2STX1360
2STL1360

Low voltage fast-switching NPN power bipolar transistors

Features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast-switching speed

Applications

- Emergency lighting
- Led
- CCFL drivers (back lighting)
- Voltage regulation
- Relay driver

Description

The devices are NPN transistors manufactured using new “PB-HCD” (Power Bipolar High Current Density) technology. The resulting transistor shows exceptional high gain performances coupled with very low saturation voltage.

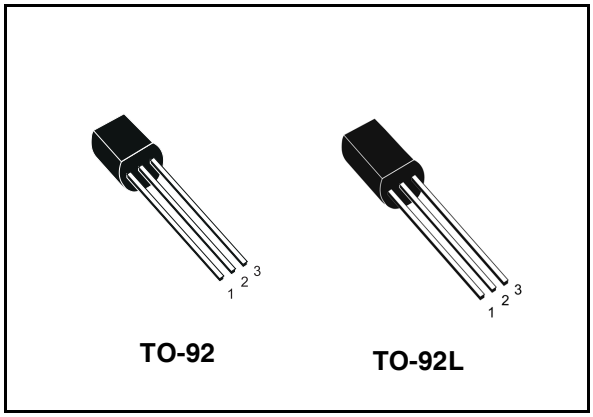


Figure 1. Internal schematic diagram

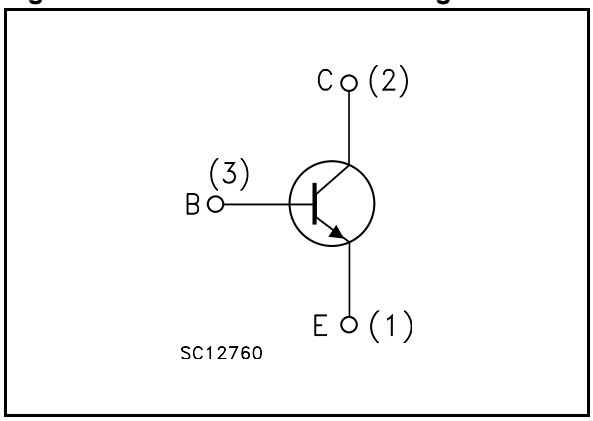


Table 1. Device summary

Order codes	Marking	Package	Packaging
2STX1360	X1360	TO-92	Bulk
2STL1360	L1360	TO-92L	Bulk

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value		Unit
		2STX1360	2STL1360	Unit
V_{CBO}	Collector-base voltage (I_E = 0)	80		V
V_{CEO}	Collector-emitter voltage (I_B = 0)	60		V
V_{EBO}	Emitter-base voltage (I_C = 0)	6		V
I_C	Collector current	3		A
I_{CM}	Collector peak current (t_P < 5ms)	5		A
P_{tot}	Total dissipation at T_{amb} = 25°C	1	1.2	W
T_{stg}	Storage temperature	-65 to 150		°C
T_J	Max. operating junction temperature	150		°C

Table 3. Thermal data

Symbol	Parameter		Value		Unit
			TO-92	TO-92L	Unit
$R_{thj\text{-}amb}$	Thermal resistance junction-ambient	max	125	104.2	°C/W

2 Electrical characteristics

(T_{case} = 25°C unless otherwise specified)

Table 4. Electrical characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (I_E =0)	V_{CB} = 80V			100	nA
I_{EBO}	Emitter cut-off current (I_C =0)	V_{EB} = 6V			100	nA
V_{BE}	Base-emitter voltage	V_{CE} = 2V I_C = 100mA	630	670	730	mV
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 2A I_B = 100mA I_C = 3A I_B = 150mA		150 210	300 500	mV mV
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 2A I_B = 100mA		0.89	1.2	V
h_{FE} (1)	DC current gain	I_C = 0.1A V_{CE} = 2V I_C = 1A V_{CE} = 2V	80 160	280	400	
	RESISTIVE LOAD					
t_d	Delay time	V_{CC} = 10V I_C = 3A		17	20	ns
t_r	Rise time	I_{B1} = -I_{B2} = 300mA		81	100	ns
t_s	Storage time	(see figure 9)		620	720	ns
t_f	Fall time			54	65	ns
f_T	Transition frequency	I_C = 0.1A V_{CE} = 10V		130		MHz

