

KEY FEATURES

- JAN/JANTX/JANTXV STANDARD PRODUCTS
- QUALIFIED PER MIL-PRF-19500/371
- LOW ON RESISTANCE
- FAST SWITCHING
- HIGH OFF ISOLATION
- HIGH POWER TRANSISTOR
- SECOND SOURCE FOR MICROSEMI
- DESIGNED FOR USE IN HIGH VOLTAGE INVERTERS, CONVERTERS, SWITCHING REGULATORS AND LINE OPERATED AMPLIFIERS



Part Number	Package	19500/	Emitter/Base Voltage	Collector Current
2N3902	TO-3	371	400V/700V	3.5A
2N5157	TO-3	371	500V/700V	3.5A

ABSOLUTE MAXIMUM RATINGS

Emitter-Base Voltage	2N3902 - 5V 2N5157 - 6V	Storage Temperature	-65 to 200°C
Base Current	2A	Operating Temperature	-65 to 200°C
Lead Temperature (1/16 from case, 10 sec)	300°C	Power Dissipation Derating	5W @ 25°C T_A 100W @ 75°C T_C 29mW/°C for $T_A > 25^\circ\text{C}$ 800mW/°C for $T_C > 75^\circ\text{C}$

ORDERING GUIDE

JAN2N3902

JANTX2N3902

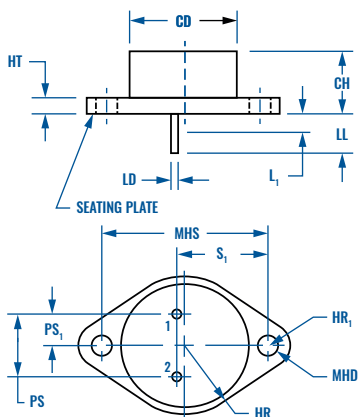
JANTXV2N3902

JAN2N5157

JANTX2N5157

JANTXV2N5157

TO-3 PACKAGE OUTLINE & PIN CONNECTIONS



Ltr	Dimensions			
	Inches		mm	
	Min.	Max.	Min.	Max.
CD		0.875		22.22
CH	0.250	0.328	6.35	8.33
HR	0.495	0.525	12.57	13.34
HR ₁	0.131	0.188	3.33	4.78
HT	0.060	0.135	1.52	3.43
LD	0.038	0.043	0.97	1.09
LL	0.312	0.500	7.92	12.70
L ₁		0.050		1.27
MHD	0.151	0.161	3.84	4.09
MHS	1.177	1.197	29.90	30.40
PS	0.420	0.440	10.67	11.18
PS ₁	0.205	0.225	5.21	5.72
S ₁	0.655	0.675	16.64	17.15

