2N5581, 2N5582

NPN Low Power Silicon Transistor

Rev. V1

Features

- Available in JAN, JANTX and JANTXV per MIL-PRF-19500/423
- Available in TO-46 package
- Designed for Small Signal General Purpose Switching Applications.

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

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Breakdown Voltage, Collector - Emitter	I_C = 10 mA dc	$V_{(BR)CEO}$	V dc	50	—
Collector - Base Cutoff Current	V_{CB} = 75 V dc	I_{CBO1}	µA dc	—	10
Emitter - Base Cutoff Current	V_{EB} = 6.0 V dc	I_{EBO1}	µA dc	—	10
Emitter - Base Cutoff Current	V_{EB} = 4.0 V dc	I_{EBO2}	nA dc	—	10
Collector - Base Cutoff Current	V_{CB} = 60 V dc	I_{CBO2}	nA dc	—	10
Forward Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 0.1 mA dc 2N5581 2N5582	h_{FE1}	-	 30 50	
	V_{CE} = 10 V dc; I_C = 1.0 mA dc 2N5581 2N5582	h_{FE2}		 35 75	
	V_{CE} = 10 V dc; I_C = 10 mA dc 2N5581 2N5582	h_{FE3}		 40 100	
	V_{CE} = 10 V dc; I_C = 150 mA dc 2N5581 2N5582	h_{FE4}		 40 100	 120 300
	V_{CE} = 10 V dc; I_C = 500 mA dc 2N5581 2N5582	h_{FE5}		 20 30	

Electrical Characteristics (+25°C unless otherwise specified)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector-Emitter Saturated Voltage	I_C = 150 mA dc; I_B = 15 mA dc	$V_{CE(SAT)1}$	V dc	—	0.3
Collector-Emitter Saturated Voltage	I_C = 500 mA dc; I_B = 50 mA dc	$V_{CE(SAT)2}$	V dc	—	1.0
Base-Emitter Saturated Voltage	I_C = 150 mA dc; I_B = 15 mA dc	$V_{BE(SAT)1}$	V dc	0.6	1.2
Base-Emitter Saturated Voltage	I_C = 500 mA dc; I_B = 50 mA dc	$V_{BE(SAT)2}$	V dc	—	2.0
Collector - Base Cutoff Current	T_A = +150°C V_{CB} = 60 V dc	I_{CBO3}	µA dc	—	10
Forward-Current Transfer Ratio	T_A = -55°C V_{CE} = 10 V dc; I_C = 10 mA dc 2N5581 2N5582	h_{FE6}		 15 35	
Dynamic Characteristics					
Small-Signal Short-Circuit Forward Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 1 mA dc; f = 1 kHz 2N5581 2N5582	h_{fe}		 30 50	
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio	V_{CE} = 20 V dc; I_C = 20 mA dc; f = 100 MHz	$\lvert h_{FE} \rvert$		2.5	5.0
Open Circuit Output Capacitance	V_{CB} = 10 V dc; I_E = 0; 100 kHz ≤ f ≤ 1 MHz	C_{obo}	pF	—	8
Input Capacitance (Output Open Circuited)	V_{EB} = 0.5 V dc; I_C = 0; f = 100 kHz ≤ f ≤ 1 MHz	C_{ibo}	pF	—	25
Turn-On Time	See Figure 6 of MIL-PRF-19500/423	t_{on}	ns	—	35
Turn-Off Time	See Figure 7 of MIL-PRF-19500/423	t_{off}	ns	—	300
Pulse Response	See Figure 8 of MIL-PRF-19500/423	$t_{on} + t_{off}$	ns	—	18

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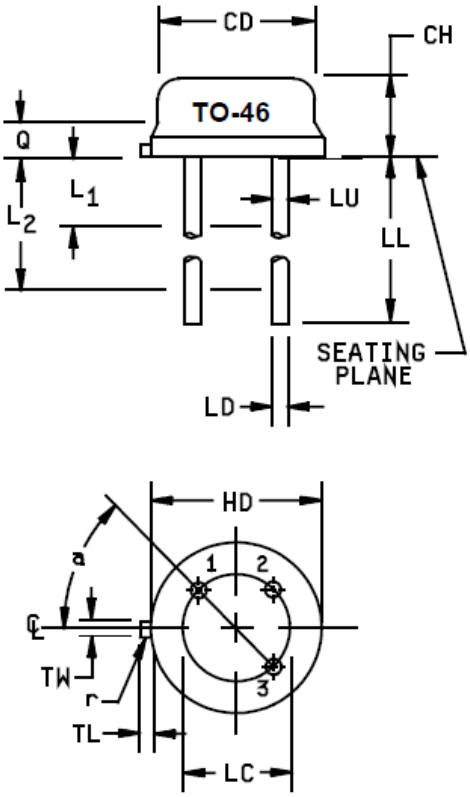
Absolute Maximum Ratings (T_A = +25°C unless otherwise specified)

Ratings	Symbol	Value
Collector - Emitter Voltage	V_{CEO}	50 V dc
Collector - Base Voltage	V_{CBO}	75 V dc
Emitter - Base Voltage	V_{EBO}	6 V dc
Collector Current	I_C	800 mA dc
Operating & Storage Temperature Range	T_J, T_{STG}	-65°C to +200°C
T_A = +25°C 2N5581 2N5582	P_T (1)	 0.5 W 0.5 W
T_C = +25°C 2N5581 2N5582	$P_{T\,2}$ (2)	 2.0 W 2.0 W
Thermal Resistance, Junction to Case 2N5581 2N5582	$R_{\theta JC}$ (2) (4)	 80°C/W 80°C/W
Thermal Resistance, Junction to Ambient 2N5581 2N5582	$R_{\theta JA}$ (1) (3)	 325°C/W 325°C/W

(1) For derating see figure 2 of MIL-PRF-19500/423
(2) For derating see figure 3 of MIL-PRF-19500/423
(3) For thermal resistance see figure 4 of MIL-PRF-19500/423
(4) For thermal resistance see figure 5 of MIL-PRF-19500/423

Outline Drawing (TO-46)

Symbol	Dimensions				Notes
	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
L1		.050		1.27	6
L2	.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 L_1 and L_2. Dimension LD applies between L_2 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 ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions 2N5581 and 2N5582 (TO-46).