

Plastic Medium-Power Complementary Silicon Transistors

...designed for general-purpose amplifier and low-speed switching applications.

- High DC Current Gain —
 $h_{FE} = 2500$ (Typ) @ I_C
 $= 4.0$ Adc
- Collector-Emitter Sustaining Voltage — @ 30 mAdc
 $V_{CEO(sus)} = 60$ Vdc (Min) — TIP100, TIP105
 $= 80$ Vdc (Min) — TIP101, TIP106
 $= 100$ Vdc (Min) — TIP102, TIP107
- Low Collector-Emitter Saturation Voltage —
 $V_{CE(sat)} = 2.0$ Vdc (Max) @ I_C
 $= 3.0$ Adc
 $= 2.5$ Vdc (Max) @ $I_C = 8.0$ Adc
- Monolithic Construction with Built-in Base-Emitter Shunt Resistors
- TO-220AB Compact Package

*MAXIMUM RATINGS

Rating	Symbol	TIP100, TIP105	TIP101, TIP106	TIP102, TIP107	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	100	Vdc
Collector-Base Voltage	V_{CB}	60	80	100	Vdc
Emitter-Base Voltage	V_{EB}	5.0			Vdc
Collector Current — Continuous Peak	I_C	8.0 15			Adc
Base Current	I_B	1.0			Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	80 0.64			Watts W/ $^\circ\text{C}$
Unclamped Inductive Load Energy (1)	E	30			mJ
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	2.0 0.016			Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +150			$^\circ\text{C}$

THERMAL CHARACTERISTICS

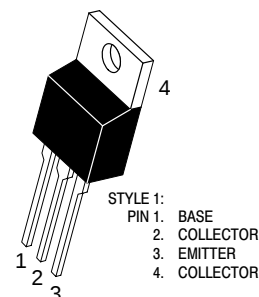
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.56	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

(1) $I_C = 1.1$ A, $L = 50$ mH, P.R.F. = 10 Hz, $V_{CC} = 20$ V, $R_{BE} = 100$ Ω .

NPN
TIP100
TIP101*
TIP102*
PNP
TIP105
TIP106*
TIP107*

*ON Semiconductor Preferred Device

DARLINGTON
8 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
60-80-100 VOLTS
80 WATTS



CASE 221A-09
TO-220AB

Preferred devices are ON Semiconductor recommended choices for future use and best overall value.

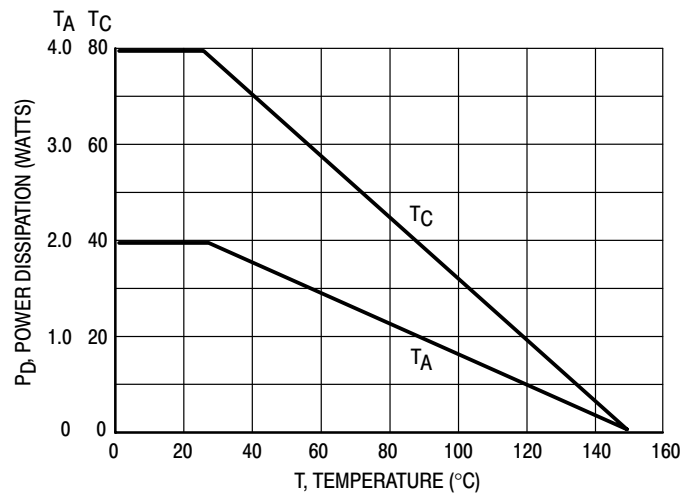


Figure 1. Power Derating

TIP100 TIP101 TIP102 TIP105 TIP106 TIP107

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage (1) ($I_C = 30\text{ mAdc}$, $I_B = 0$)	$V_{CEO(sus)}$	60 80 100	— — —	Vdc
Collector Cutoff Current ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 50\text{ Vdc}$, $I_B = 0$)	I_{CEO}	— — —	50 50 50	μAdc
Collector Cutoff Current ($V_{CB} = 60\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 80\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 100\text{ Vdc}$, $I_E = 0$)	I_{CBO}	— — —	50 50 50	μAdc
Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	8.0	mAdc

