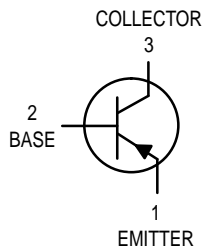
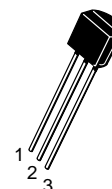


# Amplifier Transistor

## PNP Silicon



**MP5L51**



**CASE 29-04, STYLE 1**  
**TO-92 (TO-226AA)**

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	-100	Vdc
Collector–Base Voltage	$V_{CBO}$	-100	Vdc
Emitter–Base Voltage	$V_{EBO}$	-4.0	Vdc
Collector Current — Continuous	$I_C$	-600	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = -1.0$ mAdc, $I_B = 0$ )	$V_{(BR)CEO}$	-100	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = -100$ $\mu$ Adc, $I_E = 0$ )	$V_{(BR)CBO}$	-100	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -10$ $\mu$ Adc, $I_C = 0$ )	$V_{(BR)EBO}$	-4.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = -50$ Vdc, $I_E = 0$ )	$I_{CBO}$	—	-1.0	$\mu$ Adc
Emitter Cutoff Current ( $V_{EB} = -3.0$ Vdc, $I_C = 0$ )	$I_{EBO}$	—	-100	nAdc

1. Pulse Test: Pulse Width = 300  $\mu$ s, Duty Cycle = 2.0%.

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

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS(1)</b>				
DC Current Gain <sup>(1)</sup> ( $I_C = -50 \text{ mAdc}$ , $V_{CE} = -5.0 \text{ Vdc}$ )	$h_{FE}$	40	250	—
Collector–Emitter Saturation Voltage ( $I_C = -10 \text{ mAdc}$ , $I_B = -1.0 \text{ mAdc}$ ) ( $I_C = -50 \text{ mAdc}$ , $I_B = -5.0 \text{ mAdc}$ )	$V_{CE(sat)}$	— —	-0.25 -0.30	Vdc
Base–Emitter Saturation Voltage ( $I_C = -10 \text{ mAdc}$ , $I_B = -1.0 \text{ mAdc}$ ) ( $I_C = -50 \text{ mAdc}$ , $I_B = -5.0 \text{ mAdc}$ )	$V_{BE(sat)}$	— —	-1.2 -1.2	Vdc
<b>SMALL–SIGNAL CHARACTERISTICS</b>				
Current–Gain — Bandwidth Product ( $I_C = -10 \text{ mAdc}$ , $V_{CE} = -10 \text{ Vdc}$ , $f = 20 \text{ MHz}$ )	$f_T$	60	—	MHz
Output Capacitance ( $V_{CB} = -10 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{obo}$	—	8.0	pF
Small–Signal Current Gain ( $I_C = -1.0 \text{ mAdc}$ , $V_{CE} = -10 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$ )	$h_{fe}$	20	—	—

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle = 2.0%.

