

2N3485A, 2N3486A



PNP Silicon Switching Transistor

Rev. V2

Features

- Available in JAN, JANTX and JANTXV per MIL-PRF-19500/392
- TO-46 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	$I_C = -10 \text{ mA dc}$	$V_{(BR)CEO}$	V dc	-60	—
Collector - Base Cutoff Current	$V_{CB} = -60 \text{ V dc}$	I_{CBO1}	$\mu\text{A dc}$	—	-10
Emitter - Base Cutoff Current	$V_{EB} = -5 \text{ V dc}$	I_{EBO1}	$\mu\text{A dc}$	—	-10
Collector - Base Cutoff Current	$V_{CB} = -50 \text{ V dc}$	I_{CBO2}	nA dc	—	-10
Emitter - Base Cutoff Current	$V_{EB} = -3.5 \text{ V dc}$	I_{EBO2}	nA dc	—	-50
Base - Emitter Voltage (saturated)	$I_C = -150 \text{ mA dc}; I_B = -15 \text{ mA dc}$ $I_C = -500 \text{ mA dc}; I_B = -50 \text{ mA dc}$	$V_{BE(sat)1}$ $V_{BE(sat)2}$	V dc	—	-1.3 -2.6
Collector-Emitter Voltage (saturated)	$I_C = -150 \text{ mA dc}; I_B = -15 \text{ mA dc}$ $I_C = -500 \text{ mA dc}; I_B = -50 \text{ mA dc}$	$V_{CE(sat)1}$ $V_{CE(sat)2}$	V dc	—	-0.4 -1.6
Forward Current Transfer Ratio	$V_{CE} = -10 \text{ V dc}; I_C = -0.1 \text{ mA dc}$ 2N3485A 2N3486A	h_{FE1}	-	40 75	
	$V_{CE} = -10 \text{ V dc}; I_C = -1.0 \text{ mA dc}$ 2N3485A 2N3486A	h_{FE2}	-	40 100	
	$V_{CE} = -10 \text{ V dc}; I_C = -10 \text{ mA dc}$ 2N3485A 2N3486A	h_{FE3}	-	40 100	
	$V_{CE} = -10 \text{ V dc}; I_C = -150 \text{ mA dc}$ 2N3485A 2N3486A	h_{FE4}	-	40 100	120 300
	$V_{CE} = -10 \text{ V dc}; I_C = -500 \text{ mA dc}$ 2N3485A 2N3486A	h_{FE5}	-	40 50	

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

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Cutoff Current	$T_A = +150^\circ\text{C}$ $V_{CB} = -50\text{ V dc}$	I_{CBO3}	$\mu\text{A dc}$	—	-10
Forward - Current Transfer Ratio	$T_A = -55^\circ\text{C}$ $V_{CE} = -10\text{ V dc}; I_C = -1.0\text{ mA dc}$ 2N3485A 2N3486A	h_{FE6}		20 40	
Dynamic Characteristics					
Small Signal Short Circuit Forward-Current Transfer Ratio	$V_{CE} = -10\text{ V dc}; I_C = -1\text{ mA dc}; f = 1\text{ kHz}$ 2N3485A 2N3486A	h_{fe}		40 100	
Open Circuit Output Capacitance	$V_{CB} = -10\text{ V dc}; I_E = -0; 100\text{ kHz} \leq f \leq 1\text{ MHz}$	C_{obo}	pF	—	8
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio	$V_{CE} = -20\text{ V dc}; I_C = -50\text{ mA dc}; f = 100\text{ MHz}$	$ h_{fe} $	-	2.0	10
Input Capacitance (Output Open-Circuited)	$V_{EB} = -2.0\text{ V dc}; I_C = -0; 100\text{ kHz} \leq f \leq 1\text{ MHz}$	C_{ibo}	pF	—	30
Parameter	Test Conditions	Symbol	Units	Min.	Max.
Turn-On Time	See Figure 6 of MIL-PRF-19500/392	t_{on}	ns	—	45
Turn-Off Time	See Figure 7 of MIL-PRF-19500/392 2N3485A 2N3486A	t_{off}	ns	—	175 200
Pulse Response (non-saturated)	See Figure 8 of MIL-PRF-19500/392	$t_{on} + t_{off}$	ns	—	18

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

Ratings	Symbol	Value
Collector - Emitter Voltage	V_{CEO}	-60 V dc
Collector - Base Voltage	V_{CBO}	-60 V dc
Emitter - Base Voltage	V_{EBO}	-5 V dc
Collector Current	I_C	-600 mA dc
Total Power Dissipation $T_A = +25^\circ\text{C}$ $T_C = +25^\circ\text{C}$	$P_T^{(1)(2)}$	0.5 W 2.0 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	$R_{\theta JC}$	80°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	325°C/W

