

2N6437 & 2N6438



PNP Power Silicon Transistor

Rev. V1

Features

- Available in JAN, JANTX and JANTXV per MIL-PRF-19500/508
- TO-3 Package
- Designed for Power Amplifier and Medium Speed Switching Applications



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

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Breakdown Voltage	$I_C = -50 \text{ mA dc}$, 2N6437 $I_C = -50 \text{ mA dc}$, 2N6438	$V_{(BR)CEO}$	V dc	-100 -120	—
Collector - Emitter Cutoff Current	$V_{CE} = -50 \text{ V dc}$, 2N6437 $V_{CE} = -60 \text{ V dc}$, 2N6438	I_{CEO}	$\mu\text{A dc}$	—	-50
Collector - Emitter Cutoff Current	$V_{CE} = -100 \text{ V dc}$, $V_{BE} = +1.5 \text{ V dc}$, 2N6437 $V_{CE} = -120 \text{ V dc}$, $V_{BE} = +1.5 \text{ V dc}$, 2N6438	I_{CEX1}	$\mu\text{A dc}$	—	-5.0
Collector - Base Cutoff Current	$V_{CB} = -120 \text{ V dc}$, 2N6437 $V_{CB} = -140 \text{ V dc}$, 2N6438	I_{CBO}	$\mu\text{A dc}$	—	-10
Emitter - Base Cutoff Current	$V_{EB} = -6 \text{ V dc}$	I_{EBO}	$\mu\text{A dc}$	—	-100
Base - Emitter Voltage (saturated)	$I_C = -10 \text{ A dc}$, $I_B = -1.0 \text{ A dc}$	$V_{BE(sat)}$	V dc	—	-1.8
Collector-Emitter Voltage (saturated)	$I_C = -10 \text{ A dc}$, $I_B = -1.0 \text{ A dc}$ $I_C = -25 \text{ A dc}$, $I_B = -2.5 \text{ A dc}$	$V_{CE(sat)1}$ $V_{CE(sat)2}$	V dc	—	-1.0 -1.8
Forward Current Transfer Ratio	$V_{CE} = -2 \text{ V dc}$, $I_C = -5 \text{ A dc}$ $V_{CE} = -2 \text{ V dc}$, $I_C = -10 \text{ A dc}$ $V_{CE} = -2 \text{ V dc}$, $I_C = -25 \text{ A dc}$	h_{FE1} h_{FE2} h_{FE3}	-	40 30 12	120
Collector - Emitter Cutoff Current	$T_A = +150^\circ\text{C}$ $V_{CE} = -100 \text{ V dc}$, $V_{BE} = +1.5 \text{ V dc}$, 2N6437 $V_{CE} = -120 \text{ V dc}$, $V_{BE} = +1.5 \text{ V dc}$, 2N6438	I_{CEX2}	mA dc	—	-1.0
Forward - Current Transfer Ratio	$T_A = -55^\circ\text{C}$ $V_{CE} = -2 \text{ V dc}$, $I_C = -10 \text{ A dc}$	h_{FE4}		10	

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

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Turn-On Time	$V_{CC} = -80\text{ V dc}$, $I_C = -10\text{ A dc}$, $I_{B1} = -1.0\text{ A dc}$	t_{on}	μs	—	0.5
Turn-Off Time	$V_{CC} = -80\text{ V dc}$, $I_C = -10\text{ A dc}$, $I_{B1} = I_{B2} = -1.0\text{ A dc}$	t_{off}	μs	—	1.25
Storage Time	$V_{CC} = -80\text{ V dc}$, $I_C = -10\text{ A dc}$, $I_{B1} = I_{B2} = -1.0\text{ A dc}$	t_s	μs	—	1.0

Dynamic Characteristics

Magnitude of Common-Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio	$V_{CE} = -10\text{ V dc}$, $I_C = -1\text{ A dc}$, $f = 10\text{ MHz}$	$ h_{fe} $	-	4.0	12
Output Capacitance (Open Circuit)	$V_{CB} = -10\text{ V dc}$; $I_E = 0$, $0.1\text{ MHz} \leq f \leq 1\text{ MHz}$	C_{obo}	pF	—	700

Safe Operating Area Continuous

DC Tests:	$T_C = +25^\circ\text{C}$, 1 Cycle, $t = 1.0\text{ s}$
Test 1:	$V_{CE} = -8\text{ V dc}$, $I_C = -25\text{ A dc}$ (Both device types)
Test 2:	$V_{CE} = -14\text{ V dc}$, $I_C = -14\text{ A dc}$ (Both device types)
Test 3:	$V_{CE} = -100\text{ V dc}$, $I_C = -100\text{ mA dc}$ 2N6437 $V_{CE} = -120\text{ Vdc}$, $I_C = -83\text{ mA dc}$ 2N6438

