

TIP131, TIP132 (NPN), TIP137 (PNP)

Preferred Devices

Darlington Complementary Silicon Power Transistors

Designed for general-purpose amplifier and low-speed switching applications.

Features

- High DC Current Gain –
 $h_{FE} = 2500$ (Typ) @ I_C
 $= 4.0$ Adc
- Collector-Emitter Sustaining Voltage – @ 30 mAdc
 $V_{CEO(sus)} = 80$ Vdc (Min) – TIP131
 $= 100$ Vdc (Min) – TIP132, TIP137
- Low Collector-Emitter Saturation Voltage –
 $V_{CE(sat)} = 2.0$ Vdc (Max) @ $I_C = 4.0$ Adc
 $= 3.0$ Vdc (Max) @ $I_C = 6.0$ Adc
- Monolithic Construction with Built-In Base-Emitter Shunt Resistors
- Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	TIP131	TIP132 TIP137	Unit
Collector-Emitter Voltage	V_{CEO}	80	100	Vdc
Collector-Base Voltage	V_{CB}	80	100	Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current – Continuous Peak	I_C	8.0 12		Adc
Base Current	I_B	300		mAdc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_D	70		W
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_D	2.0		W
Operating and Storage Junction, Temperature Range	T_J, T_{stg}	–65 to +150		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.78	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	63.5	$^\circ\text{C/W}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

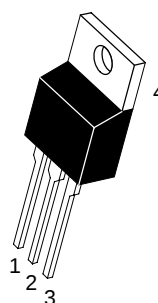
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

<http://onsemi.com>

DARLINGTON 8 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS 80–100 VOLTS, 70 WATTS



TO-220AB
CASE 221A
STYLE 1

MARKING DIAGRAM



TIP13x = Device Code
x = 1, 2, or 7
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping
TIP131	TO-220	50 Units/Rail
TIP131G	TO-220 (Pb-Free)	50 Units/Rail
TIP132	TO-220	50 Units/Rail
TIP132G	TO-220 (Pb-Free)	50 Units/Rail
TIP137	TO-220	50 Units/Rail
TIP137G	TO-220 (Pb-Free)	50 Units/Rail

Preferred devices are recommended choices for future use and best overall value.

TIP131, TIP132 (NPN), TIP137 (PNP)

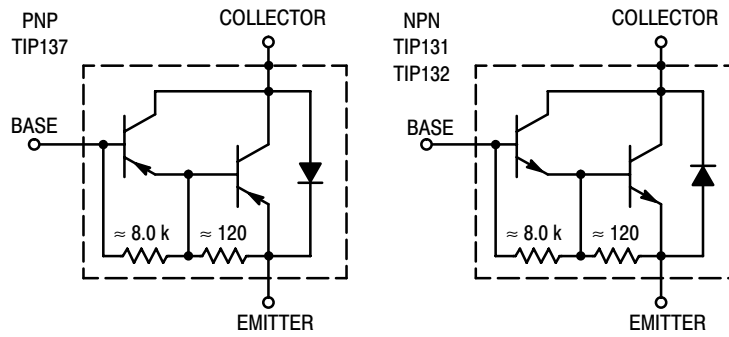


Figure 1. Darlington Circuit Schematic

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage (Note 1) ($I_C = 30 \text{ mAdc}$, $I_B = 0$)	$V_{CE(sus)}$	80 100	– –	Vdc
Collector Cutoff Current ($V_{CE} = 40 \text{ Vdc}$, $I_B = 0$) ($V_{CE} = 50 \text{ Vdc}$, $I_B = 0$)	I_{CEO}	– –	0.5 0.5	mAdc
Collector Cutoff Current ($V_{CB} = 80 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 100 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	– –	0.2 0.2	mAdc
Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	–	5.0	mAdc
ON CHARACTERISTICS (Note 1)				
DC Current Gain ($I_C = 1.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) ($I_C = 4.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$)	h_{FE}	500 1000	– 15000	–
Collector-Emitter Saturation Voltage ($I_C = 4.0 \text{ Adc}$, $I_B = 16 \text{ mAdc}$) ($I_C = 6.0 \text{ Adc}$, $I_B = 30 \text{ mAdc}$)	$V_{CE(sat)}$	– –	2.0 3.0	Vdc
Base-Emitter On Voltage ($I_C = 4.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$)	$V_{BE(on)}$	–	2.5	Vdc

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

TIP131, TIP132 (NPN), TIP137 (PNP)