1. For derate see figure 2 and figure 3 of MIL-PRF-19500/392
2. For thermal impedance see figure 4 and figure 5 of MIL-PRF-19500/392

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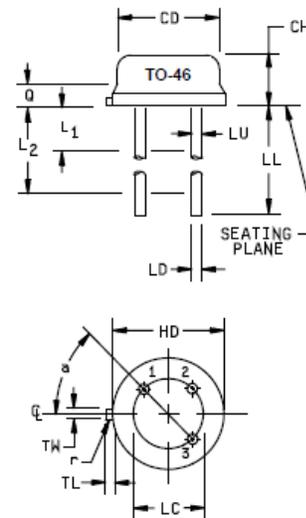


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Outline Drawing (TO-46)

Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.178	.195	4.52	4.95	
CH	.065	.085	1.65	2.16	
HD	.209	.230	5.31	5.84	
LC	.100 TP		2.54 TP		5
LD	.016	.021	0.41	0.53	
LL	.500	1.750	12.70	44.45	6
LU	.016	.019	0.41	0.48	6
L ₁		.050		1.27	6
L ₂	.250		6.35		6
Q		.040		1.02	3
TL	.028	.048	0.71	1.22	8
TW	.036	.046	0.91	1.17	4
r		.010		0.25	9
α	45° TP		45° TP		5

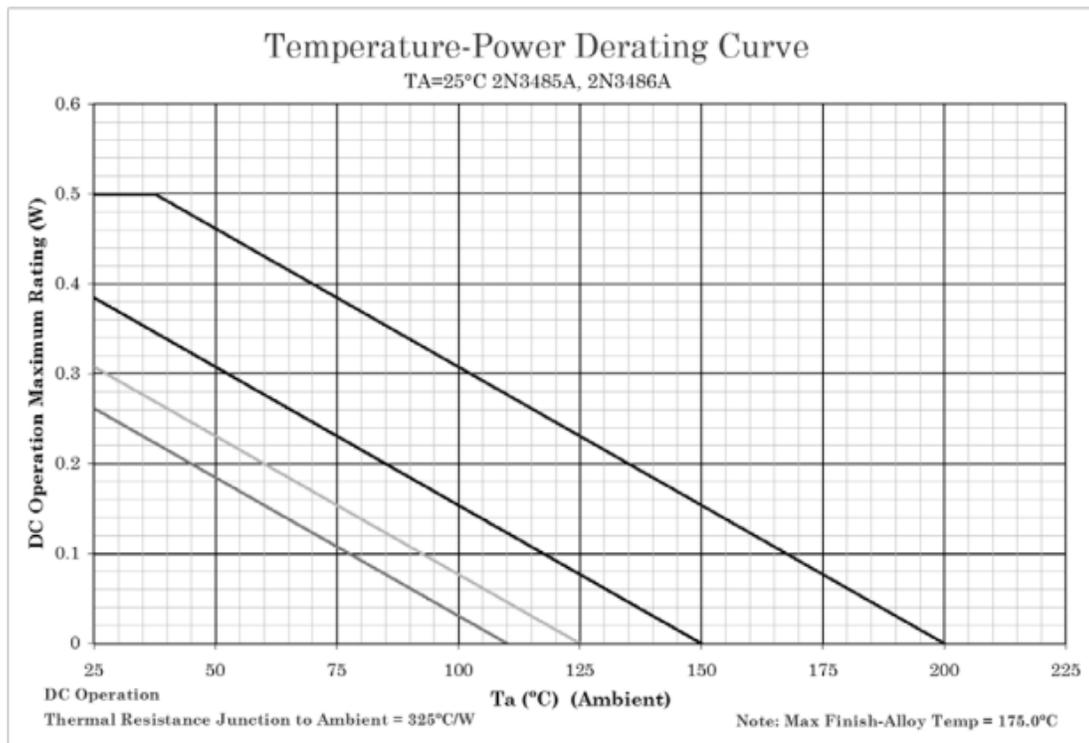


NOTES:

1. Dimensions are in inches. Lead 1 is emitter, lead 2 is base, and lead 3 is collector.
2. Millimeters are given for general information only.
3. Symbol TL is measured from HD maximum.
4. Details of outline in this zone are optional.
5. Leads at gauge plane .054 inch (1.37 mm) +.001 inch (0.03 mm) -.000 inch (0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of TP relative to tab. Device may be measured by direct methods or by gauge.
6. Symbol LU applies between L₁ and L₂. Dimension LD applies between L₂ and LL minimum.
7. Lead number three is electrically connected to case.
8. Beyond r maximum, TW shall be held for a minimum length of .011 inch (0.28 mm).
9. Symbol r applied to both inside corners of tab.
10. In accordance with ANSI Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 1. Physical dimensions – TO-46.

