2N3740 & 2N3741

PNP Power Silicon Transistor

Rev. V4

Features

- Available in JAN, JANTX, JANTXV, JANS and JANSR per MIL-PRF-19500/441
- Radiation Tolerant Levels M, D, P, L and R
- TO-66 Package
- Designed for Power Amplifier and Medium Speed Switching Applications

Electrical Characteristics (T_A = +25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Off Characteristics					
Collector - Emitter Breakdown Voltage	I_C = -100 mA dc, 2N3740 I_C = -100 mA dc, 2N3741	$V_{(BR)CEO}$	V dc	-60 -80	—
Collector - Emitter Cutoff Current	V_{CE} = -40 V dc, 2N3740 V_{CE} = -60 V dc, 2N3741	I_{CEO}	µA dc	—	-10
Collector - Emitter Cutoff Current	V_{CE} = -60 V dc, V_{BE} = 1.5 V dc, 2N3740 V_{CE} = -80 V dc, V_{BE} = 1.5 V dc, 2N3741	I_{CEX}	nA dc	—	-300
Collector - Base Cutoff Current	V_{CE} = -60 V dc, 2N3740 V_{CE} = -80 V dc, 2N3741	I_{CBO}	nA dc	—	-100
Emitter - Base Cutoff Current	V_{EB} = -7 V dc	I_{EBO}	nA dc	—	-100
On Characteristics[1]					
Forward Current Transfer Ratio	I_C = -100 mA dc, V_{CE} = -1 V dc I_C = -250 mA dc, V_{CE} = -1 V dc I_C = -500 mA dc, V_{CE} = -1 V dc I_C = -1 A dc, V_{CE} = -1 V dc I_C = -4 A dc, V_{CE} = -5 V dc	h_{FE}	-	40 30 20 10 3	120
Collector - Emitter Saturation Voltage	I_C = -250 mA dc, I_B = -25 mA dc I_C = -1 A dc, I_B = -125 mA dc	$V_{CE(SAT)1}$ $V_{CE(SAT)2}$	V dc	—	-0.4 -0.6
Base - Emitter Voltage	I_C = -250 mA dc, V_{CE} = -1 Vdc	V_{BE}	V dc	—	-1.0
Dynamic Characteristics					
Small-Signal Short-Circuit Forward Current Transfer Ratio	I_C = -100 mA dc; V_{CE} = -10 V dc; f = 5 MHz	$\lvert h_{FE} \rvert$	-	1	12
Small-Signal Short-Circuit Forward Current Transfer Ratio	I_C = -50 mA dc; V_{CE} = -10 V dc; f = 1 kHz	h_{FE}	-	25	250
Output Capacitance	V_{CB} = -10 V dc; I_E = 0; 100 kHz ≤ f ≤ 1 MHz	C_{obo}	pF	—	100
Switching Characteristics					
Turn-On Time	I_C = -1 A dc; I_{B1} = -0.1 A dc	t_{on}	ns	—	400
Turn-Off Time	I_C = -1 A dc; I_{B1} = I_{B2} = -0.1 A dc	t_{off}	µs	—	1

1. Pulse Test: Pulse Width = 300 µs, Duty Cycle ≤2.0%.

Electrical Characteristics (T_A = +25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Cutoff Current	T_A = +150°C V_{CE} = -60 V dc, 2N3740 V_{CE} = -80 V dc, 2N3741	I_{CEX2}	µA dc	—	-25
Forward Current Transfer Ratio	T_A = -55°C V_{CE} = -1 V dc; I_C = -250 mA dc	h_{FE6}		10	—
Safe Operating Area					
DC Tests:	T_C = +25°C, I Cycle, t = 1.0 s				
Test 1:	V_{CE} = -6.25 V dc, I_C = -4.0 A dc				
Test 2:	V_{CE} = -20 Vdc, I_C = -1.25 A dc				
Test 3:	V_{CE} = -50 Vdc, I_C = -150 A dc, 2N3740 V_{CE} = -65 Vdc, I_C = -150 A dc, 2N3741				

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Absolute Maximum Ratings (T_A = +25°C unless otherwise specified)

