

PNP SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/290

Devices

2N2904	2N2905
2N2904A	2N2905A
2N2904AL	2N2905AL

Qualified Level

JAN
JANTX
JANTXV
JANS

MAXIMUM RATINGS

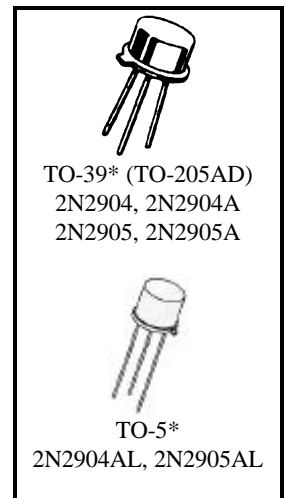
Ratings	Symbol	2N2904 2N2905	2N2904A, L 2N2905A, L	Unit
Collector-Emitter Voltage	V_{CEO}	40	60	Vdc
Collector-Base Voltage	V_{CBO}		60	Vdc
Emitter-Base Voltage	V_{EBO}		5.0	Vdc
Collector Current	I_C		600	mAdc
Total Power Dissipation @ $T_A = +25^{\circ}C$ ⁽¹⁾ @ $T_C = +25^{\circ}C$ ⁽²⁾	P_T		0.6 3.0	W
Operating & Storage Junction Temp. Range	T_J, T_{stg}		-65 to +200	$^{\circ}C$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.29	$^{\circ}C/mW$

1) Derate linearly 3.43 W/ $^{\circ}C$ for $T_A > +25^{\circ}C$

2) Derate linearly 17.2 W/ $^{\circ}C$ for $T_C > +25^{\circ}C$



*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage $I_C = 10$ mAdc	$V_{(BR)CEO}$	40 60		Vdc
Collector-Emitter Cutoff Voltage $V_{CE} = 40$ Vdc $V_{CE} = 60$ Vdc	I_{CES}		1.0 1.0	μ Adc
Collector-Base Cutoff Current $V_{CB} = 50$ Vdc $V_{CB} = 60$ Vdc	I_{CBO}		20 10 10	η Adc μ Adc
Emitter-Base Cutoff Current $V_{EB} = 3.5$ Vdc $V_{EB} = 5.0$ Vdc	I_{EBO}		50 10	η Adc μ Adc

2N2904, 2N2904A, 2N2904AL, 2N2905, 2N2905A, 2N2905AL JAN SERIES

ELECTRICAL CHARACTERISTICS (con't)

Characteristics		Symbol	Min.	Max.	Unit	
ON CHARACTERISTICS ⁽³⁾						
Forward-Current Transfer Ratio $I_C = 0.1 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	2N2904 2N2905 2N2904A, 2N2904AL 2N2905A, 2N2905AL	h_{FE}	20 35 40 75			
$I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	2N2904 2N2905 2N2904A, 2N2904AL 2N2905A, 2N2905AL		25 50 40 100	175 450 175 450		
$I_C = 10 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	2N2904 2N2905 2N2904A, 2N2904AL 2N2905A, 2N2905AL		35 75 40 100			
$I_C = 150 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	2N2904, 2N2904A, L 2N2905, 2N2905A, L		40 100	120 300		
$I_C = 500 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	2N2904 2N2905 2N2904A, 2N2904AL 2N2905A, 2N2905AL		20 30 40 50			
Collector-Emitter Saturation Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$			$V_{CE(sat)}$		0.4 1.6	Vdc
Base-Emitter Voltage $I_C = 150 \text{ mAdc}, I_B = 15 \text{ mAdc}$ $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$			$V_{BE(sat)}$		1.3 2.6	Vdc
DYNAMIC CHARACTERISTICS						
Small-Signal Cutoff Frequency $I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$	2N2904 2N2905 2N2904A, 2N2905A 2N2904AL, 2N2905AL		h_{fe}	25 50 40 100		
Small-Signal Cutoff Frequency, Magnitude $I_C = 50 \text{ mAdc}, V_{CE} = 20 \text{ Vdc}, f = 100 \text{ MHz}$			$ h_{fe} $	2.0		
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$			C_{obo}		8.0	pF
Input Capacitance $V_{EB} = 2.0 \text{ Vdc}, I_C = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$			C_{ibo}		30	pF
SWITCHING CHARACTERISTICS						
Turn-On Time $V_{CC} = 30 \text{ Vdc}; I_C = 150 \text{ mAdc}; I_{B1} = 15 \text{ mAdc}$			t_{on}		45	ηs
Turn-Off Time $V_{CC} = 30 \text{ Vdc}; I_C = 150 \text{ mAdc}; I_{B1} = I_{B2} = 15 \text{ mAdc}$			t_{off}		300	ηs

(3) Pulse Test: Pulse Width = 300 μs , Duty Cycle \leq 2.0%.