Note (1) Pulsed duration = 300 µs, duty cycle ≤1.5%

2.1 Electrical characteristics (curves)

Figure 2. DC current gain

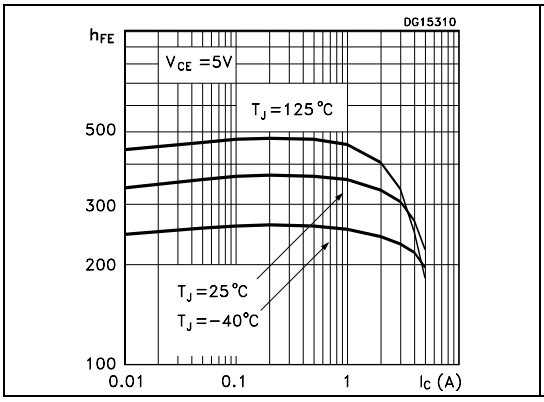


Figure 3. DC current gain

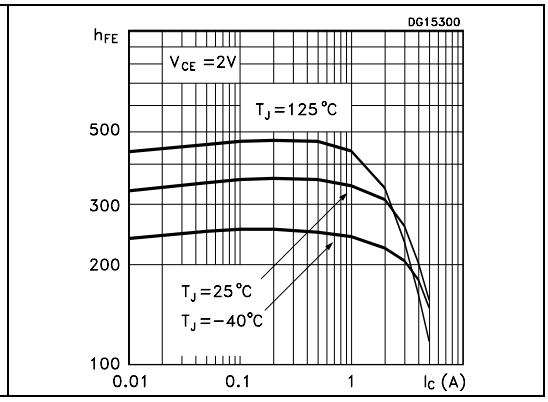


Figure 4. Collector-emitter saturation voltage

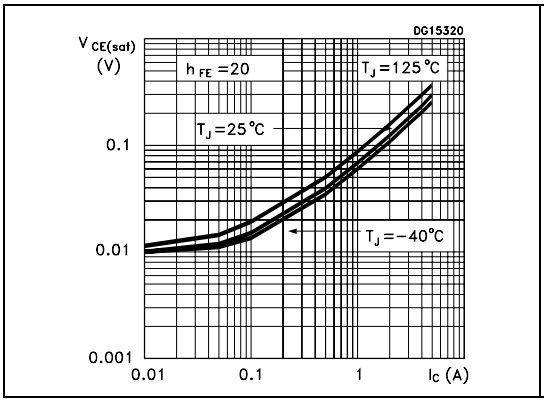