Temperature-Power Derating Curve

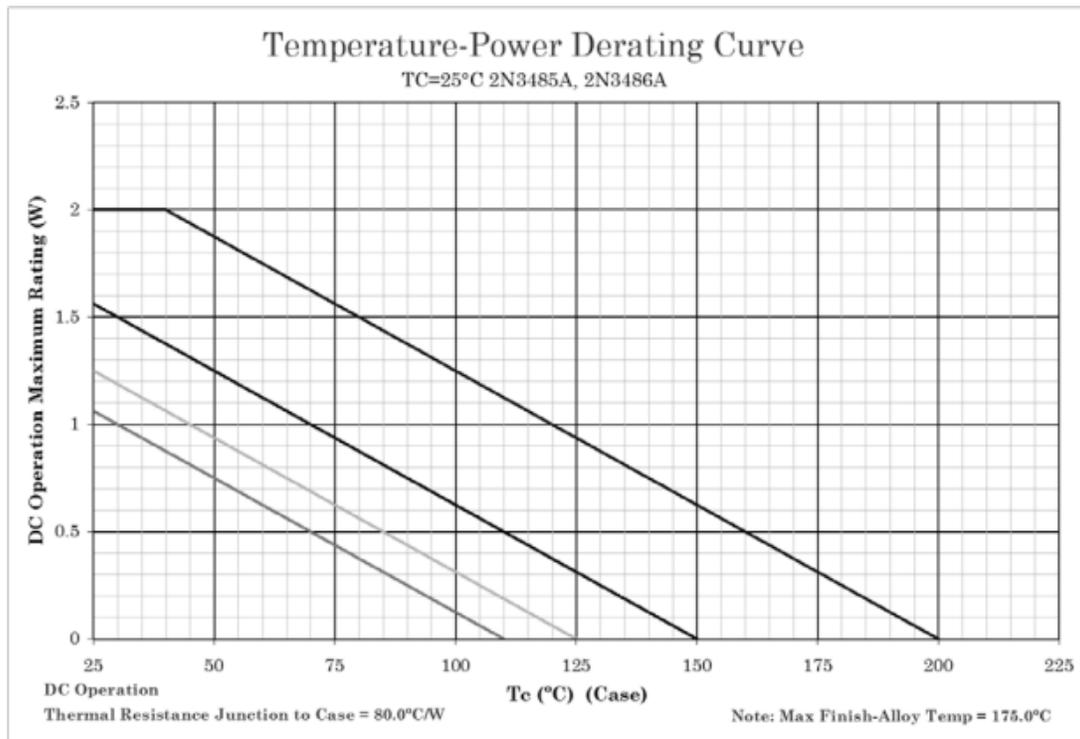


NOTES:

1. This is the true inverse of the worst case thermal resistance value. 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°C to show power rating where most users want to limit T_J in their application.

FIGURE 2. Derating for 2N3485A, and 2N3486A ($R_{\theta JA}$) (TO-46).

