

Features

- Available in JAN, JANTX, JANTXV per MIL-PRF-19500/370
- TO-3 Package
- Designed for High Voltage, High Power Switching and Amplifier Applications



Electrical Characteristics ($T_C = +25^\circ\text{C}$ unless otherwise noted)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Breakdown Voltage	$I_C = 3 \text{ A dc}$ $I_C = 1.5 \text{ A dc}, R_{BE} = 100 \Omega$ $V_{EB} = 1.5 \text{ V dc}, I_C = 1.5 \text{ A dc}$	$V_{(BR)CEO}$ $V_{(BR)CER}$ $V_{(BR)CEX}$	V dc	140 150 160	—
Collector - Emitter Cutoff Current	$V_{EB} = 1.5 \text{ V dc}, V_{CE} = 125 \text{ V dc}$	I_{CEX}	mA dc	—	0.01
Collector - Base Cutoff Current	$V_{CB} = 140 \text{ V dc}$	I_{CBO1}	mA dc	—	0.1
Emitter - Base Cutoff Current	$V_{EB} = 7.0 \text{ V dc}$	I_{EBO}	mA dc	—	1
Forward Current Transfer Ratio	$V_{CE} = 4.0 \text{ V dc}, I_C = 3 \text{ A dc}$	h_{FE1}	-	20	70
Collector - Emitter Saturation Voltage	$I_C = 3 \text{ A dc}, I_B = 300 \text{ mA dc}$	$V_{CE(SAT)}$	V dc	—	1.0
Emitter - Base Voltage (non-saturated)	$I_C = 3 \text{ A dc}, V_{CE} = 4.0 \text{ V dc}$	V_{BE}	V dc	—	1.7
Small-Signal Short-Circuit Forward-Current Transfer Ratio	$V_{CE} = 4 \text{ V dc}, I_C = 3 \text{ A dc}, f = 100 \text{ kHz}$	h_{fe}	—	1	—
Collector - Emitter Cutoff Current	$T_A = +150^\circ\text{C}$ $V_{CB} = 140 \text{ V dc}$	I_{CBO2}	mA dc	—	1.0
Forward Current Transfer Ratio	$T_A = -55^\circ\text{C}$ $V_{CE} = 4 \text{ V dc}, I_C = 3 \text{ A dc}$	h_{FE2}	-	15	—

Absolute Maximum Ratings ($T_C = +25^\circ\text{C}$ unless otherwise noted)

Ratings	Symbol	Value
Collector - Emitter Voltage	V_{CEO}	140 V dc
Collector - Emitter Voltage	V_{CER}	150 V dc
Collector - Base Voltage	V_{CBO}	160 V dc
Emitter - Base Voltage	V_{EBO}	7.0 V dc
Base Current	I_B	7.0 A dc
Collector Current	I_C	10 A dc
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ ¹	P_T	6.0 W
Total Power Dissipation @ $T_C = +25^\circ\text{C}$ ²	P_T	117 W
Operating & Storage Temperature Range	T_J, T_{STG}	-65°C to +200°C

Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case ³	$R_{\theta JC}$	1.5°C/W

- Derate linearly 34.2 mW/°C above $T_A = +25^\circ\text{C}$.
- See figure 2 of MIL-PRF-19500/370 for temperature-power derating curves.
- See figure 3 of MIL-PRF-19500/370 for transient thermal impedance graph.

Safe Operating Area

DC Tests: $T_C = +25^\circ\text{C}$, 1 Cycle, $t = 1.0$ s

Test 1: $I_C = 10$ A dc, $V_{CE} = 11.7$ V dc

Test 2: $I_C = 1.5$ A dc, $V_{CE} = 78$ V dc

Test 3: $I_C = 0.5$ A dc, $V_{CE} = 125$ V dc

Outline Drawing (TO-3)