Figure 5. Base-emitter saturation voltage

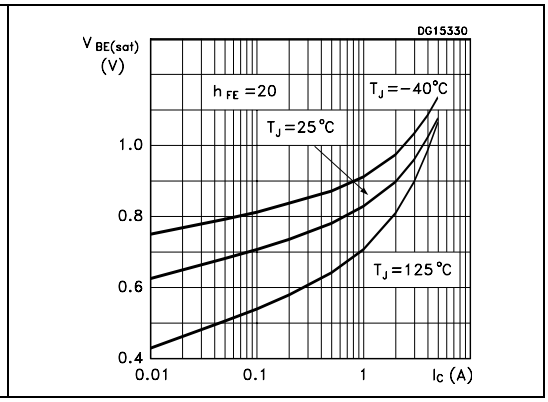


Figure 6. Resistive load switching time

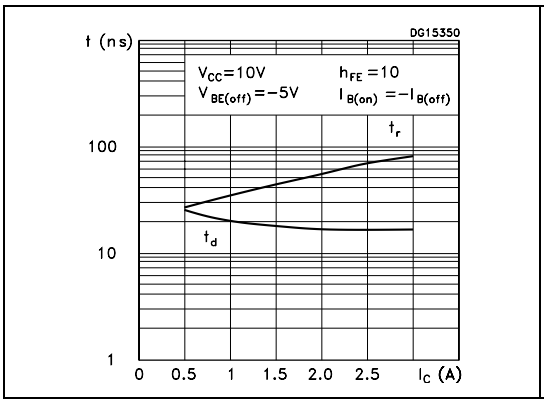


Figure 7. Resistive load switching time

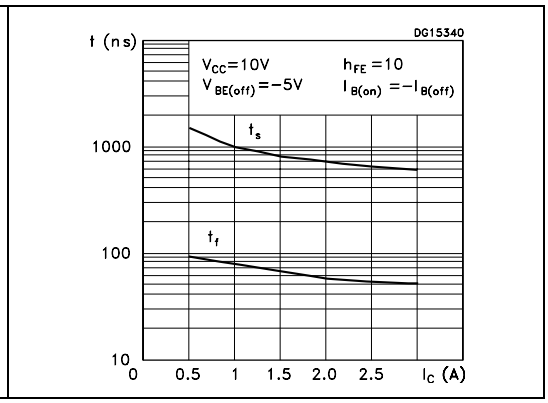
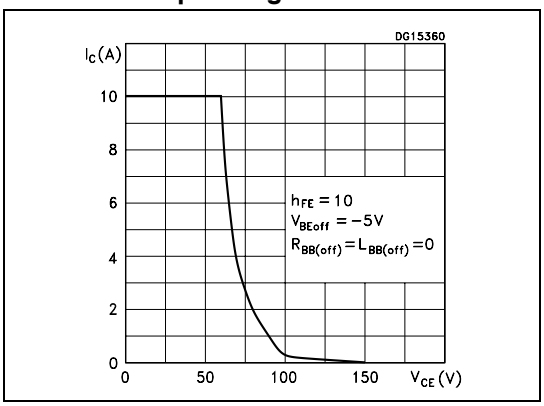
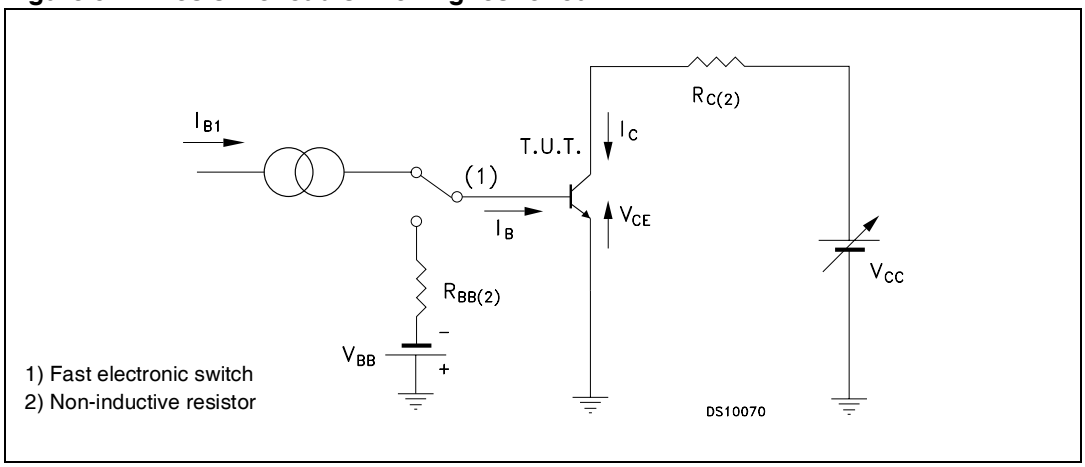


