



ELECTRONICS, INC.  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089

## TIP105 Silicon PNP Transistor Darlington Power Amp, Switch TO-220 Type Package

**Description:**

The TIP105 is a silicon PNP Darlington transistor in a TO-220 type package designed for general purpose amplifier and low-speed switching applications.

**Features:**

- High DC Current Gain:  $h_{FE} = 2500$  (Typ) at  $I_C = 4A$
- Collector-Emitter Sustaining Voltage:  $V_{CEO(sus)} = 60V$  (Min) at  $I_C = 30mA$
- Low Collector-Emitter Saturation Voltage:  $V_{CE(sat)} = 2V$  (Max) at  $I_C = 3A$   
 $V_{CE(sat)} = 2.5V$  (Max) at  $I_C = 8A$

**Absolute Maximum Ratings:** (Note 1)

Collector-Emitter Voltage, $V_{CEO}$ .....	60V
Collector-Base Voltage, $V_{CB}$ .....	60V
Emitter-Base Voltage, $V_{EB}$ .....	5V
Collector Current, $I_C$	
Continuous .....	8A
Peak .....	15A
Base Current, $I_B$ .....	1A
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	80W
Derate Above $+25^\circ C$ .....	0.64W/ $^\circ C$
Unclamped Inductive Load Energy (Note 2), $E$ .....	30mJ
Total Power Dissipation ( $T_A = +25^\circ C$ ), $P_D$ .....	2.0W
Derate Above $+25^\circ C$ .....	0.016W/ $^\circ C$
Operating Junction Temperature Range, $T_J$ .....	$-65^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-65^\circ$ to $+150^\circ C$
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	1.56 $^\circ C/W$
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	62.5 $^\circ C/W$

Note 1. Stresses exceeding those listed in the Absolute Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damages may occur and reliability may be affected.

Note 2.  $I_C = 1.1A$ ,  $L = 50mH$ , P.R.F. = 10Hz,  $V_{CC} = 20V$ ,  $R_{BE} = 100\Omega$ .

**Electrical Characteristics:** ( $T_C = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Collector–Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C = 30\text{mA}, I_B = 0$ , Note 3	60	–	–	V
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 60\text{V}, I_E = 0$	–	–	50	$\mu\text{A}$
	$I_{CEO}$	$V_{CE} = 30\text{V}, I_B = 0$	–	–	50	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{BE} = 5\text{V}, I_C = 0$	–	–	8	mA
<b>ON Characteristics</b> (Note 3)						
DC Current Gain	$h_{FE}$	$V_{CE} = 4\text{V}, I_C = 3\text{A}$	1000	–	20,000	
		$V_{CE} = 4\text{V}, I_C = 8\text{A}$	200	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 3\text{A}, I_B = 6\text{mA}$	–	–	2.0	V
		$I_C = 8\text{A}, I_B = 80\text{mA}$ ,	–	–	2.5	V
Base–Emitter On Voltage	$V_{BE(on)}$	$I_C = 8\text{A}, V_{CE} = 4\text{V}$	–	–	2.8	V
<b>Dynamic Characteristics</b>						
Small–Signal Current Gain	$h_{fe}$	$I_C = 3\text{A}, V_{CE} = 4\text{V}, f = 1\text{MHz}$	4.0	–	–	
Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{V}, I_E = 0, f = 0.1\text{MHz}$	–	–	300	pF

Note 3. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

