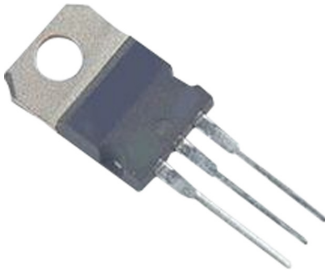
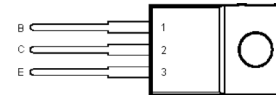


Darlington Transistor TO-220

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TO-220 Package (Top View)



Pin 2 is in electrical contact with the mounting base.

Features:

- 70W at 25°C case temperature
- 8A continuous collector current
- Min. hFE of 1,000 at 4V, 4A

Absolute Maximum Ratings at 25°C Case Temperature (Unless Otherwise Noted)

Rating	Symbol	Value	Unit
Collector-base voltage ($I_E = 0$)	V_{CBO}	-100	V
Collector-emitter voltage ($I_B = 0$)	V_{CEO}		
Emitter-base voltage	V_{EBO}	-5	
Continuous collector current	I_C	-8	A
Peak collector current (note 1)	I_{CM}	-12	
Continuous base current	I_B	-0.3	
Continuous device dissipation at (or below) 25°C case temperature (note 2)	P_{tot}	70	W
Continuous device dissipation at (or below) 25°C free air temperature (note 3)		2	
Unclamped inductive load energy (note 4)	$1/2LI_C^2$	75	mJ
Operating junction temperature range	T_j	-65 to +150	°C
Storage temperature range	T_{stg}		
Lead temperature 3.2mm from case for 10 seconds	T_L	260	

Notes:

1. This value applies for $t_p \leq 0.3\text{ms}$, duty cycle $\leq 10\%$
2. Derate linearly to 150°C case temperature at the rate of $0.56\text{W}/^\circ\text{C}$
3. Derate linearly to 150°C free air temperature at the rate of $16\text{mW}/^\circ\text{C}$
4. This rating is based on the capability of the transistor to operate safely in a circuit of: $L = 20\text{mH}$, $I_{B(on)} = -5\text{mA}$, $R_{BE} = 100\Omega$, $V_{BE(off)} = 0$, $R_S = 0.1\Omega$, $V_{CC} = -20\text{V}$

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Electrical characteristics at 25°C case temperature

Parameter	Test Conditions	Min.	Symbol	Max.	Unit
Collector-emitter breakdown voltage	$I_C = -30\text{mA}$ $I_B = 0$ (Note 5)	-100	$V_{(BR)CEO}$	-	V
Collector-emitter cut-off current	$V_{CE} = -50\text{V}$ $I_B = 0$	-	I_{CEO}	-0.5	mA
Collector cut-off current	$V_{CB} = -100\text{V}$ $I_E = 0$ $V_{CB} = -100\text{V}$ $I_E = 0$ $T_C = 100^\circ\text{C}$	-	I_{CBO}	-0.2 -1	
Emitter cut-off current	$V_{EB} = -5\text{V}$ $I_C = 0$	-	I_{EBO}	-5	
Forward current transfer ratio	$V_{CE} = -4\text{V}$ $I_C = -1\text{A}$ $V_{CE} = -4\text{V}$ $I_C = -4\text{A}$ (Notes 5 and 6)	500 1,000	h_{FE}	15,000	-
Collector-emitter saturation voltage	$I_B = -16\text{mA}$ $I_C = -4\text{A}$ $I_B = -30\text{mA}$ $I_C = -6\text{A}$ (Notes 5 and 6)	-	$V_{CE(sat)}$	-2 -3	V
Base-emitter voltage	$V_{CE} = -4\text{V}$ $I_C = -4\text{A}$ (Notes 5 and 6)	-	V_{BE}	-2.5	
Output capacitance	$V_{CB} = -10\text{V}$ $I_E = 0$	-	C_{obo}	200	pF
Parallel diode forward voltage	$I_E = -8\text{A}$ $I_B = 0$ (Notes 5 and 6)	-	V_{EC}	-3.5	V

Notes:

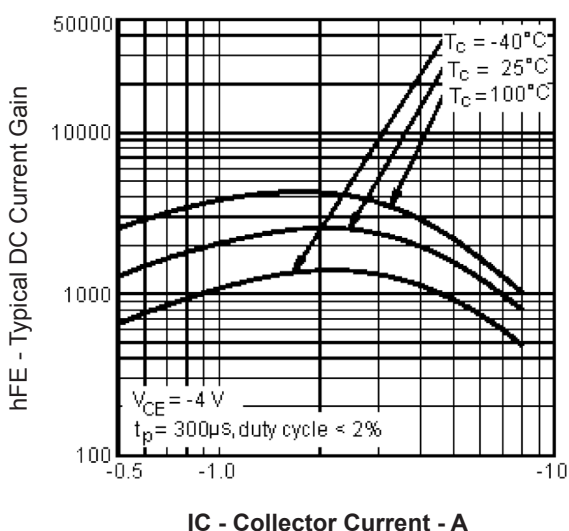
- These parameters must be measured using pulse techniques, $t_p = 300\mu\text{s}$, duty cycle $\leq 2\%$.
- These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts

