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TIP140 Silicon NPN Transistor Darlington Power Amp, Switch TO-247 Type Package

Description:

The TIP140 is a silicon NPN Darlington transistor in a TO-247 type package designed for general purpose amplifier and low frequency switching applications.

Features:

- High DC Current Gain: $h_{FE} = 1000$ (Min) at $I_C = 5A$, $V_{CE} = 4V$
- Collector-Emitter Sustaining Voltage: $V_{CEO(sus)} = 60V$ (Min) at $I_C = 30mA$

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	10A
Peak (Note 2)	15A
Base Current, I_B	500mA
Total Power Dissipation ($T_C = +25^\circ C$), P_D	125W
Operating Junction Temperature Range, T_J	-65° to $+150^\circ C$
Storage Temperature Range, T_{stg}	-65° to $+150^\circ C$
Thermal Resistance, Junction-to-Case, R_{thJC}	$1.0^\circ C/W$
Thermal Resistance, Junction-to-Ambient, R_{thJA}	$35.7^\circ C/W$

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. 5ms, $\leq 10\%$ Duty Cycle

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C = 30mA$, $I_B = 0$, Note 3	60	-	-	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 60V$, $I_E = 0$	-	-	1.0	mA
		$V_{CE} = 30V$, $I_B = 0$	-	-	2.0	mA
Emitter Cutoff Current	I_{EBO}	$V_{BE} = 5V$	-	-	2	mA

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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics (Note 3)						
DC Current Gain	h_{FE}	$V_{CE} = 4\text{V}, I_C = 5\text{A}$	1000	-	-	
		$V_{CE} = 4\text{V}, I_C = 10\text{A}$	500	-	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 5\text{A}, I_B = 10\text{mA}$	-	-	2.0	V
		$I_C = 10\text{A}, I_B = 40\text{mA}$	-	-	3.0	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{A}, I_B = 40\text{mA}$	-	-	3.5	V
Base-Emitter On Voltage	$V_{BE(on)}$	$I_C = 10\text{A}, V_{CE} = 4\text{V}$	-	-	3.0	V
Switching Characteristics						
Delay Time	t_d	$V_{CC} = 30\text{V}, I_C = 5\text{A}, I_B = 20\text{mA},$ Duty Cycle $\leq 2\%$, $I_{B1} = I_{B2},$ R_C & R_B Varied, $T_J = +25^\circ\text{C}$	-	0.15	-	μs
Rise Time	t_r		-	0.55	-	μs
Storage Time	t_s		-	2.5	-	μs
Fall Time	t_f		-	2.5	-	μs

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

