TIP140/141/142
TIP145/146/147

COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

- TIP141, TIP142, TIP145 AND TIP147 ARE STMicroelectronics PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES
- MONOLITHIC DARLINGTON CONFIGURATION
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

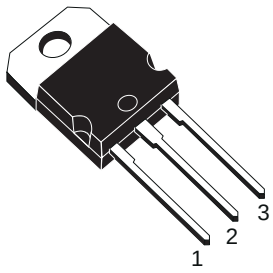
APPLICATIONS

- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

DESCRIPTION

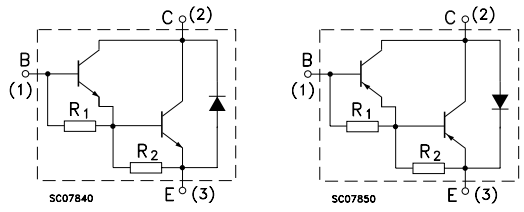
The TIP140, TIP141 and TIP142 are silicon Epitaxial-Base NPN power transistors in monolithic Darlington configuration, mounted in TO-218 plastic package. They are intented for use in power linear and switching applications.

The complementary PNP types are TIP145, TIP146 and TIP147 respectively.



TO-218

INTERNAL SCHEMATIC DIAGRAM



R_1 Typ. = 5 KΩ R_2 Typ. = 150 Ω

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value			Unit
		NPN	TIP140	TIP141	TIP142	
		PNP	TIP145	TIP146	TIP147	
V_{CBO}	Collector-Base Voltage (I_E = 0)		60	80	100	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)		60	80	100	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)		5			V
I_C	Collector Current		10			A
I_{CM}	Collector Peak Current		20			A
I_B	Base Current		0.5			A
P_{tot}	Total Dissipation at $T_{case} \leq 25\ ^oC$		125			W
T_{stg}	Storage Temperature		-65 to 150			^oC
T_j	Max. Operating Junction Temperature		150			^oC

For PNP types voltage and current values are negative.

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	1	$^oC/W$

ELECTRICAL CHARACTERISTICS (T_{case} = 25 ^oC unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current (I_E = 0)	for **TIP140/145** for **TIP141/146** for **TIP142/147**	V_{CB} = 60 V V_{CB} = 80 V V_{CB} = 100 V			1 1 1	mA mA mA
I_{CEO}	Collector Cut-off Current (I_B = 0)	for **TIP140/145** for **TIP141/146** for **TIP142/147**	V_{CE} = 30 V V_{CE} = 40 V V_{CE} = 50 V			2 2 2	mA mA mA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 V				2	mA
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 30 mA for **TIP140/145** for **TIP141/146** for **TIP142/147**		 60 80 100			 V V V
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 5 A I_C = 10 A	I_B = 10 mA I_B = 40 mA			2 3	V V
$V_{BE(on)}$*	Base-Emitter Voltage	I_C = 10 A	V_{CE} = 4 V			3	V
h_{FE}*	DC Current Gain	I_C = 5 A I_C = 10 A	V_{CE} = 4 V V_{CE} = 4 V	1000 500			
 t_{on} t_{off}	RESISTIVE LOAD Turn-on Time Turn-off Time	I_C = 10 A I_{B2} = -40 mA	I_{B1} = 40 mA R_L = 3 Ω		 0.9 4		 µs µs

For PNP types voltage and current values are negative.

∗ Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %

TO-218 (SOT-93) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.7		4.9	0.185		0.193
C	1.17		1.37	0.046		0.054
D		2.5			0.098	
E	0.5		0.78	0.019		0.030
F	1.1		1.3	0.043		0.051
G	10.8		11.1	0.425		0.437
H	14.7		15.2	0.578		0.598
L2	–		16.2	–		0.637
L3		18			0.708	
L5	3.95		4.15	0.155		0.163
L6		31			1.220	
R	–		12.2	–		0.480
Ø	4		4.1	0.157		0.161