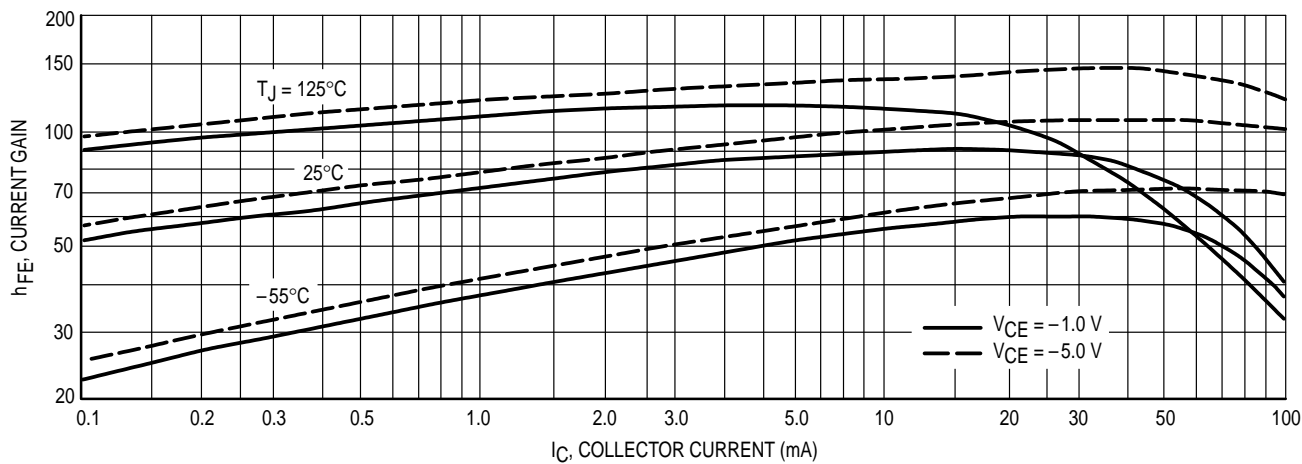


Figure 1. DC Current Gain

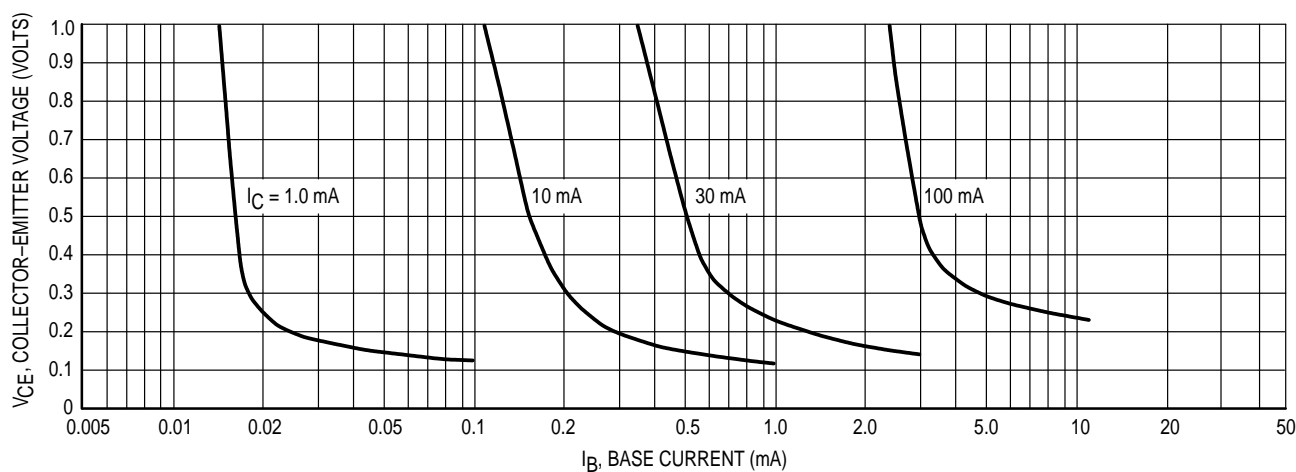


Figure 2. Collector Saturation Region

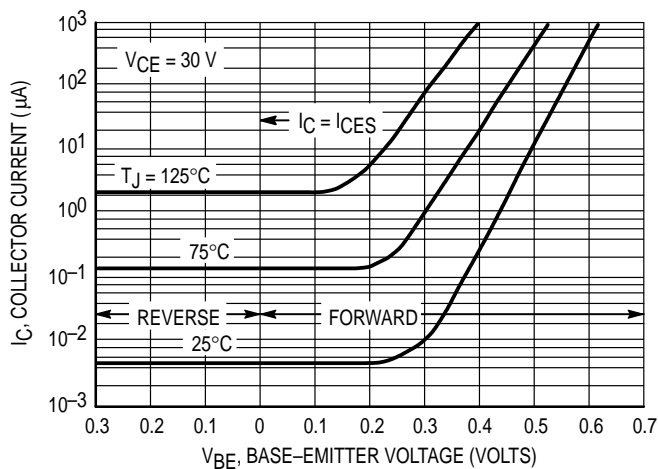


Figure 3. Collector Cut-Off Region

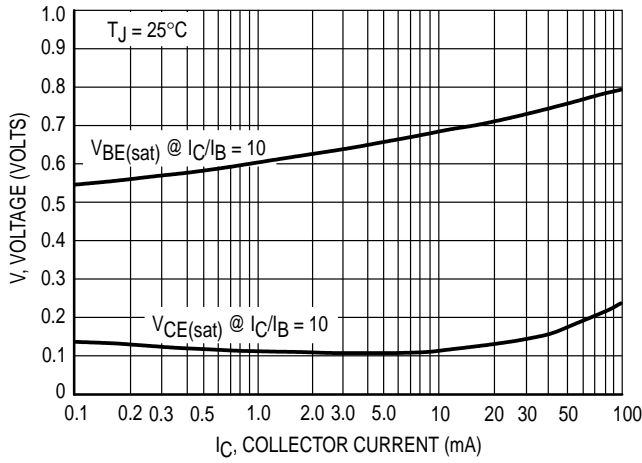


Figure 4. "On" Voltages

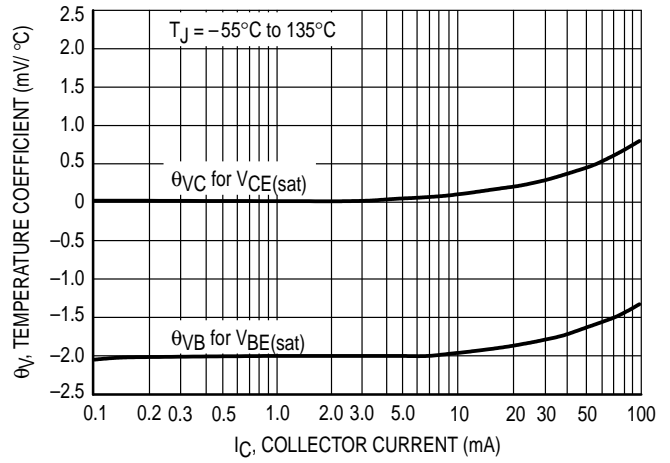
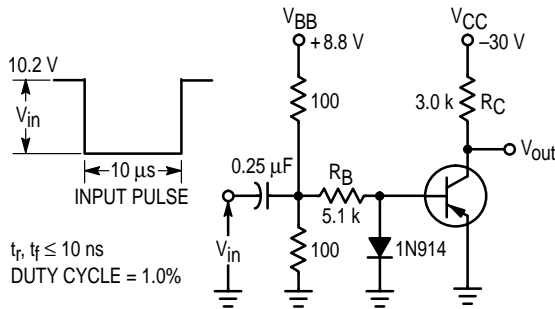