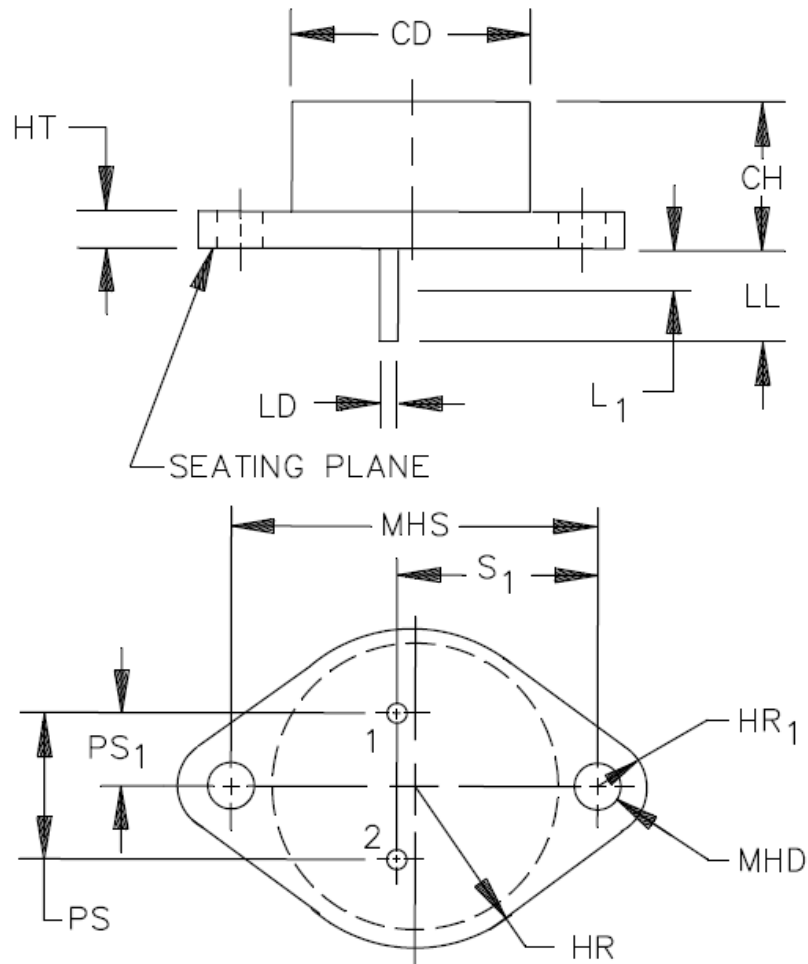


FIGURE 1. Physical dimensions (TO-204AA, formerly TO-3).

Outline Drawing (TO-3)

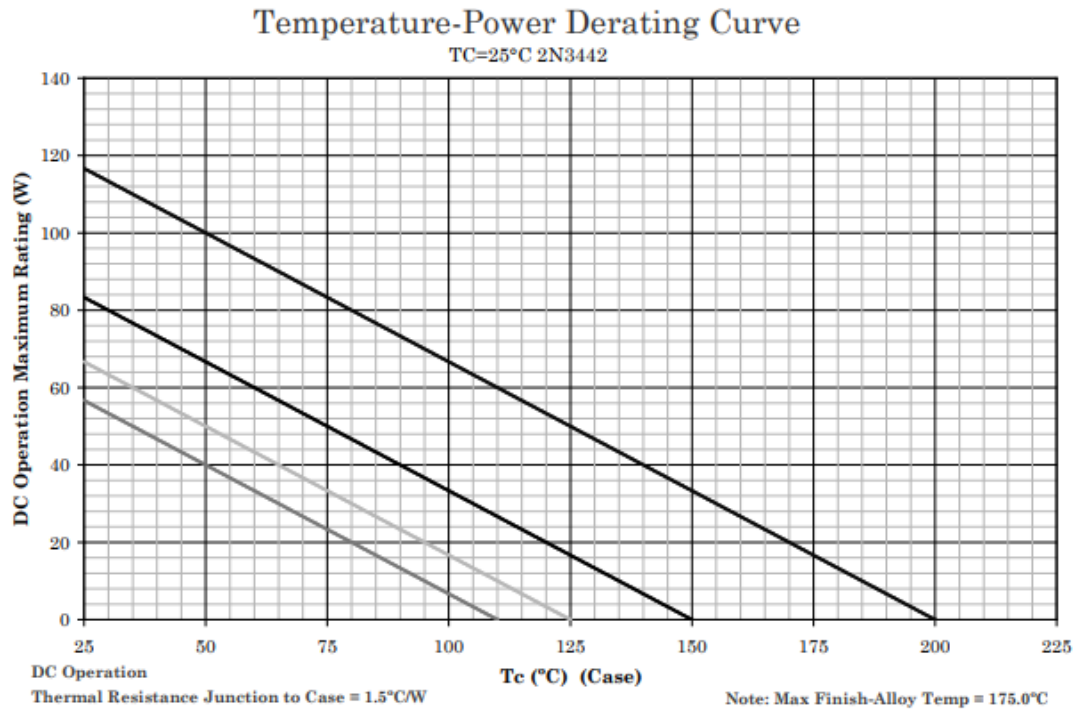
Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.875		22.23	3
CH	.250	.450	6.35	11.43	
HR	.495	.525	12.57	13.34	
HR ₁	.131	.188	3.33	4.78	4
HT	.060	.135	1.52	3.43	
L ₁		.050		1.27	5, 6
LD	.038	.043	0.97	1.09	5, 6
LL	.312	.500	7.92	12.70	5
MHD	.151	.161	3.84	4.09	4
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	7
PS ₁	.205	.225	5.21	5.72	7
S ₁	.655	.675	16.64	17.15	7

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Terminal 1 is the emitter; terminal 2 is the base; and the collector shall be electrically connected to the case.
3. Body contour is optional within zone defined by dimension CD.
4. Applies to both ends.
5. Applies to both terminals.
6. Dimension LD applies between L₁ and LL. Lead diameter shall not exceed twice dimension LD within dimension L₁. Diameter is uncontrolled in dimension L₁.
7. These dimensions shall be measured at points .050 inch (1.27 mm) to .055 inch (1.4 mm) below the seating plane. When gauge is not used, measurement will be made at the seating plane.
8. 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.
9. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 1. Physical dimensions ((TO-204AA, formerly TO-3) - Continued.