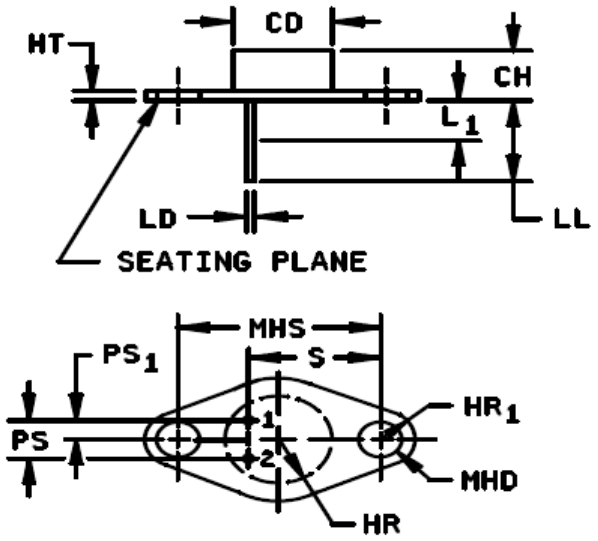
Ratings	Symbol	Value
Collector - Emitter Voltage 2N3740 2N3741	V_{CEO}	 -60 V dc -80 V dc
Collector - Base Voltage 2N3740 2N3741	V_{CBO}	 -60 V dc -80 V dc
Emitter - Base Voltage	V_{EBO}	-7 V dc
Base Current	I_B	-2 A dc
Collector Current	I_C	-4 A dc
Total Power Dissipation T_C = +25°C T_A = +25°C T_C = +100°C	P_T (1)	 25 W 3 W 14 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	$R_{\theta JC}$ (2)	7°C/W

1. Derate linearly @ 0.428 mW / °C for T_C >+25°C.
2. See figures 6 and 7 of MIL-PRF-19500/441 for transient thermal impedance graphs.

Outline Drawing (TO-66)

