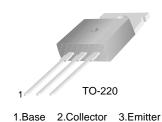


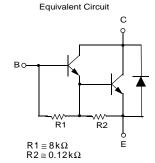
ON Semiconductor®

TIP120 / TIP121 / TIP122 NPN Epitaxial Darlington Transistor

Features

- Medium Power Linear Switching Applications
- Complementary to TIP125 / TIP126 / TIP127





Ordering Information

Part Number	Top Mark	Package	Packing Method
TIP120	TIP120	TO-220 3L (Single Gauge)	Bulk
TIP120TU	TIP120	TO-220 3L (Single Gauge)	Rail
TIP121	TIP121	TO-220 3L (Single Gauge)	Bulk
TIP121TU	TIP121	TO-220 3L (Single Gauge)	Rail
TIP122	TIP122	TO-220 3L (Single Gauge)	Bulk
TIP122TU	TIP122	TO-220 3L (Single Gauge)	Rail

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_C = 25^{\circ}C$ unless otherwise noted.

Symbol	Parameter	Value	Unit	
		TIP120	60	
V_{CBO}	Collector-Base Voltage	TIP121	80	V
		TIP122	100	
V _{CEO} Collector-Emitter Voltage	Collector-Emitter Voltage	TIP120	60	
		TIP121	80	V
		TIP122	100	
V _{EBO}	Emitter-Base Voltage		5	V
I _C	Collector Current (DC)		5	А
I _{CP}	Collector Current (Pulse)		8	А
I _B	Base Current (DC)		120	mA
TJ	Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-65 to 150	°C

Thermal Characteristics

Values are at $T_C = 25^{\circ}C$ unless otherwise noted.

Symbol	Parameter	Value	Unit
P _C	Collector Dissipation (T _A = 25°C)	2	W
	Collector Dissipation (T _C = 25°C)	65	

Electrical Characteristics

Values are at $T_C = 25$ °C unless otherwise noted.

Symbol	Parameter		Conditions	Min.	Max.	Unit
V _{CEO} (sus)	Collector-Emitter Sustaining Voltage	TIP120	I _C = 100 mA, I _B = 0	60		V
		TIP121		80		
		TIP122		100		
I _{CEO}	Collector Cut-Off Current	TIP120	$V_{CE} = 30 \text{ V}, I_{B} = 0$		0.5	mA
		TIP121	$V_{CE} = 40 \text{ V}, I_{B} = 0$		0.5	
		TIP122	$V_{CE} = 50 \text{ V}, I_{B} = 0$		0.5	
	Collector Cut-Off Current	TIP120	$V_{CB} = 60 \text{ V}, I_{E} = 0$		0.2	mA
I _{CBO}		TIP121	$V_{CB} = 80 \text{ V}, I_{E} = 0$		0.2	
		TIP122	$V_{CB} = 100 \text{ V}, I_{E} = 0$		0.2	
I _{EBO}	Emitter Cut-Off Current		$V_{EB} = 5 \text{ V}, I_{C} = 0$		2	mA
h _{FE}	DC Current Gain ⁽¹⁾		$V_{CE} = 3 \text{ V, } I_{C} = 0.5 \text{ A}$	1000		
			$V_{CE} = 3 \text{ V}, I_{C} = 3 \text{ A}$	1000		
V _{CE} (sat)	Collector-Emitter Saturation Voltage ⁽¹⁾		$I_C = 3 \text{ A}, I_B = 12 \text{ mA}$		2.0	V
			$I_C = 5 \text{ A}, I_B = 20 \text{ mA}$		4.0	
V _{BE} (on)	Base-Emitter On Voltage ⁽¹⁾		$V_{CE} = 3 \text{ V, } I_{C} = 3 \text{ A}$		2.5	V
C _{ob}	Output Capacitance		V _{CB} = 10 V, I _E = 0, f = 0.1 MHz		200	pF

Note:

