



# 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

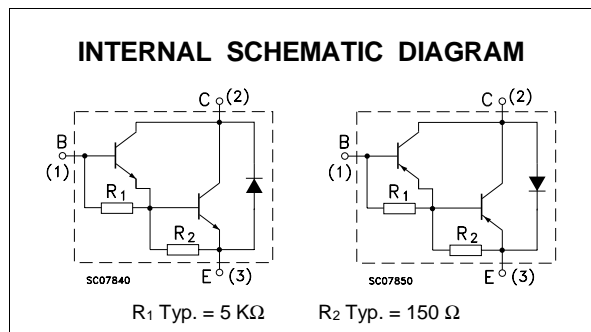
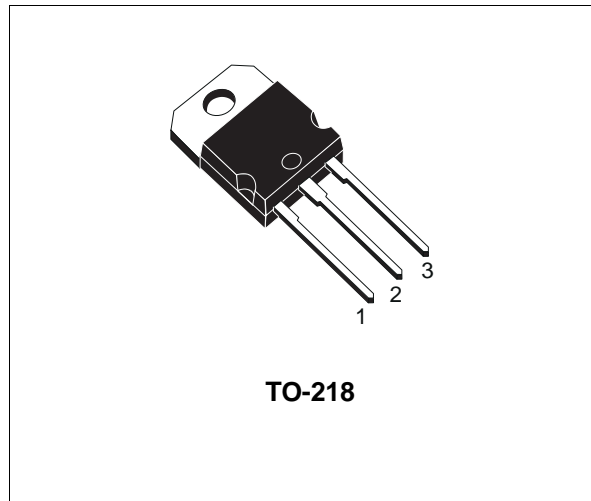
### APPLICATIONS

- 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 intended for use in power linear and switching applications.

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



### 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 $T_{case} \leq 25^\circ C$			125		W
$T_{stg}$	Storage Temperature			-65 to 150		$^\circ C$
$T_j$	Max. Operating Junction Temperature			150		$^\circ C$

For PNP types voltage and current values are negative.

## TIP140 / TIP141 / TIP142 / TIP145 / TIP146 / TIP147

### THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1	$^{\circ}C/W$
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### ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}C$ unless otherwise specified)

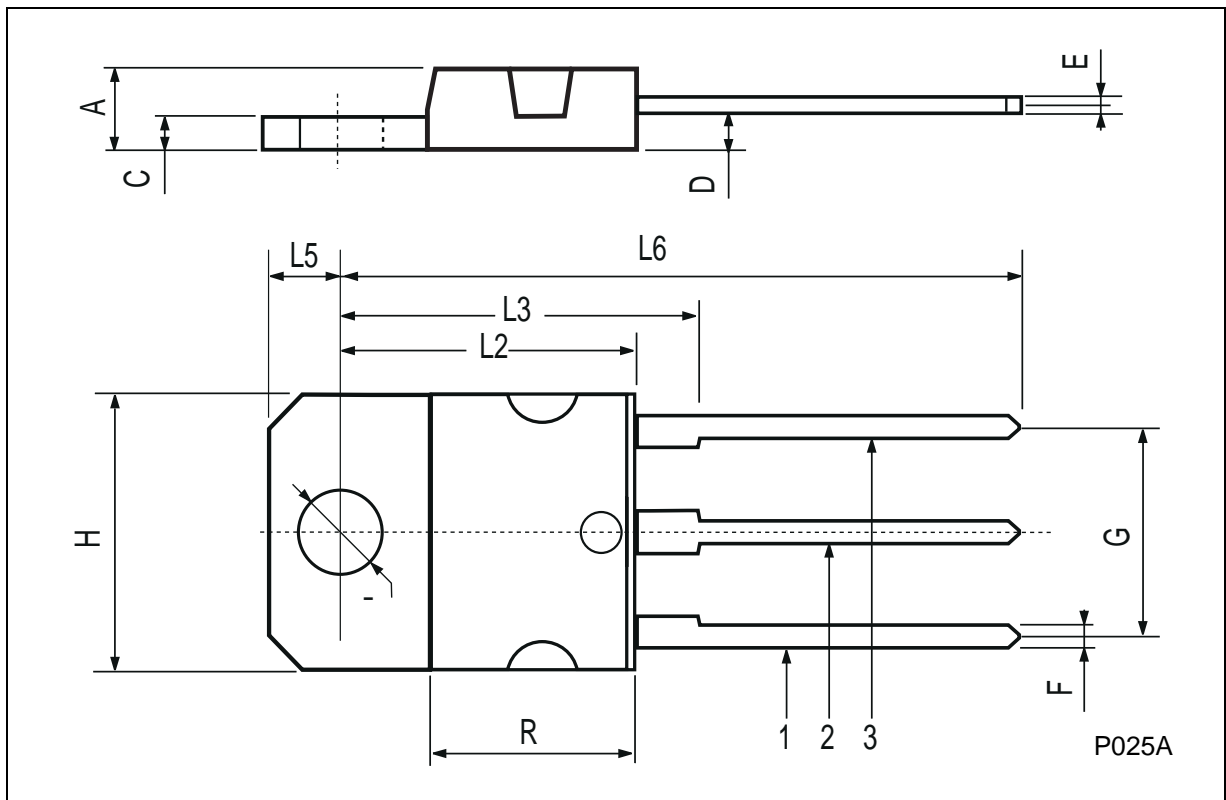
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cut-off Current ( $I_E = 0$ )	for <b>TIP140/145</b> $V_{CB} = 60 V$ for <b>TIP141/146</b> $V_{CB} = 80 V$ for <b>TIP142/147</b> $V_{CB} = 100 V$			1 1 1	$mA$ $mA$ $mA$
$I_{CEO}$	Collector Cut-off Current ( $I_B = 0$ )	for <b>TIP140/145</b> $V_{CE} = 30 V$ for <b>TIP141/146</b> $V_{CE} = 40 V$ for <b>TIP142/147</b> $V_{CE} = 50 V$			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 <b>TIP140/145</b> for <b>TIP141/146</b> for <b>TIP142/147</b>	60 80 100			$V$ $V$ $V$
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 5 A$ $I_B = 10 mA$ $I_C = 10 A$ $I_B = 40 mA$			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	$I_C = 5 A$ $V_{CE} = 4 V$ $I_C = 10 A$ $V_{CE} = 4 V$	1000 500			
$t_{on}$ $t_{off}$	RESISTIVE LOAD Turn-on Time Turn-off Time	$I_C = 10 A$ $I_{B1} = 40 mA$ $I_{B2} = -40 mA$ $R_L = 3 \Omega$		0.9 4		$\mu s$ $\mu s$

For PNP types voltage and current values are negative.

\* Pulsed: Pulse duration = 300  $\mu s$ , 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



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