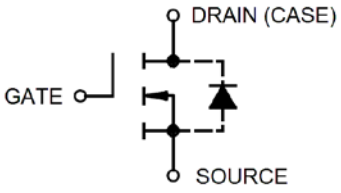
FIGURE 3 – Maximum Safe Operating Area

PACKAGE DIMENSIONS





Symbol	Dimensions				Note
	Inch		Millimeters		
	Min	Max	Min	Max	
CD	0.305	0.335	7.75	8.51	
CH	0.160	0.180	4.07	4.57	
HD	0.335	0.370	8.51	9.39	
LC	0.200 TP		5.08 TP		6
LD	0.016	0.021	0.41	0.53	7, 8
LL	0.500	0.750	12.70	19.05	7, 8
LU	0.016	0.019	0.41	0.48	7, 8
L1	-	0.050	-	1.27	7, 8
L2	0.250	-	6.35	-	7, 8
P	0.100	-	2.54	-	5
Q	-	0.050	-	1.27	4
TL	0.029	0.045	0.74	1.14	3
TW	0.028	0.034	0.72	0.86	2
r	-	0.010	-	0.25	9
α	45° TP		45° TP		6



Schematic

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Beyond radius (r) maximum, TW shall be held for a minimum length of 0.011 (0.028 mm).
3. Dimension TL measured from maximum HD.
4. Outline in this zone is not controlled.
5. Dimension CD shall not vary more than 0.010 (0.25 mm) in zone P. This zone is controlled for automatic handling.
6. Leads at gauge plane 0.054 +0.001, -0.000 (1.37 +0.03, -0.00 mm) below seating plane shall be within 0.007 (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC.
7. LU applies between L1 and L2. LD applies between L2 and LL minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
8. All three leads.
9. Radius (r) applies to both inside corners of tab.
10. Drain is electrically connected to the case.
11. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
12. Lead 1 = source, lead 2 = gate, lead 3 = drain.