Figure 5. Temperature Coefficients



Values Shown are for  $I_C$  @ 10 mA

Figure 6. Switching Time Test Circuit

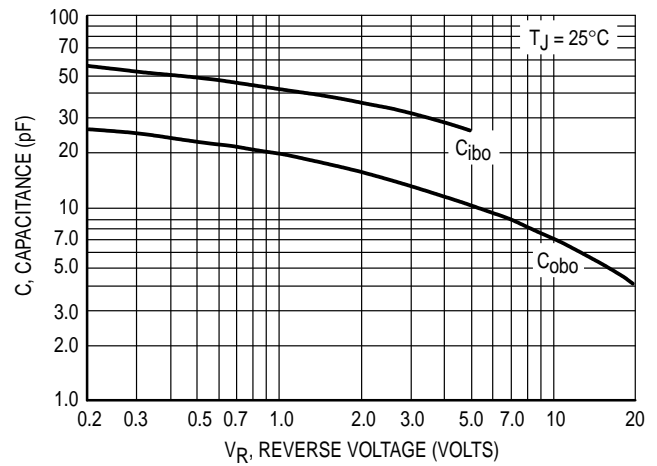


Figure 7. Capacitances

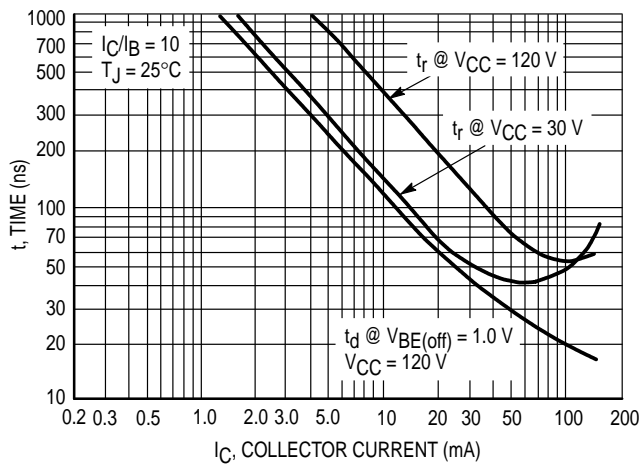


Figure 8. Turn-On Time

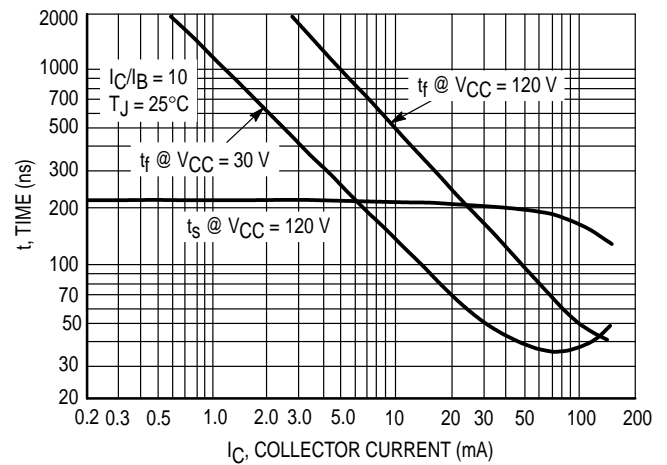
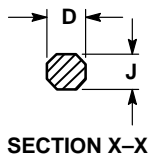
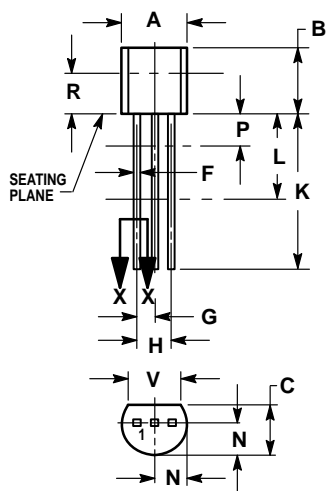


Figure 9. Turn-Off Time

PACKAGE DIMENSIONS




**CASE 029-04  
(TO-226AA)  
ISSUE AD**

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
  4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K. MINIMUM LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	—	12.70	—
L	0.250	—	6.35	—
N	0.080	0.105	2.04	2.66
P	—	0.100	—	2.54
R	0.115	—	2.93	—
V	0.135	—	3.43	—

- STYLE 1:
1. EMITTER
  2. BASE
  3. COLLECTOR

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