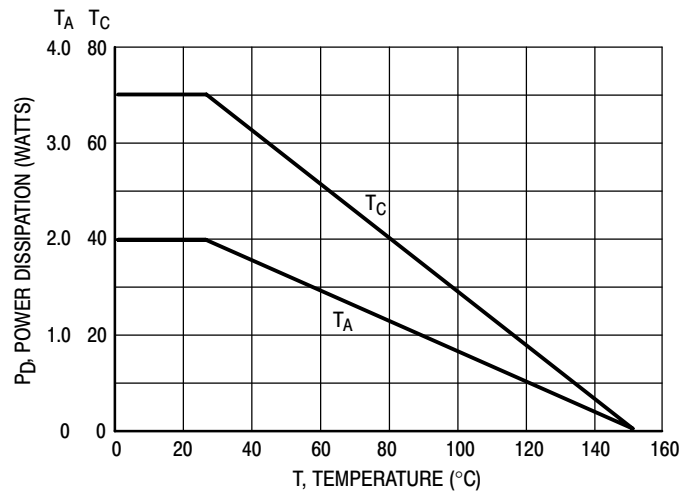


Figure 2. Power Derating

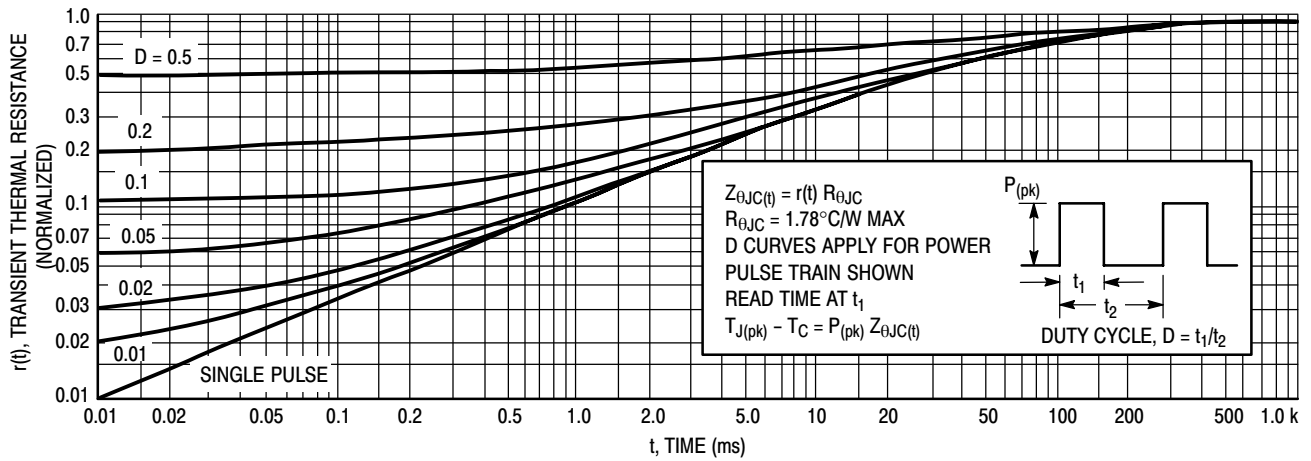
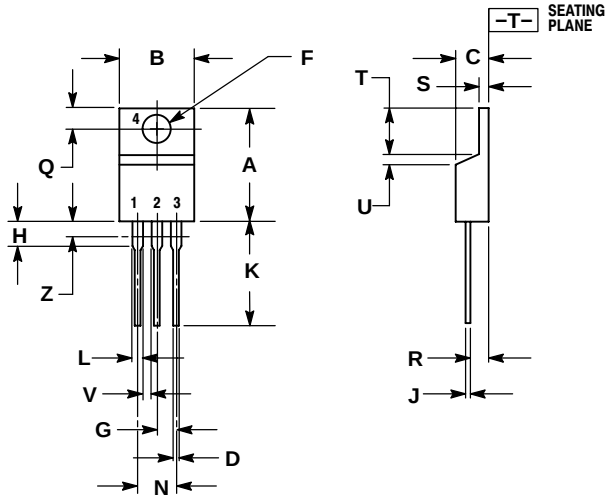


Figure 3. Thermal Response

TIP131, TIP132 (NPN), TIP137 (PNP)

PACKAGE DIMENSIONS

TO-220
CASE 221A-09
ISSUE AA



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

STYLE 1:

- PIN 1: BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082-1312 USA
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your local Sales Representative.