Thermal Characteristics

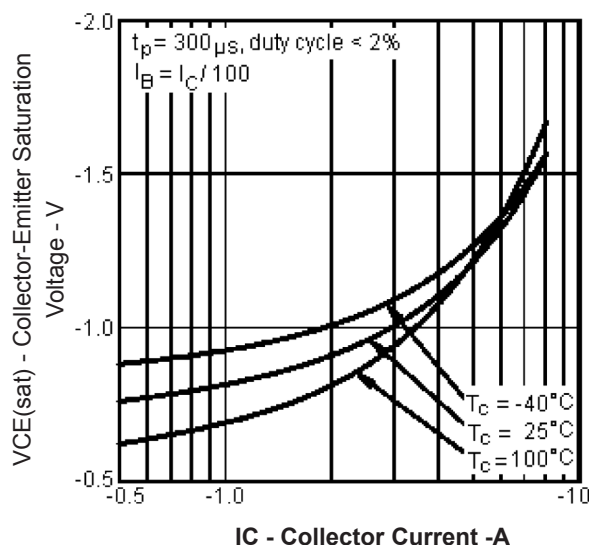
Parameter	Symbol	Min.	Typical	Max.	Unit
Junction to case thermal resistance	$R_{\theta JC}$	-	-	1.78	$^\circ\text{C/W}$
Junction to free air thermal resistance	$R_{\theta JA}$	-	-	62.5	

Typical Characteristics

Typical DC Current Gain vs Collector Current

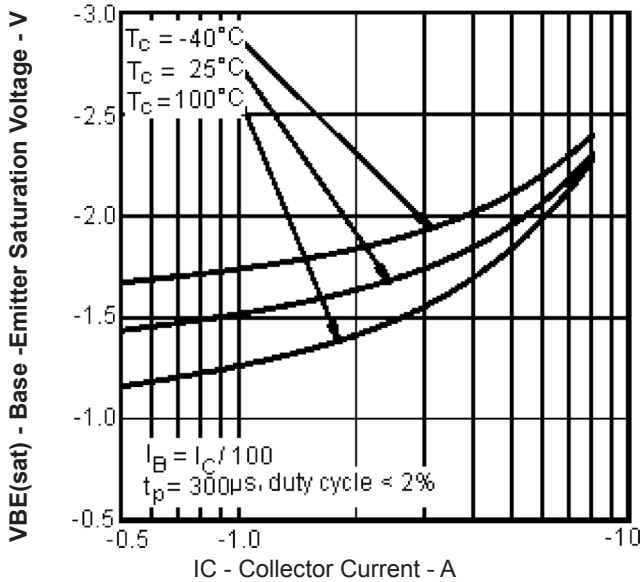


Collector-Emitter Saturation Voltage vs Collector Current



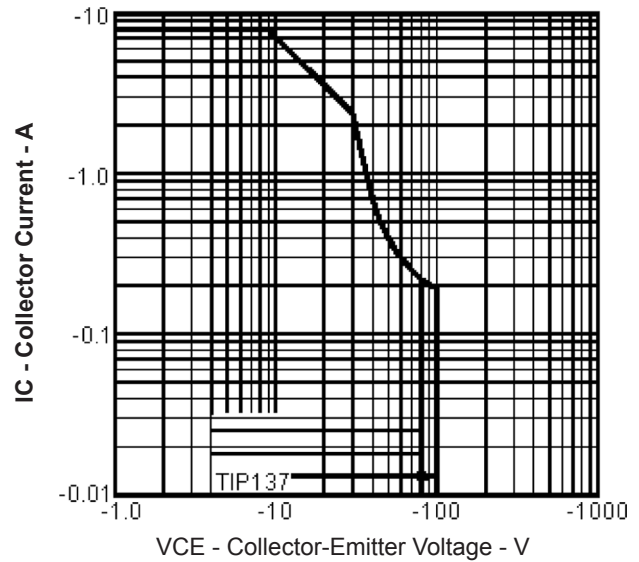
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Base-Emitter Saturation Voltage vs Collector Current



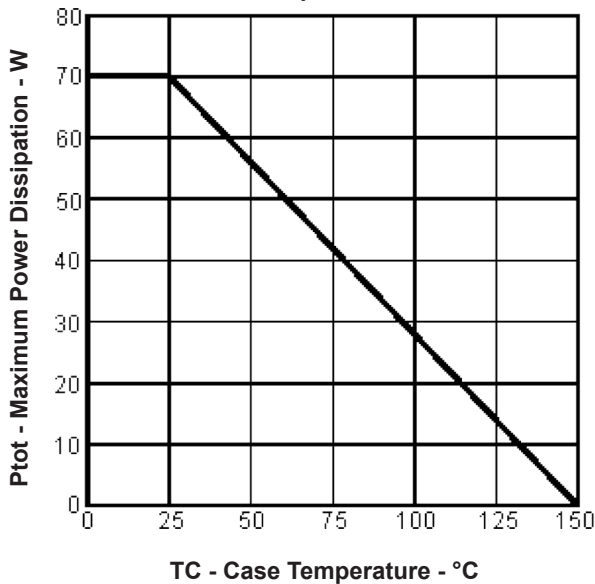
Maximum Safe Operating Regions

Maximum Forward-Bias Safe Operating Area



Thermal Information

Maximum Power Dissipation vs Case Temperature



Part Number Table

Description	Part Number
Darlington Transistor, TO-220	TIP137

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