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

Ratings	Symbol	Value
Collector - Emitter Voltage 2N6437 2N6438	V_{CEO}	-100 V dc -120 V dc
Collector - Base Voltage 2N6437 2N6438	V_{CBO}	-120 V dc -140 V dc
Emitter - Base Voltage	V_{EBO}	-6 V dc
Base Current	I_B	-10 A dc
Collector Current	I_C	-25 A dc
Total Power Dissipation $T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	$P_T^{(1)}$	200 W 112 W
Operating & Storage Temperature Range	T_{OP}, T_{STG}	-65°C to $+200^\circ\text{C}$

Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.875°C/W

1. Between $T_C = +25^\circ\text{C}$ and $T_C = +200^\circ\text{C}$, linear derating factor (average) = $1.14 \text{ W/}^\circ\text{C}$.

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Outline Drawing (TO-3)

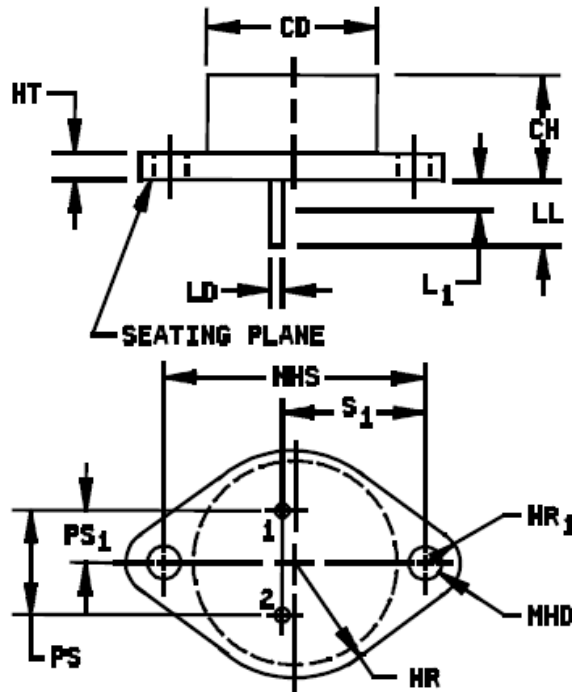


FIGURE 1. Physical dimensions (TO-204 similar to TO-3).

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Outline Drawing (TO-3)

Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.875		22.23	
CH	.250	.360	6.35	9.14	
HR	.495	.525	12.57	13.33	4
HR ₁	.131	.188	3.33	4.78	4
HT	.060	.135	1.52	3.43	
LD	.038	.043	0.97	1.09	4, 6
LL	.312	.500	7.92	12.7	
L ₁		.050		1.27	6
MHD	.151	1.65	3.83	41.91	4
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	3
PS ₁	.205	.225	5.21	5.72	3
S ₁	.655	.675	16.64	17.15	
Notes	1, 2, 5, 7		1, 2, 5, 7		

NOTES:

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) +.005 inch (0.13 mm) -.000 inch (0.00 mm) below seating plane. Measurement will be made at the seating plane.
4. Two places.
5. 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.
6. Lead diameter shall not exceed twice LD within L₁.
7. Lead designation, shall be as follows:
8. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

Lead number	Bipolar transistor
1	Emitter
2	Base
Case	Collector

FIGURE 1. Physical dimensions (TO-204 similar to TO-3) - Continued.

