

PNP SILICON DUAL TRANSISTOR

Qualified per MIL-PRF-19500 /336

DEVICES

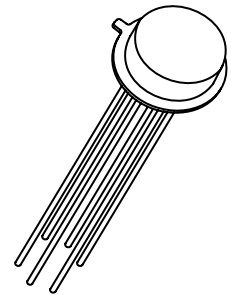
2N3810 2N3811
 2N3810L 2N3811L
 2N3810U 2N3811U

LEVELS

JAN
 JANTX
 JANTV
 JANS

ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

Parameters / Test Conditions	Symbol	Value		Unit
Collector-Emitter Voltage	V_{CEO}	60		Vdc
Collector-Base Voltage	V_{CBO}	60		Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Collector Current	I_C	50		mAdc
		One Section ¹	Both Sections ²	
Total Power Dissipation @ $T_A = +25^\circ\text{C}$	P_T	200	350	mW
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$



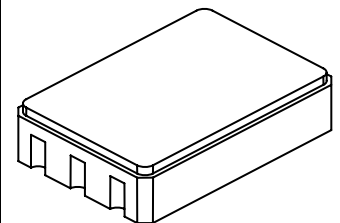
TO-78

NOTES:

- Derate linearly 1.143mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$ (one section)
- Derate linearly 2.000mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$ (both sections)

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage $I_C = 100\mu\text{Adc}$	$V_{(BR)CEO}$	60		Vdc
Collector-Base Cutoff Current $V_{CB} = 50\text{Vdc}$ $V_{CB} = 60\text{Vdc}$	I_{CBO}		10 10	ηAdc μAdc
Emitter-Base Cutoff Current $V_{EB} = 4.0\text{Vdc}$ $V_{EB} = 5.0\text{Vdc}$	I_{EBO}		10 10	ηAdc μAdc



U - Package

ELECTRICAL CHARACTERISTICS (con't)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS				
Forward-Current Transfer Ratio $I_C = 10\mu\text{A dc}, V_{CE} = 5.0\text{V dc}$ $I_C = 100\mu\text{A dc}, V_{CE} = 5.0\text{V dc}$ $I_C = 1.0\text{mA dc}, V_{CE} = 5.0\text{V dc}$ $I_C = 10\text{mA dc}, V_{CE} = 5.0\text{V dc}$ $I_C = 1.0\mu\text{A dc}, V_{CE} = 5.0\text{V dc}$ $I_C = 10\mu\text{A dc}, V_{CE} = 5.0\text{V dc}$ $I_C = 100\mu\text{A dc}, V_{CE} = 5.0\text{V dc}$ $I_C = 1.0\text{mA dc}, V_{CE} = 5.0\text{V dc}$ $I_C = 10\text{mA dc}, V_{CE} = 5.0\text{V dc}$	2N3810, 2N3810L, 2N3810U 2N3811, 2N3811L, 2N3811U	h_{FE} h_{FE}	100 150 150 125 75 225 300 300 250	450 450
Collector-Emitter Saturation Voltage $I_C = 100\mu\text{A dc}, I_B = 10\mu\text{A dc}$ $I_C = 1.0\text{mA dc}, I_B = 100\mu\text{A dc}$	$V_{CE(sat)}$		0.2 0.25	Vdc
Base-Emitter Saturation Voltage $I_C = 100\mu\text{A dc}, I_B = 10\mu\text{A dc}$ $I_C = 1.0\text{mA dc}, I_B = 100\mu\text{A dc}$	$V_{BE(sat)}$		0.7 0.8	Vdc
Base-Emitter Non-Saturation Voltage $V_{CE} = 5.0\text{V dc}, I_C = 100\mu\text{A dc}$	V_{BE}		0.7	Vdc

DYNAMIC CHARACTERISTICS

Forward Current Transfer Ratio, Magnitude $I_C = 500\mu\text{A dc}, V_{CE} = 5.0\text{V dc}, f = 30\text{MHz}$ $I_C = 1.0\text{mA dc}, V_{CE} = 5.0\text{V dc}, f = 100\text{MHz}$	$ h_{fe} $	1.0 1.0	5.0	
Small-Signal Short Circuit Forward Current Transfer Ratio $I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}, f = 1.0\text{kHz}$	h_{fe}	150 300	600 900	
Small-Signal Short Circuit Input Impedance $I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}, f = 1.0\text{kHz}$	h_{je}	3.0 3.0	30 40	k Ω
Small-Signal Short Circuit Output Admittance $I_C = 1.0\text{mA dc}, V_{CE} = 10\text{V dc}, f = 1.0\text{kHz}$	h_{oe}	5.0	60	μmhos