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 3.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 8.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	h_{FE}	1000 200	20,000 —	—
Collector–Emitter Saturation Voltage ($I_C = 3.0\text{ Adc}$, $I_B = 6.0\text{ mAdc}$) ($I_C = 8.0\text{ Adc}$, $I_B = 80\text{ mAdc}$)	$V_{CE(sat)}$	— —	2.0 2.5	Vdc
Base–Emitter On Voltage ($I_C = 8.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	$V_{BE(on)}$	—	2.8	Vdc

DYNAMIC CHARACTERISTICS

Small–Signal Current Gain ($I_C = 3.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$, $f = 1.0\text{ MHz}$)	h_{fe}	4.0	—	—
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 0.1\text{ MHz}$)	C_{ob}	— —	300 200	pF

(1) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.

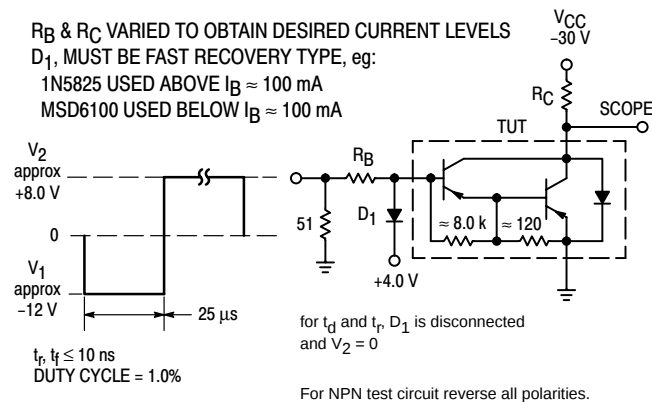


Figure 2. Switching Times Test Circuit