Temperature-Power Derating Curve

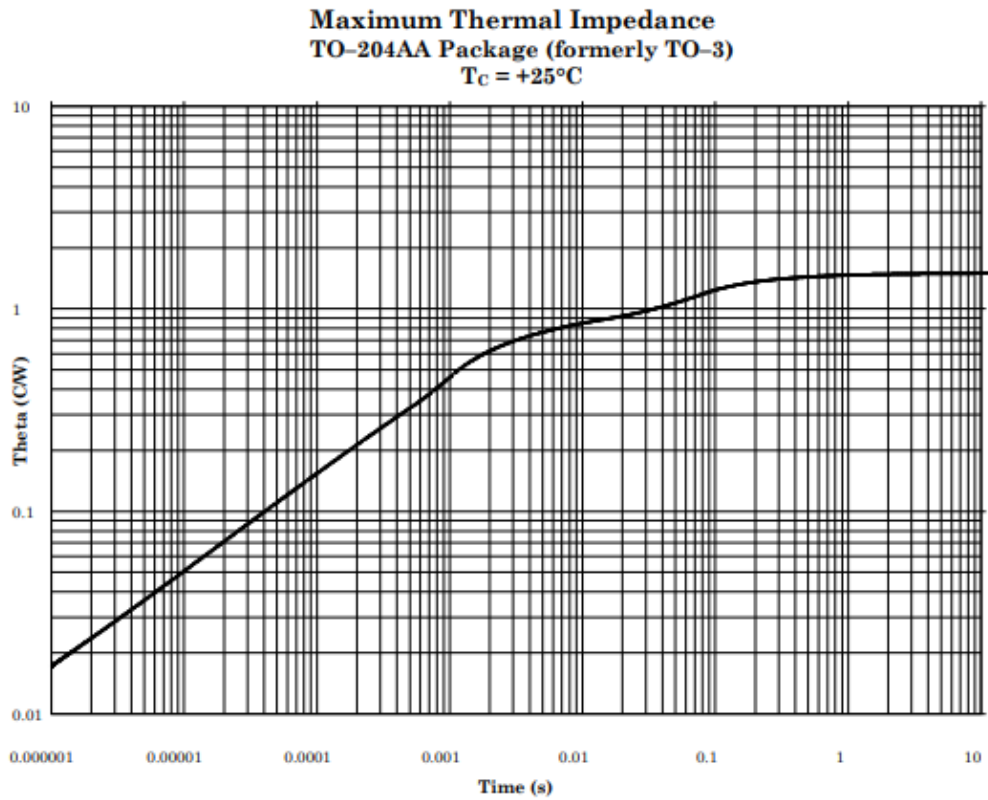


NOTES:

1. All devices are capable of operating at $\leq T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum T_J allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J \leq +200^\circ\text{C}$) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at $T_J \leq +150^\circ\text{C}$, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at $T_J \leq +125^\circ\text{C}$, and $+110^\circ\text{C}$ to show power rating where most users want to limit T_J in their application.

FIGURE 2. Temperature-power derating graph for device type 2N3442 (TO-204AA, formerly TO-3).

Thermal Impedance Curve



T_C = +25°C. Thermal resistance = 1.5°C/W.

FIGURE 3. Transient thermal impedance graph for device type 2N3442.

VPT COMPONENTS. ALL RIGHTS RESERVED.

Information in this document is provided in connection with VPT Components products. These materials are provided by VPT Components as a service to its customers and may be used for informational purposes only. Except as provided in VPT Components Terms and Conditions of Sale for such products or in any separate agreement related to this document, VPT Components assumes no liability whatsoever. VPT Components assumes no responsibility for errors or omissions in these materials. VPT Components may make changes to specifications and product descriptions at any time, without notice. VPT Components makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF VPT COMPONENTS PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. VPT COMPONENTS FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. VPT COMPONENTS SHALL NOT BE LIABLE FOR ANY SPECIAL, IN-DIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

VPT Components products are not intended for use in medical, lifesaving or life sustaining applications. VPT Components customers using or selling VPT Components products for use in such applications do so at their own risk and agree to fully indemnify VPT Components for any damages resulting from such improper use or sale.