Temperature-Power Derating Curve



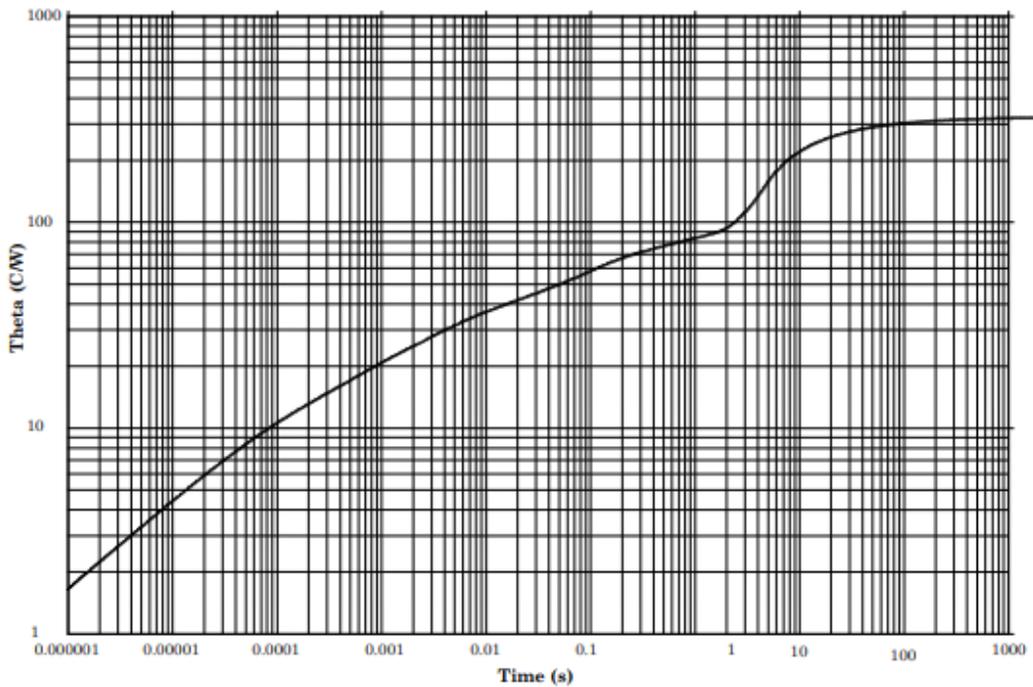
NOTES:

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4. Derate design curves chosen at $T_J \leq 125^\circ\text{C}$, and 110°C to show power rating where most users want to limit T_J in their application.

FIGURE 3. Derating for 2N3485A, and 2N3486A ($R_{\theta JC}$) (TO-46).

Thermal Impedance Curve

Maximum Thermal Impedance

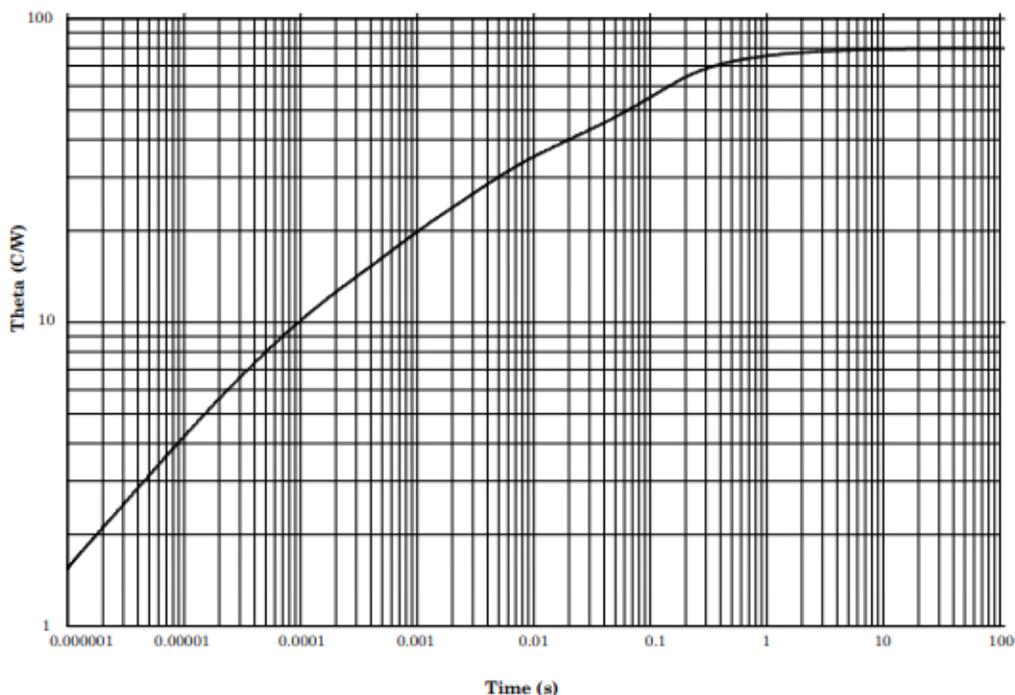


$T_A = +25^\circ\text{C}$ at $P_{diss} = 500\text{mW}$ (Thermal Resistance $R_{\theta JA} = 325^\circ\text{C/W}$ at 500mW)

FIGURE 4. Thermal impedance graph ($R_{\theta JA}$) for 2N3485A, and 2N3486A (TO-46).

Thermal Impedance Curve

Maximum Thermal Impedance



$T_c = +25^{\circ}\text{C}$. thermal resistance $R_{\theta JC} = 80\text{C/W}$ at $T_c +25^{\circ}\text{C}$.

FIGURE 5. Thermal impedance graph ($R_{\theta JC}$) for 2N3485A, and 2N3486A (TO-46).

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