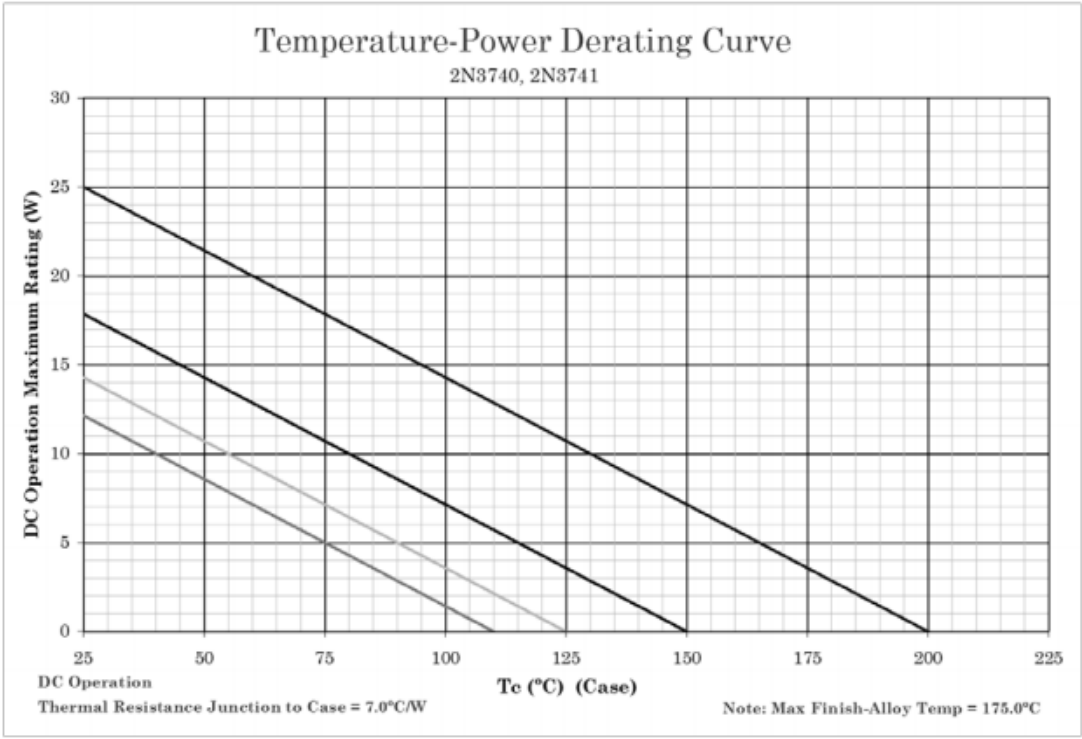


Symbol	Dimensions				Notes	Symbol	Dimensions				Notes
	Inches		Millimeter				Inches		Millimeters		
	Min	Max	Min	Max			Min	Max	Min	Max	
CD		.620		15.75	9	LL	.360	.500	9.14	12.70	4, 8
CH	.250	.340	6.35	8.64		L_1		.050		1.27	4, 8
HT	.050	.075	1.27	1.91		MHD	.142	.152	3.61	3.86	6, 9
HR		.350		8.89		MHS	.958	.962	24.33	24.43	
HR_1	.115	.145	2.92	3.68	5	PS	.190	.210	4.83	5.33	3
LD	.028	.034	0.71	0.86	4, 8, 9	PS_1	.093	.107	2.36	2.72	3
						S	.570	.590	14.48	14.99	3

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. These dimensions should be measured at points .050 to .055 inch (1.27 to 1.40 mm) below seating plane. When gauge is not used, measurement will be made at seating plane.
4. Both terminals.
5. At both ends.
6. Two holes.
7. The collector shall be electrically connected to the case.
8. LD applies between L1 and LL. Lead diameter shall not exceed twice LD within L1.
9. In accordance with ASME Y14.5M, diameters are equivalent to ϕ symbology.
10. Lead 1 is the emitter, lead 2 is the base, collector is the case.

FIGURE 1. Physical dimensions, TO-66 (2N3740, 2N3741).

Temperature-Power Derating Curve



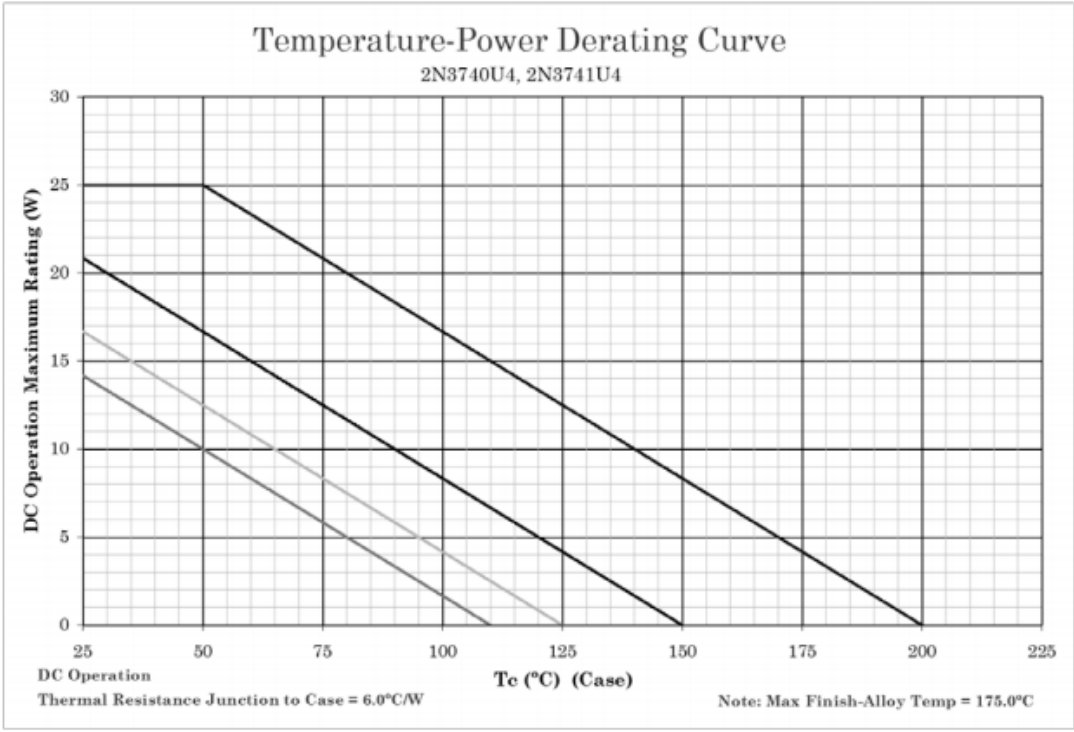
$R_{\theta JC}$ = 7°C/W

NOTES:

1. All devices are capable of operating at ≤ 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 ≤ +200°C) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at T_J ≤ +150°C where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at T_J ≤ +125°C and +110°C to show power rating where most users want to limit T_J in their application.

FIGURE 4. Temperature-power derating graph (2N3740, 2N3741, TO-66).

