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TECHNICAL DATA SHEET

NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/727

DEVICES

2N5010	**2N5013**	**2N5010S**	**2N5013S**
2N5011	**2N5014**	**2N5011S**	**2N5014S**
2N5012	**2N5015**	**2N5012S**	**2N5015S**

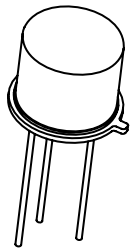
LEVELS

JAN
JANTX
JANTXV

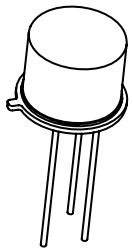
ABSOLUTE MAXIMUM RATINGS ***(T_C = +25°C unless otherwise noted)***

Parameters / Test Conditions		Symbol	Value	Unit
Collector-Emitter Voltage	2N5010	V_{CER}	500	Vdc
	2N5011		600	Vdc
	2N5012		700	Vdc
	2N5013		800	Vdc
	2N5014		900	Vdc
	2N5015		1000	Vdc
Collector-Base Voltage	2N5010	V_{CBO}	500	Vdc
	2N5011		600	Vdc
	2N5012		700	Vdc
	2N5013		800	Vdc
	2N5014		900	Vdc
	2N5015		1000	Vdc
Emitter-Base Voltage		V_{EBO}	5	Vdc
Collector Current		I_C	200	mAdc
Base Current		I_B	20	mAdc
Total Power Dissipation @ T_A = +25°C @ T_C = +25° C		P_t	 1.0 7.0	W
Thermal Resistance, Junction to Case 1/		$R_{\theta JC}$	20	°C/W
Operating & Storage Junction Temperature Range		T_j, T_{stg}	-65 to +200	°C

Note:
1/ See 19500/727 for Thermal Derating Curves.



TO-5
2N5010 thru 2N5015



TO-39
2N5010S thru 2N5015S

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ELECTRICAL CHARACTERISTICS ***(T_A = +25°C, unless otherwise noted)***

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
Collector to Base Cutoff Current					
V_{CB} = 400V	2N5010	I_{CBO1}		10	nAdc
V_{CB} = 500V	2N5011			10	nAdc
V_{CB} = 580V	2N5012			10	nAdc
V_{CB} = 650V	2N5013			10	nAdc
V_{CB} = 700V	2N5014			10	nAdc
V_{CB} = 760V	2N5015			10	nAdc
	@ T_A = +150°C				
V_{CB} = 400V	2N5010	I_{CBO2}		10	uAdc
V_{CB} = 500V	2N5011			10	uAdc
V_{CB} = 588V	2N5012			10	uAdc
V_{CB} = 650V	2N5013			10	uAdc
V_{CB} = 700V	2N5014			10	uAdc
V_{CB} = 760V	2N5015			10	uAdc
Emitter to Base Cutoff Current					
V_{EB} = 4V		I_{EBO}		20	uAdc
Collector to Base Breakdown Voltage					
I_C = 0.1mAdc	2N5010	$V_{(BR)CBO}$	500		Vdc
I_C = 0.1mAdc	2N5011		600		Vdc
I_C = 0.1mAdc	2N5012		700		Vdc
I_C = 0.2mAdc	2N5013		800		Vdc
I_C = 0.2mAdc	2N5014		900		Vdc
I_C = 0.2mAdc	2N5015		1000		Vdc
Emitter to Base Breakdown Voltage					
I_C = 0mA		$V_{(BR)EBO}$	5		Vdc
I_E = 0.05mA					
Collector to Emitter Breakdown Voltage					
R_{BE} = 1KΩ	2N5010	$V_{(BR)CER}$	500		Vdc
I_C = 0.2mA, Pulsed	2N5011		600		Vdc
	2N5012		700		Vdc
	2N5013		800		Vdc
	2N5014		900		Vdc
	2N5015		1000		Vdc
Forward-Current Transfer Ratio					
I_C = 25mA	2N5010, 2N5011, 2N5012	h_{FE1}	30	180	
I_C = 20mA	2N5013, 2N5014, 2N5015		30	180	
V_{CE} = 10V					
V_{CE} = 10V		h_{FE2}	10		
I_C = 5mA					
V_{CE} = 10V	@ T_A = -55°C	h_{FE3}	10		
I_C = 20mA					