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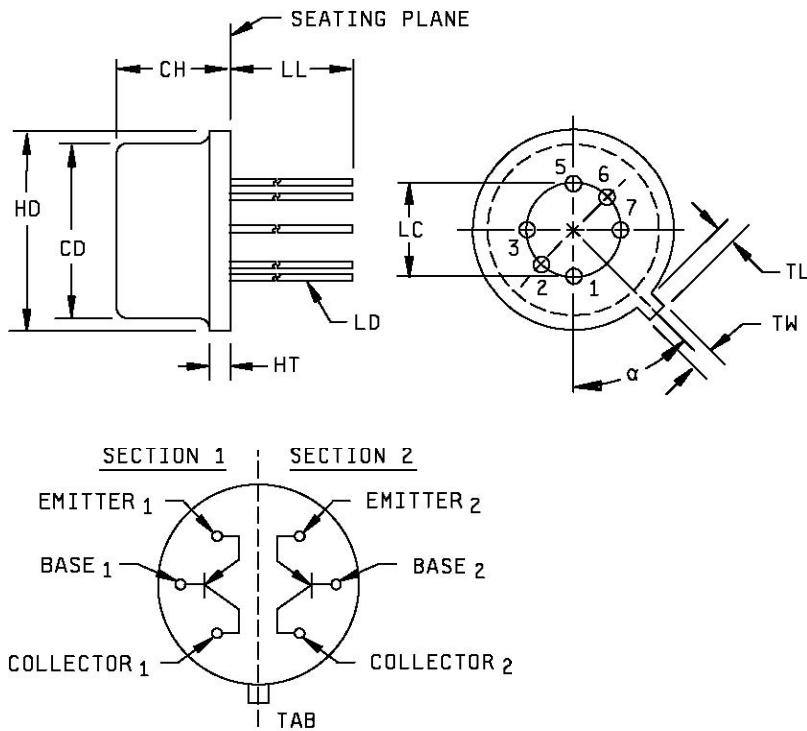
TECHNICAL DATA SHEET

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DYNAMIC CHARACTERISTICS (cont.)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Output Capacitance $V_{CB} = 5.0\text{Vdc}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{obo}		5.0	pF
Input Capacitance $V_{EB} = 5.0\text{Vdc}$, $I_C = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C_{ibo}		8.0	pF
Noise Figure				
$I_C = 100\mu\text{A}$ dc, $V_{CE} = 10\text{Vdc}$, $f = 100\text{Hz}$, $R_G = 3.0\text{k}\Omega$ 2N3810, L, U	F_1		7.0	dB
$I_C = 100\mu\text{A}$ dc, $V_{CE} = 10\text{Vdc}$, $f = 1.0\text{kHz}$, $R_G = 3.0\text{k}\Omega$ 2N3810, L, U	F_2		3.0	
$I_C = 100\mu\text{A}$ dc, $V_{CE} = 10\text{Vdc}$, $f = 10\text{kHz}$, $R_G = 3.0\text{k}\Omega$ 2N3810, L, U	F_3		2.5	
$I_C = 100\mu\text{A}$ dc, $V_{CE} = 10\text{Vdc}$, $f = 10\text{Hz to } 15.7\text{kHz}$, $R_G = 3.0\text{k}\Omega$ 2N3810, L, U	F_4		3.5	
$I_C = 100\mu\text{A}$ dc, $V_{CE} = 10\text{Vdc}$, $f = 100\text{Hz}$, $R_G = 3.0\text{k}\Omega$ 2N3811, L, U	F_1		4.0	dB
$I_C = 100\mu\text{A}$ dc, $V_{CE} = 10\text{Vdc}$, $f = 1.0\text{kHz}$, $R_G = 3.0\text{k}\Omega$ 2N3811, L, U	F_2		1.5	
$I_C = 100\mu\text{A}$ dc, $V_{CE} = 10\text{Vdc}$, $f = 10\text{kHz}$, $R_G = 3.0\text{k}\Omega$ 2N3811, L, U	F_3		2.0	
$I_C = 100\mu\text{A}$ dc, $V_{CE} = 10\text{Vdc}$, $f = 10\text{Hz to } 15.7\text{kHz}$, $R_G = 3.0\text{k}\Omega$ 2N3811, L, U	F_4		2.5	