Figure 8. Reverse biased safe operating area



2.2 Test circuit

Figure 9. Resistive load switching test circuit



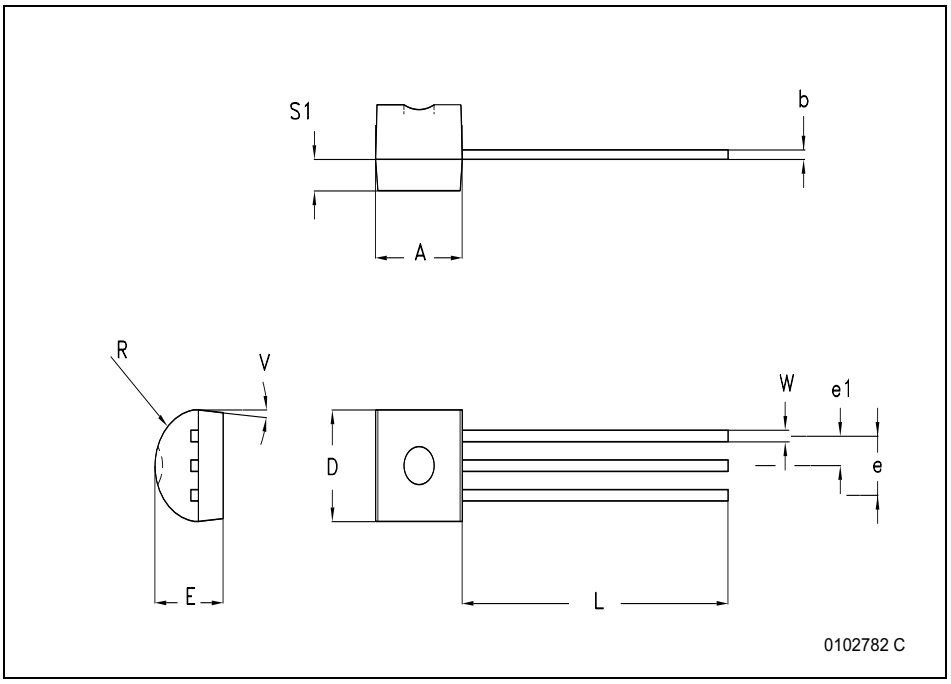
1) Fast electronic switch
2) Non-inductive resistor

3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

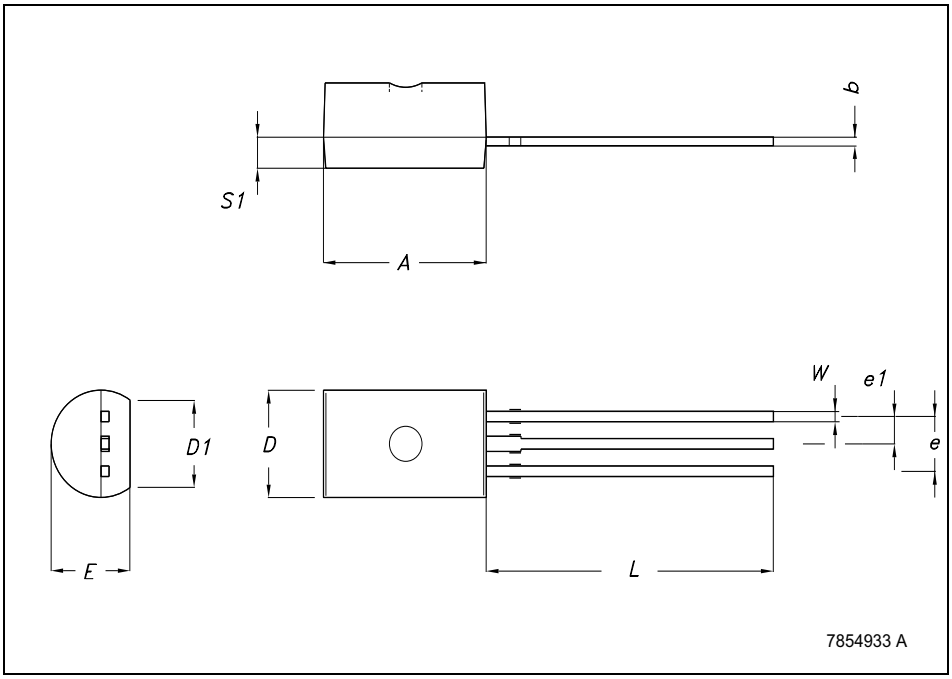
TO-92 BULK SHIPMENT MECHANICAL DATA

DIM.	mm.		
	MIN.	TYP	MAX.
A	4.32		4.95
b	0.36		0.51
D	4.45		4.95
E	3.30		3.94
e	2.41		2.67
e1	1.14		1.40
L	12.70		15.49
R	2.16		2.41
S1	0.92		1.52
W	0.41		0.56
V		5 ^{O}	



TO-92L MECHANICAL DATA

DIM.	mm.		
	MIN.	TYP	MAX.
A	7.80		8.20
b	0.35		0.45
D	4.70		5.10
D1		4	
E	3.70		4.10
e	2.44		2.64
e1		1.27	
L	13.30		14.30
S1	1.28		1.58
W	0.35		0.55



4 Revision history

Table 5. Revision history

Date	Revision	Changes
20-Oct-2006	1	Initial release
16-Jul-2007	2	Figure 2, 3,4,5,6,7 and figure 8 added.

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