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ELECTRICAL CHARACTERISTICS *(T_A = +25°C, unless otherwise noted) (Cont.)*

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
Base-Emitter Saturation Voltage					
I_C = 25mA	2N5010, 2N5011, 2N5012	$V_{BE(SAT)}$		1.0	Vdc
I_C = 20mA	2N5013, 2N5014, 2N5015			1.0	Vdc
I_B = 5mA, Pulsed					
Collector-Emitter Saturation Voltage					
I_C = 25mA	2N5010	$V_{CE(SAT)}$		1.4	Vdc
I_C = 25mA	2N5011			1.5	Vdc
I_C = 25mA	2N5012			1.6	Vdc
I_C = 20mA	2N5013			1.6	Vdc
I_C = 20mA	2N5014			1.6	Vdc
I_C = 20mA	2N5015			1.8	Vdc
I_B = 5mA, Pulsed					

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
Magnitude of small signal short-circuit forward current transfer ratio					
V_{CE} = 10Vdc, I_C = 25mA, f = 10MHz	2N5010, 2N5011, 2N5012	$\|h_{fe}\|$	1.0		
V_{CE} = 10Vdc, I_C = 20mA, f = 10MHz	2N5013, 2N5014, 2N5015		1.0		
Open circuit output capacitance		C_{obo}			pF
V_{CB} = 10V, I_E = 0, f = 2MHz				30	

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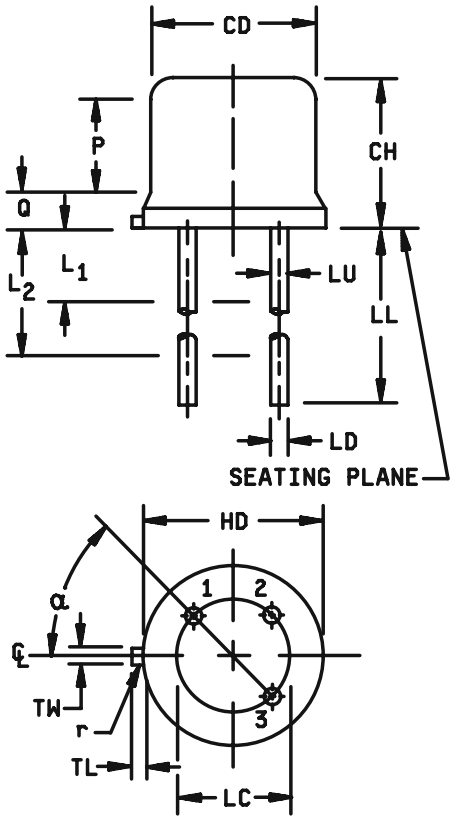
TECHNICAL DATA SHEET

PACKAGE DIMENSIONS



Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	6
CH	.240	.260	6.10	6.60	
HD	.335	.370	8.51	9.40	
LC	.200 TP		5.08 TP		7
LD	.016	.019	0.41	0.48	8,9
LL	See note 14				
LU	.016	.019	0.41	0.48	8,9
L_1		.050		1.27	8,9
L_2	.250		6.35		8,9
P	.100		2.54		7
Q		.030		0.76	5
TL	.029	.045	0.74	1.14	3,4
TW	.028	.034	0.71	0.86	3
r		.010		0.25	10
α	45° TP		45° TP		7
1, 2, 10, 12, 13, 14					

NOTE:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Beyond r (radius) maximum, TW shall be held for a minimum length of .011 (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Body contour optional within zone defined by HD, CD, and Q.
6. CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
7. Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. The device may be measured by direct methods or by gauging procedure.
8. Dimension LU applies between L_1 and L_2. Dimension LD applies between L_2 and LL minimum. Diameter is uncontrolled in and beyond LL minimum.
9. All three leads.
10. The collector shall be internally connected to the case.
11. Dimension r (radius) applies to both inside corners of tab.
12. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.
14. For non-S-suffix devices (TO-5), dimension LL = 1.5 inches (38.10 mm) min. and 1.75 inches (44.45 mm) max. For S-suffix types (TO-39), dimension LL = .5 inch (12.70 mm) min. and .750 inch (19.05 mm) max.