PACKAGE DIMENSIONS



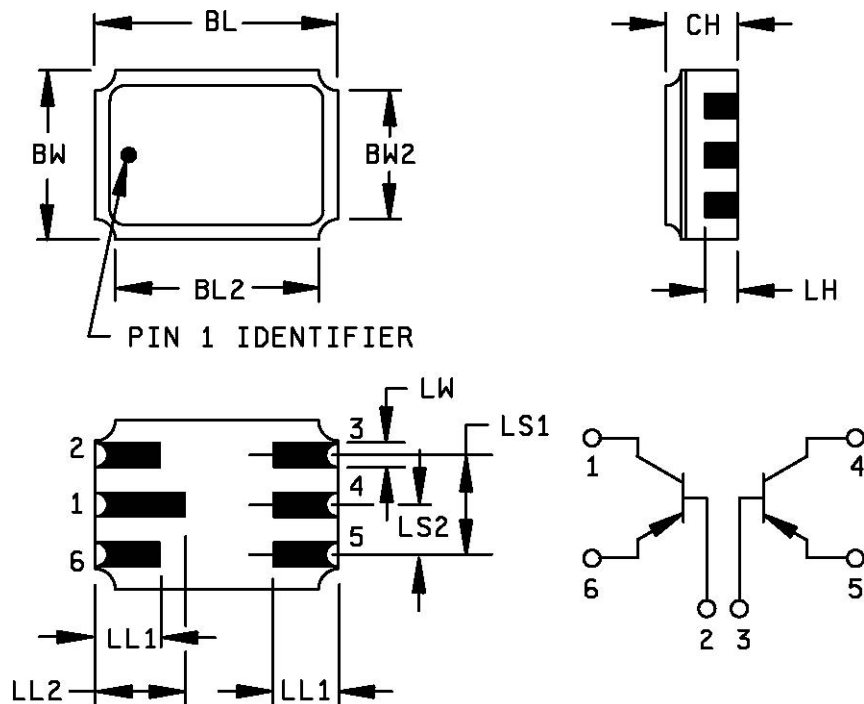
Ltr	DIMENSIONS				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	
CH	.150	.185	3.81	4.70	
HD	.335	.370	8.51	9.40	
HT	.009	.041	0.23	1.04	
LC	.200 BSC		5.08 BSC		
LD	.016	.021	0.41	0.53	10
LL	See notes 10, 11, and 13				
α	45° TP		45° TP		9
TL	.029	.045	0.74	1.14	5, 6
TW	.028	.034	0.71	0.86	4, 5

CONNECTION DIAGRAM

NOTES:

- 1 Dimensions are in inches.
- 2 Millimeters are given for general information only.
- 3 Refer to rules for dimensioning Semiconductor Product Outlines included in Publication No. 95.
- 4 Lead number 4 and 8 omitted on this variation.
- 5 TW must be held to a minimum length of .021 inch (0.53 mm).
- 6 LL measured from maximum HD.
- 7 Details of outline in this zone optional.
- 8 CD shall not vary more than .010 inch (0.25mm) in zone P. This zone is controlled for automatic handling.
- 9 Leads at gauge plane .054 - .055 inch (1.37 - 1.40 mm) below seating plane shall be within .007 (0.18 mm) radius of true position (TP) at a maximum material condition (MMC) relative to the tab at MMC. The device may be measured by direct methods or by the gauge and gauging procedure described on gauge drawing GS-1.
- 10 LD applies to LL minimum.
- 11 r (radius) applies to both inside corners of tab.
- 12 For transistor types 2N3810 and 2N3811, LL is .500 inch (12.70 mm) minimum, and .750 inch (19.05 mm) maximum. (TO-78).
- 13 For transistor types 2N3810L and 2N3811L, LL is 1.500 inches (38.10 mm) minimum, and 1.750 inches (44.45 mm) maximum.
- 14 In accordance with AMSE Y14.5M, diameters are equivalent to ϕ x symbology.
- 15 Leads 3 and 5 = emitter, leads 2 and 6 = base, leads 1 and 7 = collector.

FIGURE 1. Physical dimensions (similar to TO-78)



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.240	.250	6.10	6.35
BL2		.250		6.35
BW	.165	.175	4.19	4.45
BW2		.175		4.45
CH	.044	.080	1.12	2.03
LH	.026	.039	0.66	0.99
LL1	.060	.070	1.52	1.78
LL2	.082	.098	2.08	2.49
LS1	.095	.105	2.41	2.67
LS2	.045	.055	1.14	1.40
LW	.022	.028	0.56	0.71

Pin no.	Transistor
1	Collector no. 1
2	Base no. 1
3	Base no. 2
4	Collector no. 2
5	Emitter no. 2
6	Emitter no. 1

NOTES:

- 1 Dimensions are in inches.
- 2 Millimeters are given for general information only.
- 3 In accordance with AMSE Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 2. Physical dimensions (2N3810U and 2N3811U).