Temperature-Power Derating Curve



$R_{\theta JC}$ = 6°C/W

NOTES:

1. All devices are capable of operating at ≤ 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 ≤ +200°C) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at T_J ≤ +150°C where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at T_J ≤ +125°C and +110°C to show power rating where most users want to limit T_J in their application.

FIGURE 5. Temperature-power derating graph (2N3740U4, 2N3741U4).

Thermal Impedance Curves

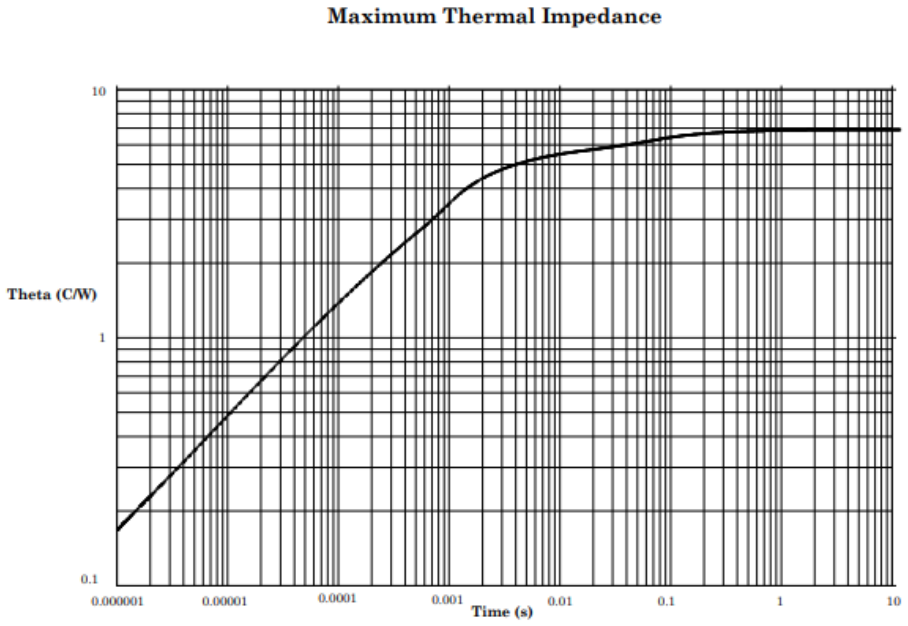


FIGURE 6. Transient thermal impedance graph (2N3740 and 2N3741).

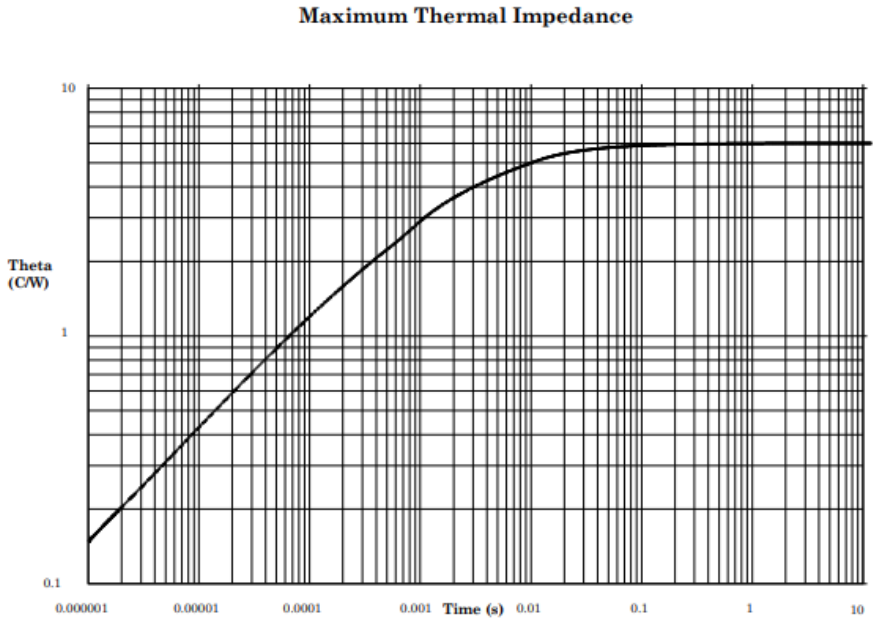


FIGURE 7. Transient thermal impedance graph (2N3740U4 and 2N3741U4).