



# TIP102 TIP105 TIP107

## COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

- STMicroelectronics PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

### APPLICATIONS

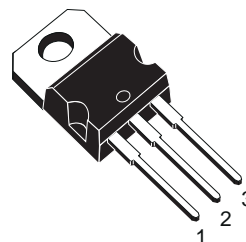
- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

### DESCRIPTION

The TIP102 is a silicon Epitaxial-Base NPN power transistor in monolithic Darlington configuration mounted in TO-220 plastic package. It is intended for use in power linear and switching applications.

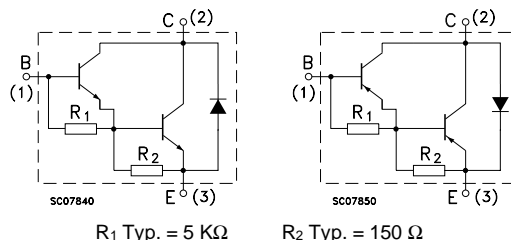
The complementary PNP type is TIP107.

Also TIP105 is a PNP type.



TO-220

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		NPN	TIP102	
V <sub>CBO</sub>	Collector-Base Voltage (I <sub>E</sub> = 0)	60	100	V
V <sub>CEO</sub>	Collector-Emitter Voltage (I <sub>B</sub> = 0)	60	100	V
V <sub>EBO</sub>	Emitter-Base Voltage (I <sub>C</sub> = 0)	5		V
I <sub>C</sub>	Collector Current	8		A
I <sub>CM</sub>	Collector Peak Current	15		A
I <sub>B</sub>	Base Current	1		A
P <sub>tot</sub>	Total Dissipation at T <sub>case</sub> ≤ 25 °C T <sub>amb</sub> ≤ 25 °C	80 2		W W
T <sub>stg</sub>	Storage Temperature	-65 to 150		°C
T <sub>j</sub>	Max. Operating Junction Temperature	150		°C

\* For PNP types voltage and current values are negative.

## TIP102 / TIP105 / TIP107

### THERMAL DATA

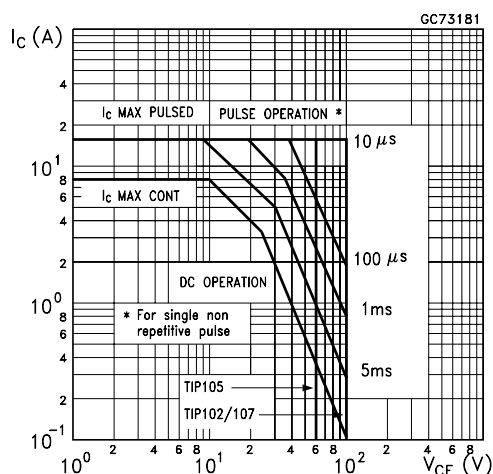
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	1.56	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	Max	62.5	°C/W

### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CEO</sub>	Collector Cut-off Current (I <sub>B</sub> = 0)	for <b>TIP105</b> V <sub>CE</sub> = 30 V for <b>TIP102/TIP107</b> V <sub>CE</sub> = 50 V			50 50	μA μA
I <sub>CBO</sub>	Collector Cut-off Current (I <sub>E</sub> = 0)	for <b>TIP105</b> V <sub>CB</sub> = 60 V for <b>TIP102/TIP107</b> V <sub>CB</sub> = 100 V			50 50	μA μA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 5 V			8	mA
V <sub>CEO(sus)</sub> *	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 30 mA for <b>TIP105</b> for <b>TIP102/TIP107</b>	60 100			V V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 3 A I <sub>B</sub> = 6 mA I <sub>C</sub> = 8 A I <sub>B</sub> = 80 mA			2 2.5	V V
V <sub>BE</sub> *	Base-Emitter Voltage	I <sub>C</sub> = 8 A V <sub>CE</sub> = 4 V			2.8	V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 3 A V <sub>CE</sub> = 4 V I <sub>C</sub> = 8 A V <sub>CE</sub> = 4 V	1000 200		20000	
V <sub>F</sub> *	Forward Voltage of Commutation Diode (I <sub>B</sub> = 0)	I <sub>F</sub> = - I <sub>C</sub> = 10 A			2.8	V

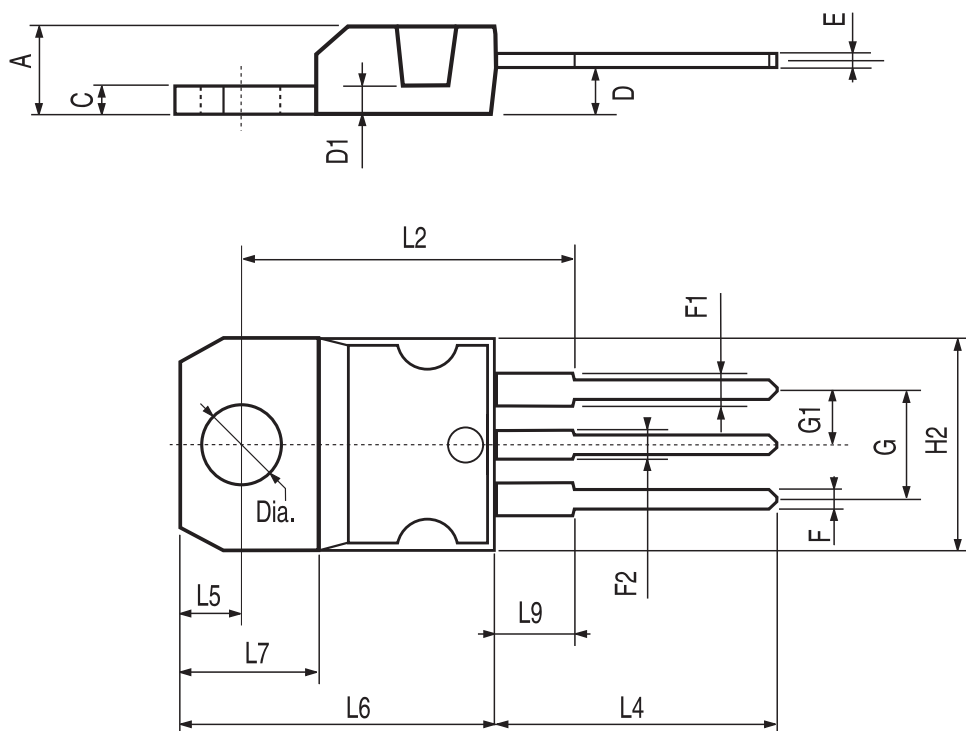
\* Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %  
For PNP types voltage and current values are negative.

### Safe Operating Area



## TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



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