2N3962
2N3963
2N3964
2N3965

CASE 22-03, STYLE 1
TO-18 (TO-206AA)

AMPLIFIER TRANSISTOR

PNP SILICON

4

MAXIMUM RATINGS

Rating	Symbol	2N3962 2N3965	2N3964	2N3963	Unit
Collector-Emitter Voltage	V_{CEO}	60	45	80	V
Collector-Base Voltage	V_{CBO}	60	45	80	V
Emitter-Base Voltage	V_{EBO}	6.0			V
Collector Current — Continuous	I_C	200			mA
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.36 2.06			Watt mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.2 6.85			Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200			°C

Refer to 2N3798 for graphs.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 5.0 ma)		$V_{(BR)CEO}$			Vdc
	2N3962, 2N3965		60	—	
	2N3963		80	—	
	2N3964		45	—	
Collector-Emitter Breakdown Voltage (I_C = 10 μA)		$V_{(BR)CES}$			Vdc
	2N3962, 2N3965		60	—	
	2N3963		80	—	
	2N3964		45	—	
Collector-Base Breakdown Voltage (I_C = 10 μA)		$V_{(BR)CBO}$			Vdc
	2N3962, 2N3965		60	—	
	2N3963		80	—	
	2N3964		45	—	
Emitter-Base Breakdown Voltage (I_C = 10 μA)		$V_{(BR)EBO}$	6.0	—	Vdc
Collector Cutoff Current		I_{CBO}			nAdc
(V_{CE} = 50 V; 2N3964 = 40 V)	2N3965, 2N3962		—	10	
(V_{CE} = 70 V)	2N3963		—	10	
Collector Cutoff Current		I_{CES}			nAdc
(V_{CE} = 50 V)	2N3962		—	10	
(V_{CE} = 70 V)	2N3963		—	10	
(V_{CE} = 40 V)	2N3964		—	10	
(V_{CE} = 50 V)	2N3965		—	10	
Emitter Cutoff Current (V_{EB} = 4.0 V)		I_{EBO}	—	10	nAdc
ON CHARACTERISTICS					
DC Current Gain(1)		h_{FE}			—
(I_C = 10 μA, V_{CE} = 5.0 V)	2N3962, 2N3963		100	300	
	2N3964, 2N3965		250	500	
(I_C = 100 μA, V_{CE} = 5.0 V)	2N3962, 2N3963		100	—	
	2N3964, 2N3965		250	—	
(I_C = 1.0 mA, V_{CE} = 5.0)	2N3962, 2N3963		100	450	
	2N3964, 2N3965		250	600	
(I_C = 10 μA, V_{CE} = 5.0, T_A = −55°C)	2N3962, 2N3963		40	—	
	2N3964, 2N3965		100	—	

ELECTRICAL CHARACTERISTICS (continued) (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Max	Unit
(I_C = 1.0 mA, V_{CE} = 5.0 V, T_A = 100°C)	2N3962, 2N3963		—	600	
	2N3964, 2N3965		—	800	
(I_C = 1.0 μA, V_{CE} = 5.0 V)	2N3962, 2N3963		60	—	
	2N3964, 2N3965		180	—	
(I_C = 10 mA, V_{CE} = 5.0 V)	2N3962, 2N3963		100	—	
	2N3964, 2N3965		200	—	
(I_C = 50 mA, V_{CE} = 5.0 V)	2N3962, 2N3963		90	—	
	2N3964, 2N3965		180	—	
(I_C = 50 mA, V_{CE} = 5.0 V, T_A = −55°C)	2N3962, 2N3963		45	—	
	2N3964, 2N3965		90	—	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			
(I_C = 10 mA, I_B = 0.5 mA)			—	0.25	V
(I_C = 50 mA, I_B = 5.0 mA)(1)			—	0.4	V
Base-Emitter Saturation Voltage		$V_{BE(sat)}$			
(I_C = 10 mA, I_B = 0.5 mA)			—	0.9	V
(I_C = 50 mA, I_B = 5.0 mA)(1)			—	0.95	V
SMALL-SIGNAL CHARACTERISTICS					
Output Capacitance		C_{obo}	—	6.0	pF
(V_{CB} = 5.0 V, f = 1.0 MHz)					
Input Capacitance		C_{ibo}	—	15	pF
(V_{EB} = 0.5 V, f = 1.0 MHz)					
Input Impedance		h_{ie}			kΩ
(I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz)	2N3962, 2N3963		2.5	17	
	2N3964, 2N3965		6.0	20	
Voltage Feedback Ratio		h_{re}	—	10	10^{-4}
(I_C = 1.0 mA, V_{CE} = 5.0, f = 1.0 kHz)					
Small-Signal Current Gain		h_{fe}			
(I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz)	2N3962, 2N3963		100	550	—
	2N3964, 2N3965		250	700	—
Magnitude of Forward Current Transfer Ratio, Common-Emitter		$\lvert h_{fe} \rvert$			
(I_C = 0.5 mA, V_{CE} = 5.0 V, f = 200 MHz)	2N3962, 2N3963		2.0	8.0	—
	2N3964, 2N3965		2.5	8.0	—
Output Admittance		h_{oe}			μmhos
(I_C = 1.0 mA, V_{CE} = 5.0, f = 1.0 kHz)	2N3962, 2N3963		5.0	40	
	2N3964, 2N3965		5.0	50	
Noise Figure		NF			dB
(I_C = 20 mA, V_{CE} = 5.0 V, BW = 15.7 kHz)	2N3962, 2N3963		—	3	
	2N3964, 2N3965		—	2	
(I_C = 20 μA, V_{CE} = 5.0 V, BW = 1.5 kHz,	2N3962, 2N3963		—	3	
f = 10 kHz, R_S = 10 kΩ)	2N3964, 2N3965		—	2	
(I_C = 20 μA, V_{CE} = 5.0 V, BW = 150 Hz,	2N3962, 2N3963		—	3	
f = 1.0 kHz, R_S = 10 kΩ)	2N3964, 2N3965		—	2	
(I_C = 20 μA, V_{CE} = 5.0 V, BW = 15 Hz,	2N3962, 2N3963		—	10	
f = 100 Hz, R_S = 10 kΩ)	2N3964, 2N3965		—	4	
(I_C = 20 μA, V_{CE} = 5.0 V, BW = 2.0 Hz,	2N3964, 2N3965		—	8	
f = 10 Hz, R_S = 10 kΩ)					

(1) Pulse Test: PW ≤ 300 μs, Duty Cycle ≤ 2%.