Complementary Silicon Transistors, Plastic, Medium-Power

TIP100, TIP101, TIP102 (NPN); TIP105, TIP106, TIP107 (PNP)

Designed for general−purpose amplifier and low−speed switching applications.

Features

- 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
- These Devices are Pb−Free and are RoHS Compliant

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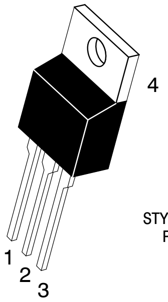
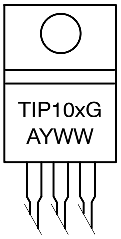
DARLINGTON 8 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS 60−80−100 VOLTS, 80 WATTS



TO−220AB
CASE 221A
STYLE 1

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

MARKING DIAGRAM



TIP10x = Device Code
x = 0, 1, 2, 5, 6, or 7
A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

See detailed ordering and shipping information on page 3 of this data sheet.

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 @ $T_C = 25°C$ Derate above 25°C	P_D	80 0.64			W W/°C
Unclamped Inductive Load Energy (1)	E	30			mJ
Total Power Dissipation @ $T_A = 25°C$ Derate above 25°C	P_D	2.0 0.016			W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +150			°C

THERMAL CHARACTERISTICS

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

ELECTRICAL CHARACTERISTICS ($T_C = 25°C$ unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Sustaining Voltage (1) ($I_C = 30$ mAdc, $I_B = 0$)	 TIP100, TIP105 TIP101, TIP106 TIP102, TIP107	$V_{CEO(sus)}$	 60 80 100	 − − −	Vdc
Collector Cutoff Current ($V_{CE} = 30$ Vdc, $I_B = 0$) ($V_{CE} = 40$ Vdc, $I_B = 0$) ($V_{CE} = 50$ Vdc, $I_B = 0$)	 TIP100, TIP105 TIP101, TIP106 TIP102, TIP107	I_{CEO}	 − − −	 50 50 50	μAdc
Collector Cutoff Current ($V_{CB} = 60$ Vdc, $I_E = 0$) ($V_{CB} = 80$ Vdc, $I_E = 0$) ($V_{CB} = 100$ Vdc, $I_E = 0$)	 TIP100, TIP105 TIP101, TIP106 TIP102, TIP107	I_{CBO}	 − − −	 50 50 50	μAdc
Emitter Cutoff Current ($V_{BE} = 5.0$ Vdc, $I_C = 0$)		I_{EBO}	−	8.0	mAdc
ON CHARACTERISTICS (1)					
DC Current Gain ($I_C = 3.0$ Adc, $V_{CE} = 4.0$ Vdc) ($I_C = 8.0$ Adc, $V_{CE} = 4.0$ Vdc)		h_{FE}	 1000 200	 20,000 −	−
Collector−Emitter Saturation Voltage ($I_C = 3.0$ Adc, $I_B = 6.0$ mAdc) ($I_C = 8.0$ Adc, $I_B = 80$ mAdc)		$V_{CE(sat)}$	 − −	 2.0 2.5	Vdc
Base−Emitter On Voltage ($I_C = 8.0$ Adc, $V_{CE} = 4.0$ Vdc)		$V_{BE(on)}$	−	2.8	Vdc
DYNAMIC CHARACTERISTICS					
Small−Signal Current Gain ($I_C = 3.0$ Adc, $V_{CE} = 4.0$ Vdc, f = 1.0 MHz)		h_{fe}	4.0	−	−
Output Capacitance ($V_{CB} = 10$ Vdc, $I_E = 0$, f = 0.1 MHz)	TIP105, TIP106, TIP107 TIP100, TIP101, TIP102	C_{ob}	− −	300 200	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

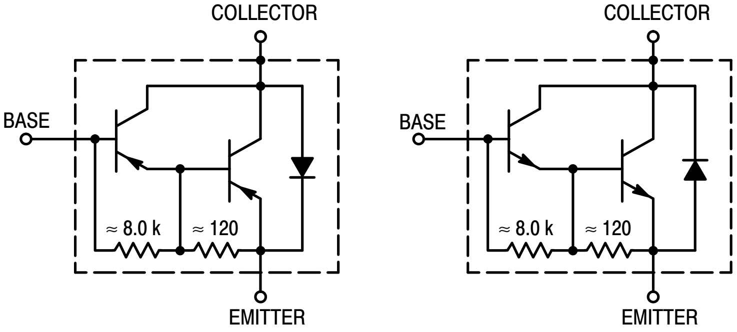


Figure 1. Darlington Circuit Schematic

ORDERING INFORMATION

Device	Package	Shipping
TIP100	TO−220	50 Units / Rail
TIP100G	TO−220 (Pb−Free)	50 Units / Rail
TIP101	TO−220	50 Units / Rail
TIP101G	TO−220 (Pb−Free)	50 Units / Rail
TIP102	TO−220	50 Units / Rail
TIP102G	TO−220 (Pb−Free)	50 Units / Rail
TIP105	TO−220	50 Units / Rail
TIP105G	TO−220 (Pb−Free)	50 Units / Rail
TIP106	TO−220	50 Units / Rail
TIP106G	TO−220 (Pb−Free)	50 Units / Rail
TIP107	TO−220	50 Units / Rail
TIP107G	TO−220 (Pb−Free)	50 Units / Rail

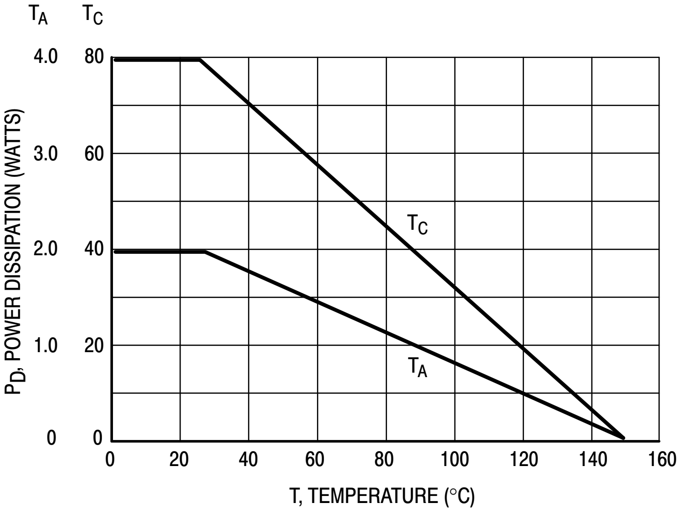


Figure 2. Power Derating