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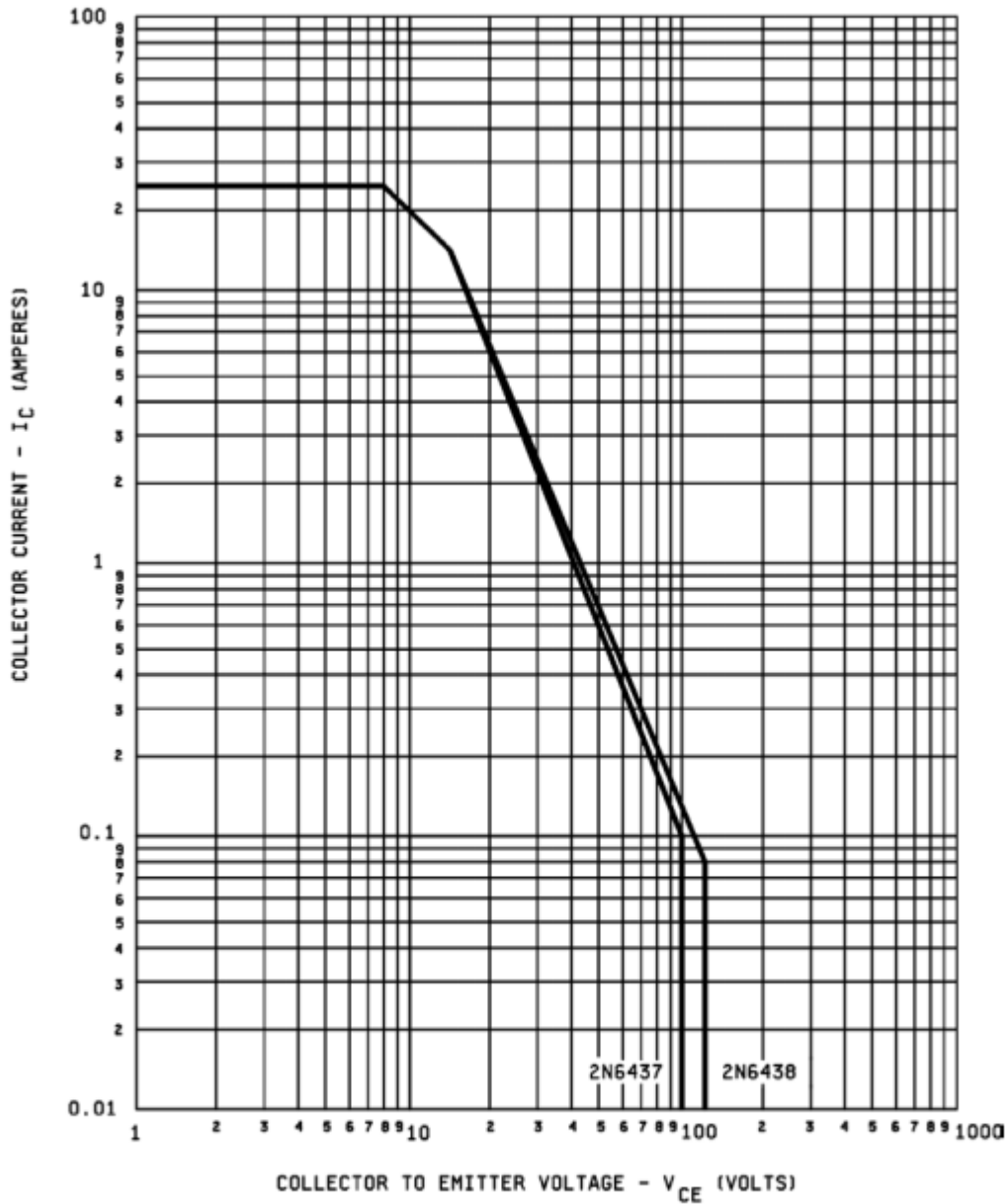


FIGURE 3. Maximum safe operating area (continuous dc).

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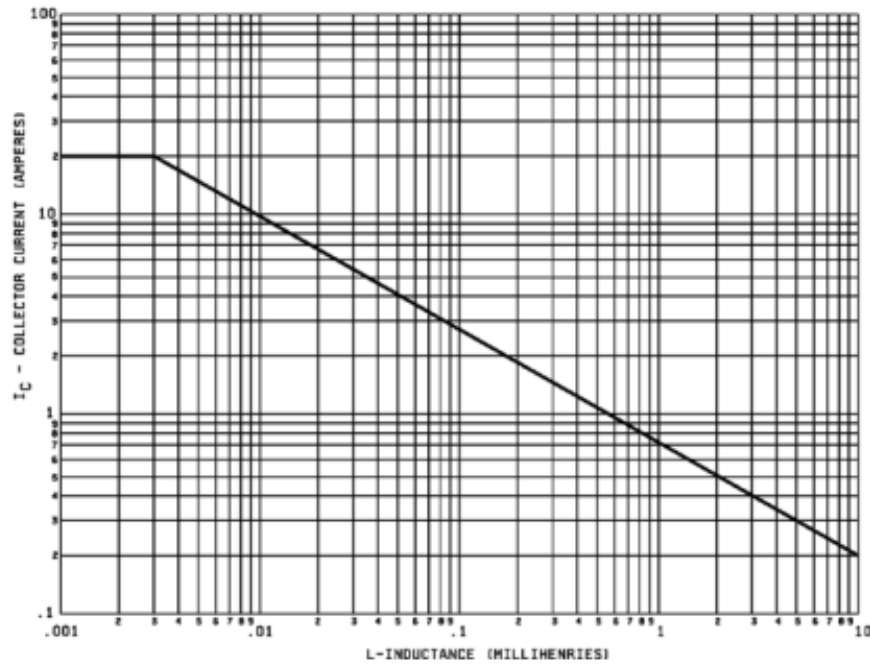


FIGURE 4 Safe operating area for switching between saturation and cutoff (unclamped inductive load).

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