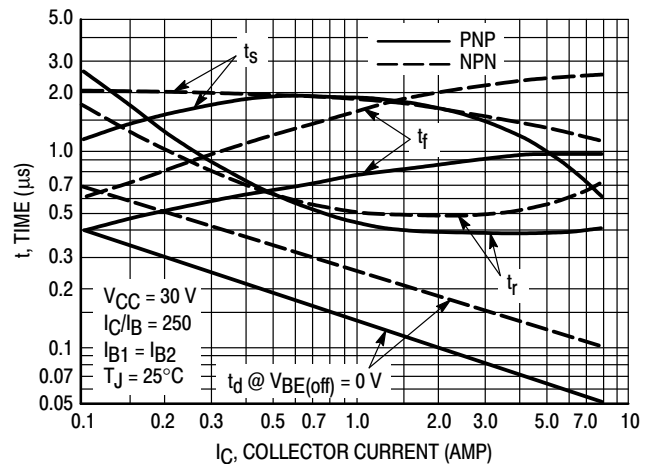


Figure 3. Switching Times

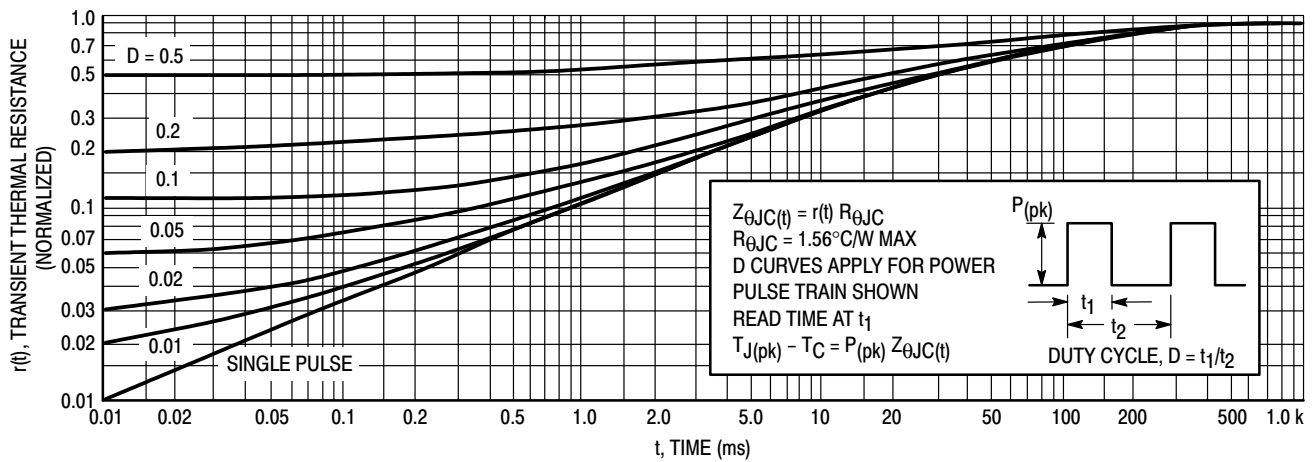


Figure 4. Thermal Response

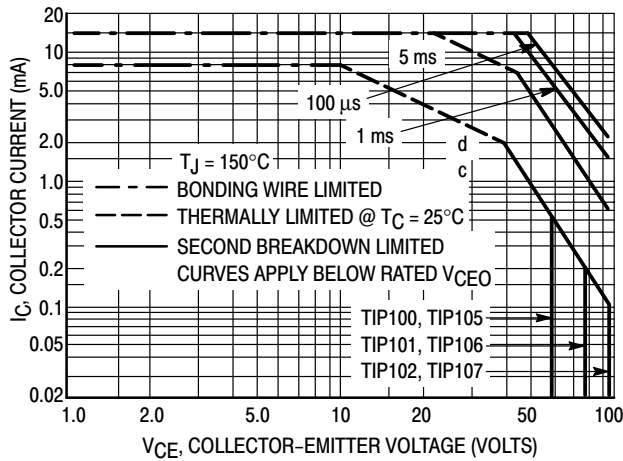


Figure 5. Active-Region Safe Operating Area

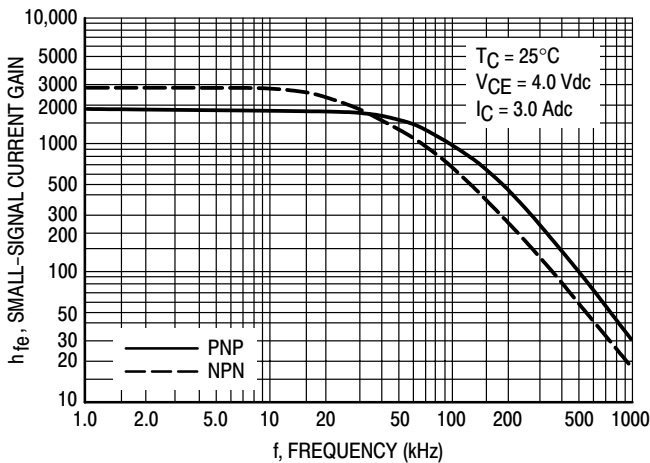


Figure 6. Small-Signal Current Gain

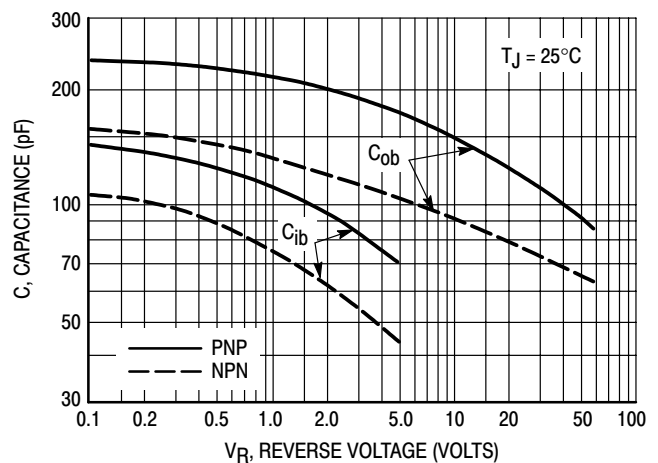


Figure 7. Capacitance

TIP100 TIP101 TIP102 TIP105 TIP106 TIP107

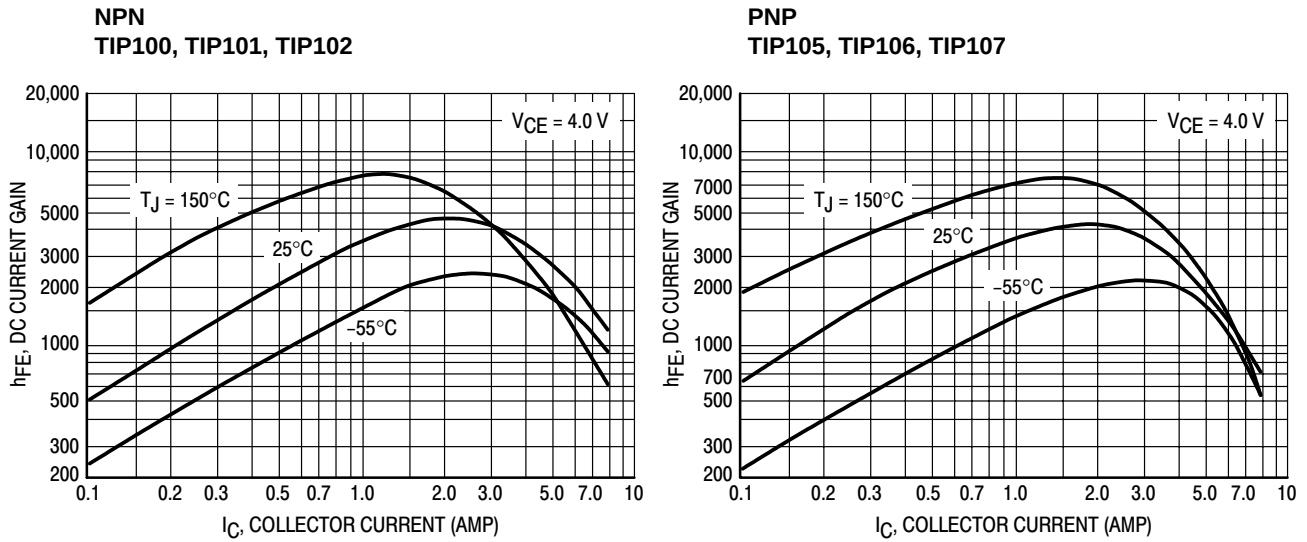


