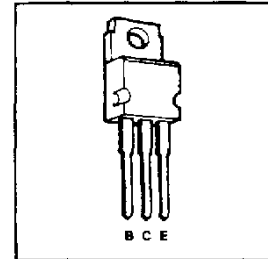


TIP115, TIP116, TIP117
PNP DARLINGTON - CONNECTED
SILICON POWER TRANSISTORS

SLPS053 Revised March 1990

- Designed for Complementary Use with TIP110, TIP111 and TIP112
- 50 W at 25°C Case Temperature
- 4 A Continuous Collector Current
- Min h_{FE} of 500 at 4 V, 2 A
- Designed for Ignition Systems, Motor Control and Solenoid Driver Applications



PACKAGE: TO220

Absolute Maximum Ratings at 25°C Case Temperature (unless otherwise noted)

		TIP115	TIP116	TIP117
V_{CBO}	Collector - base voltage ($I_E = 0$)	-60 V	-80 V	-100 V
V_{CEO}	Collector - emitter voltage ($I_B = 0$)	-60 V	-80 V	-100 V
V_{EBO}	Base - emitter voltage		-5 V	
I_C	Continuous collector current		-4 A	
I_{CM}	Peak collector current (Note 1)		-6 A	
I_B	Continuous base current		-50 mA	
P_{tot}	Continuous device dissipation at (or below) 25°C case temperature (Note 2)		50 W	
P_{tot}	Continuous device dissipation at (or below) 25°C free - air temperature (Note 3)		2 W	
$I_C^2 L/2$	Unclamped inductive load energy (Note 4)		25 mJ	
T_j & T_{stg}	Operating junction and storage temperature range	-65°C to +150°C		
T_L	Lead temperature 3.2 mm from case for 10 seconds	260°C		

- NOTES
1. This value applies for $L \leq 0.3$ m, duty cycle $\leq 10\%$.
 2. Derate linearly to +150°C case temperature at the rate of 0.4 W/°C.
 3. Derate linearly to +150°C free - air temperature at the rate of 16 mW/°C.
 4. This rating is based on the capability of the transistors to operate safely in a circuit of: $L = 20$ mH, $R_{load} = 100 \Omega$, $V_{EBO} = 0$ V, $R_B = 0.1 \Omega$, $V_{CC} = 20$ V, Energy = $I_C^2 L/2$.

Electrical Characteristics at 25°C Case Temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector - emitter sustaining voltage $I_C = -30$ mA $I_B = 0$ (Note 5)	TIP115 -60 TIP116 -80 TIP117 -100			V
I_{CEO}	Collector - emitter cut - off current $V_{CE} = -30$ V $I_B = 0$ $V_{CE} = -40$ V $I_B = 0$ $V_{CE} = -50$ V $I_B = 0$	TIP115 -2 TIP116 -2 TIP117 -2			mA
I_{CBO}	Collector cut - off current $V_{CB} = -60$ V $I_E = 0$ $V_{CB} = -80$ V $I_E = 0$ $V_{CB} = -100$ V $I_E = 0$	TIP115 -1 TIP116 -1 TIP117 -1			mA
I_{EBO}	Emitter cut - off current $V_{EB} = -5$ V $I_C = 0$			-2	mA
h_{FE}	Forward current transfer ratio $V_{CE} = -4$ V $I_C = -1$ A $V_{CE} = -4$ V $I_C = -2$ A	(Notes 5 & 6) 1000 500			
$V_{CE(sat)}$	Collector - emitter saturation voltage $I_B = -8$ mA $I_C = -2$ A	(Notes 5 & 6)		-2.5	V
V_{BE}	Base - emitter voltage $V_{CE} = -4$ V $I_C = -2$ A	(Notes 5 & 6)		-2.8	V
V_F	Parallel diode forward voltage $I_F = -I_C = -5$ A $I_B = 0$	(Notes 5 & 6)		3.5	V

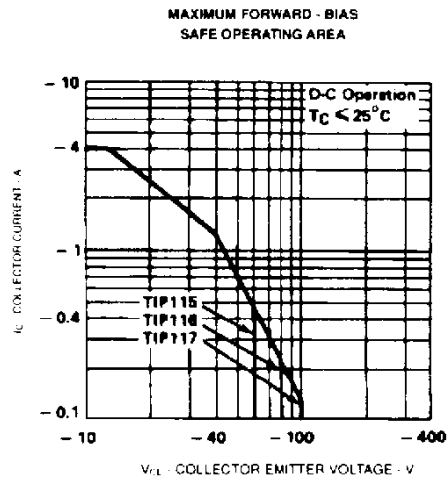
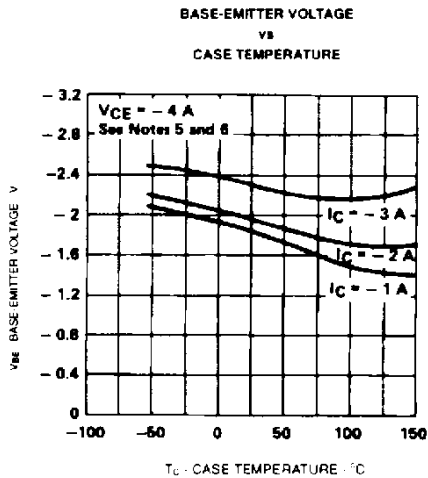
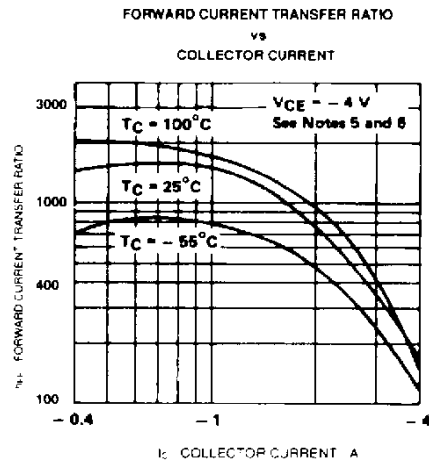
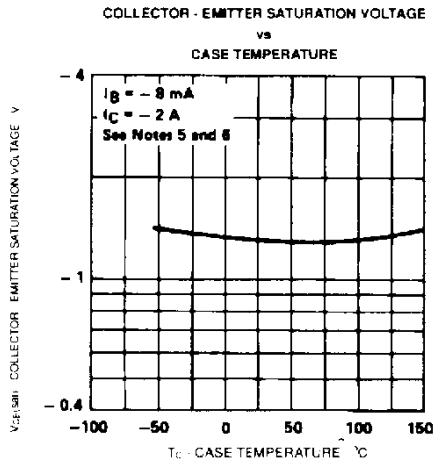
TIP115, TIP116, TIP117 PNP DARLINGTON - CONNECTED SILICON POWER TRANSISTORS

Resistive - Load - Switching Characteristics at 25°C Case Temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	MIN	TYP	MAX	UNIT
t_{on} Turn on time	$I_C = -2\text{ A}$ $I_{B(on)} = -8\text{ mA}$ $I_{B(off)} = 8\text{ mA}$		2.6		μs
t_{off} Turn off time	$V_{BE(off)} = 5\text{ V}$ $R_L = 15\ \Omega$		4.5		μs

† Voltage and current values shown are nominal, exact values vary slightly with transistor parameters.
 NOTES: 5. These parameters must be measured using pulse techniques, $t_w = 300\ \mu\text{s}$, duty cycle = 2%.
 6. These parameters must be measured using voltage sensing contacts separate from the current carrying contacts.

TYPICAL CHARACTERISTICS



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