ELECTRICAL SPECIFICATIONS
 Typical @ 25°C unless otherwise noted

Parameter		Symbol	Min.	Max.	Unit
Collector-Emitter Sustaining Voltage $I_C = 100\text{mA}$	2N3902 2N5157	$V_{CE(SUS)}$	325 400		Vdc Vdc
Collector-Emitter Cutoff Current $V_{CE} = 700\text{Vdc}, V_{BE} = 1.5\text{Vdc}$		I_{CEX}		20	μA
Collector-Emitter Cutoff Current $V_{CE} = 400\text{Vdc}$ $V_{CE} = 500\text{Vdc}$	2N3902 2N5157	I_{CEO}		100 100	μA μA
Emitter-Base Cutoff Current $V_{EB} = 5\text{Vdc}$ $V_{EB} = 6\text{Vdc}$	2N3902 2N5157	I_{EB0}		200 200	μA μA
Forward-Current Transfer Ratio $I_C = 0.5\text{Adc}, V_{CE} = 5.0\text{Vdc}$ $I_C = 1.0\text{Adc}, V_{CE} = 5.0\text{Vdc}$ $I_C = 2.5\text{Adc}, V_{CE} = 5.0\text{Vdc}$ $I_C = 3.5\text{Adc}, V_{CE} = 5.0\text{Vdc}$		h_{FE}	25 30 10 5	90	
Thermal Resistance		$R_{\theta JC}$		1.25	c/w
Base-Emitter Saturated Voltage $I_B = 0.1\text{Adc}, I_C = 1.0\text{Adc}$ $I_B = 0.7\text{Adc}, I_C = 3.5\text{Adc}$		$V_{BE(sat)}$		1.5 2.0	Vdc Vdc
Collector-Emitter Saturated Voltage $I_B = 0.1\text{Adc}, I_C = 1.0\text{Adc}$ $I_B = 0.7\text{Adc}, I_C = 3.5\text{Adc}$		$V_{CE(sat)}$		0.8 2.5	Vdc Vdc
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 0.2\text{Adc}, V_{CE} = 10\text{Vdc}, f = 1.0\text{MHz}$		$ h_{fe} $	2.5	25	
Forward Current Transfer Ratio $I_C = 1\text{Adc}, V_{CE} = 5\text{Vdc}, T = -55^\circ\text{C}$		h_{fe}	10		
Output Capacitance $V_{CB} = 10\text{Vdc}, I_E = 0\text{Adc}, 100\text{kHz} \leq f \leq 1.0\text{MHz}$		C_{obo}		250	pF
Turn-On Time $V_{CC} = 125\text{Vdc}, I_C = 1.0\text{Adc}, I_{B1} = 0.1\text{Adc}$		t_{on}		0.8	μs
Turn-Off Time $V_{CC} = 125\text{Vdc}, I_C = 1.0\text{Adc}, I_{B1} = 0.1\text{Adc}, I_{B2} = 0.5\text{Adc}$		t_{off}		1.7	μs

SAFE OPERATING AREA
DC Tests (continuous) - $T_C = +25^\circ\text{C}; t \geq 1.0\text{s}$ (See Figure 3 of MIL-PRF-19500/371)

Test 1 - $V_{CE} = 28.6\text{Vdc}, I_C = 3.5\text{Adc}$ | **Test 2** - $V_{CE} = 70\text{Vdc}, I_C = 1.43\text{Adc}$ | **Test 3 2N3902** - $V_{CE} = 325\text{Vdc}, I_C = 55\text{mA}$ | **Test 3 2N5157** - $V_{CE} = 400\text{Vdc}, I_C = 35\text{mA}$
Switching Tests, Load condition C (unclamped inductive load) - $T_C = 25^\circ\text{C}$; duty cycle = 10%; $R_S = 0.1\Omega$ (See Figure 4 of MIL-PRF-19500/371)

Test 1 - $t_P =$ approximately 3ms (vary to obtain I_C); $R_{BB1} = 20\Omega; V_{BB1} = 10\text{Vdc}; R_{BB2} = 3\text{k}\Omega; V_{BB2} = 1.5\text{Vdc}; V_{CC} = 50\text{Vdc}; I_C = 3.5\text{Adc}; L = 60\text{mH}; R = 3\Omega; R_L = 14\Omega$.

Test 2 - $t_P =$ approximately 3ms (vary to obtain I_C); $R_{BB1} = 100\Omega; V_{BB1} = 10\text{Vdc}; R_{BB2} = 3\text{k}\Omega; V_{BB2} = 1.5\text{Vdc}; I_C = 0.6\text{Adc}; V_{CC} = 50\text{Vdc}; L = 200\text{mH}; R = 8\Omega; R_L = 83\Omega$.

Switching Tests, Load condition (clamped inductive load) - $T_C = +25^\circ\text{C}$; duty cycle = 10%. (See Figure 5 of MIL-PRF-19500/371)

Test 1 - $t_P =$ approximately 30ms (vary to obtain I_C); $R_S = 0.1\Omega; R_{BB1} = 20\Omega; V_{BB1} = 10\text{Vdc}; R_{BB2} = 100\Omega; V_{BB2} = 1.5\text{Vdc}; V_{CC} = 50\text{Vdc}; I_C = 3.5\text{Adc}; L = 60\text{mH}; R = 3\Omega; R_L \geq 0\Omega$.

(A suitable clamping circuit or diode can be used.)

Clamp Voltage 2N3902 = 400 +0, -5 Vdc | **Clamp Voltage 2N5157** = 500 +0, -5 Vdc (Clamped voltage must be reached)

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