Figure 8. DC Current Gain

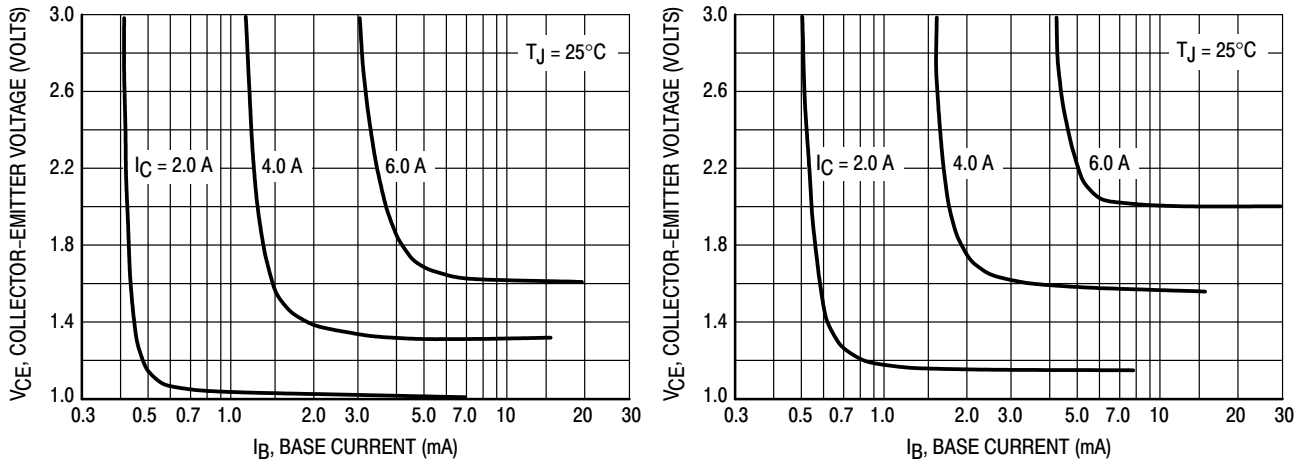


Figure 9. Collector Saturation Region

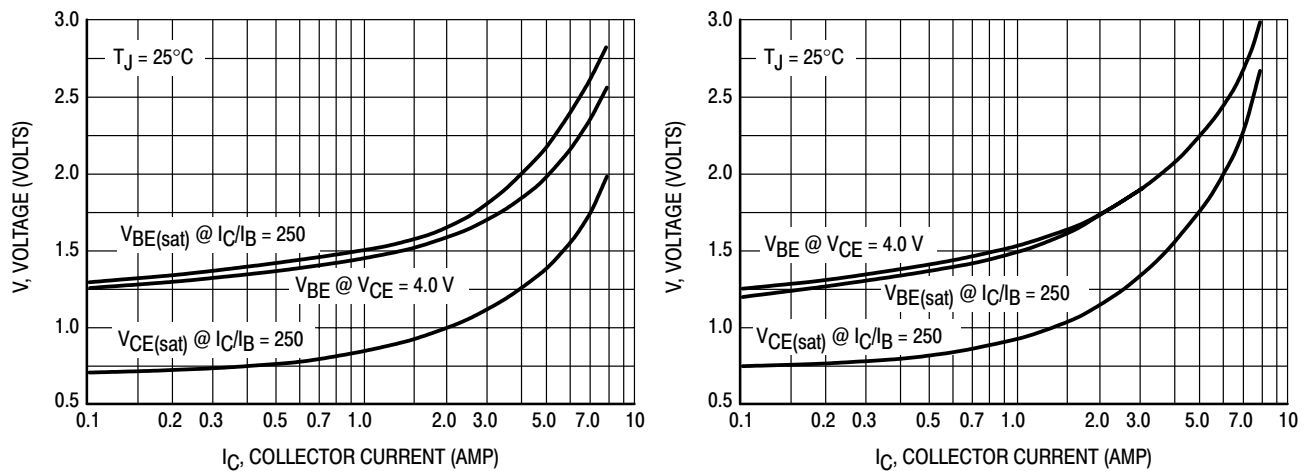
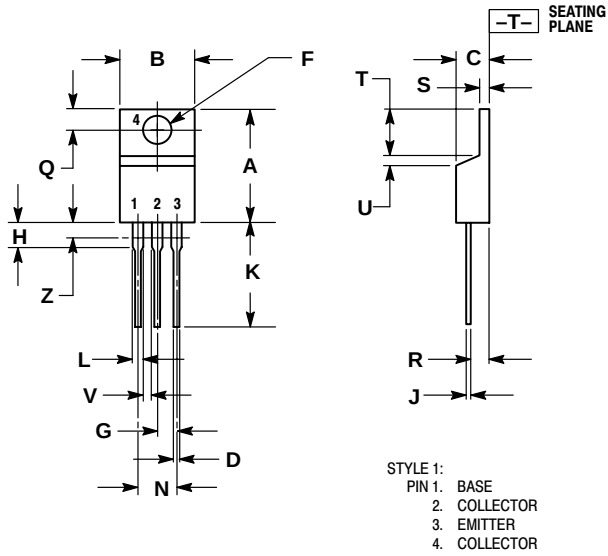


Figure 10. "On" Voltages

TIP100 TIP101 TIP102 TIP105 TIP106 TIP107

PACKAGE DIMENSIONS

TO-220AB CASE 221A-09 ISSUE AA



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

Notes

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