1. Pulse test: $pw \le 300 \mu s$, duty cycle $\le 2\%$.

Typical Performance Characteristics

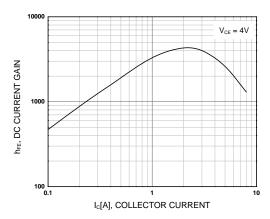


Figure 1. DC Current Gain

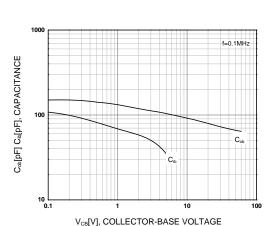


Figure 3. Output and Input Capacitance vs. Reverse Voltage

V_{EB}[V], EMITTER-BASE VOLTAGE

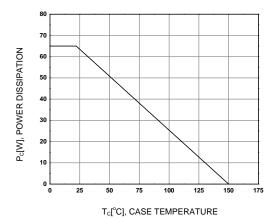


Figure 5. Power Derating

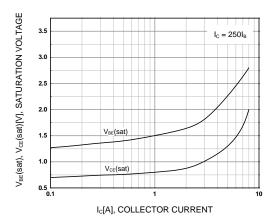


Figure 2. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

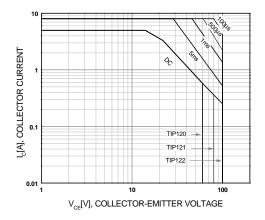
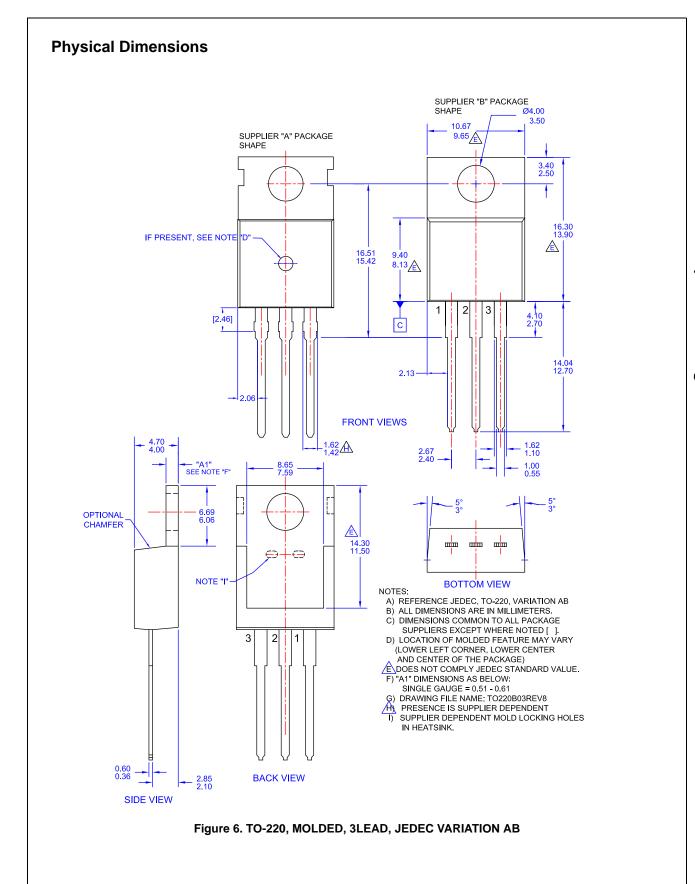


Figure 4. Safe Operating Area



ON Semiconductor and in are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hol

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor 19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada Email: orderlit@onsemi.com N. American Technical Support: 800-282-9855 Toll Free USA/Canada Europe, Middle East and Africa Technical Support: Phone: 421 33 790 2910

Phone: 421 33 790 2910

Japan Customer Focus Center
Phone: 81–3–5817–1050

ON Semiconductor Website: www.onsemi.com

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative