2STL1360
2STX1360

Low voltage fast-switching NPN power transistors

Features

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

Applications

- Emergency lighting
- LED
- Voltage regulation
- Relay drive

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.

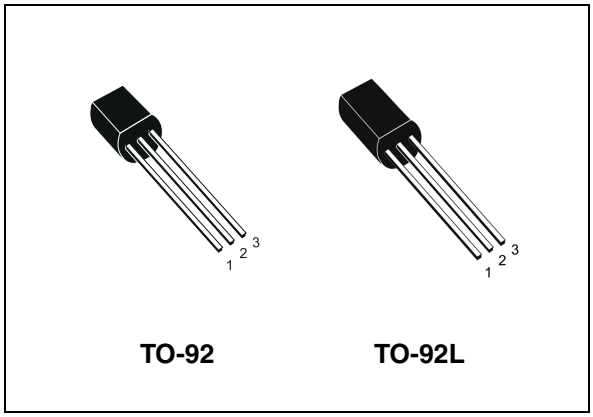


Figure 1. Internal schematic diagram

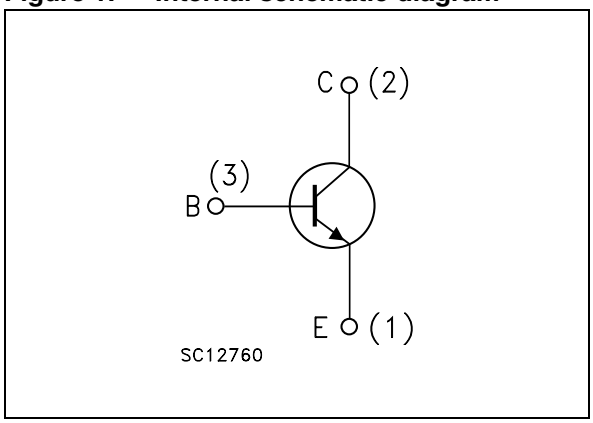


Table 1. Device summary

Order codes	Marking	Packages	Packaging
2STL1360	L1360	TO-92L	Bag
2STX1360	X1360	TO-92	Bag

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value		Unit
		2STX1360	2STL1360	
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 < 5 ms)	5		A
I_B	Base current	0.2		A
I_{BM}	Base peak current (t_P < 5 ms)	0.4		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	
R_{thJA}	Thermal resistance junction-ambient	max	125	104	°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} = 80 V			100	nA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 6 V			100	nA
$V_{BE(on)}$	Base-emitter on voltage	V_{CE} = 2 V I_C = 100 mA	630	650	730	mV
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 2 A I_B = 100 mA I_C = 3 A I_B = 150 mA		130 180	300 500	mV mV
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 2 A I_B = 100 mA		0.9	1.2	V
h_{FE} (1)	DC current gain	I_C = 0.1 A V_{CE} = 2 V I_C = 1 A V_{CE} = 2 V	80 160		 400	
 t_d t_r t_s t_f	RESISTIVE LOAD Delay time Rise time Storage time Fall time	 V_{CC} = 10 V I_C = 3 A $I_{B(on)}$ = - $I_{B(off)}$ = 300 mA $V_{BE(off)}$ = - 5 V		 17 81 620 54	 20 100 720 65	 ns ns ns ns
f_T	Transition frequency	I_C = 0.1 A V_{CE} = 10 V		130		MHz

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %

2.1 Electrical characteristics (curves)

Figure 2. DC current gain (V_{CE} = 5 V)

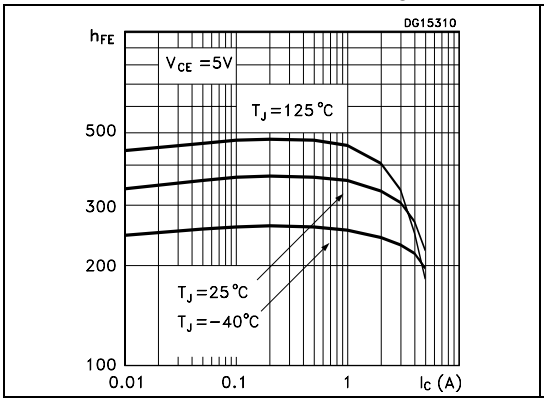


Figure 3. DC current gain (V_{CE} = 2 V)

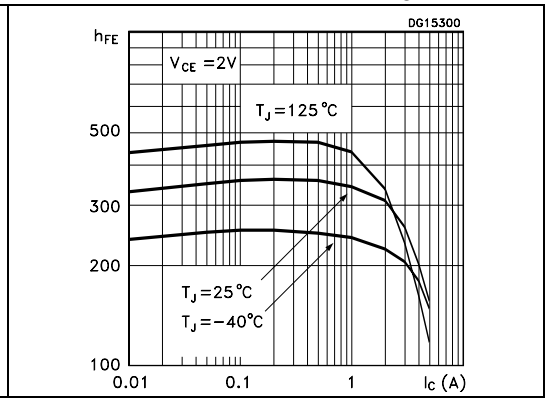


Figure 4. Collector-emitter saturation voltage

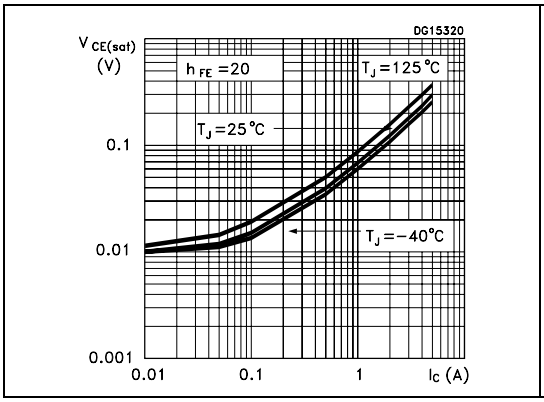


Figure 5. Base-emitter saturation voltage

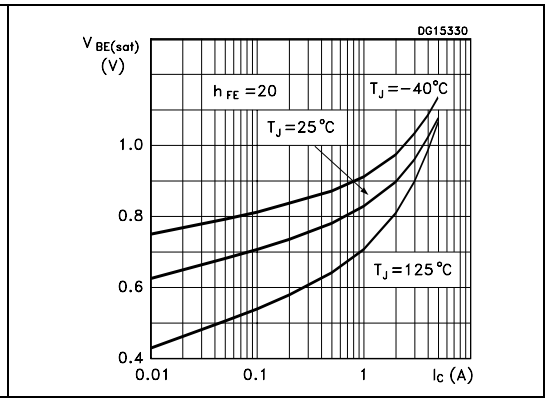


Figure 6. Resistive load switching time

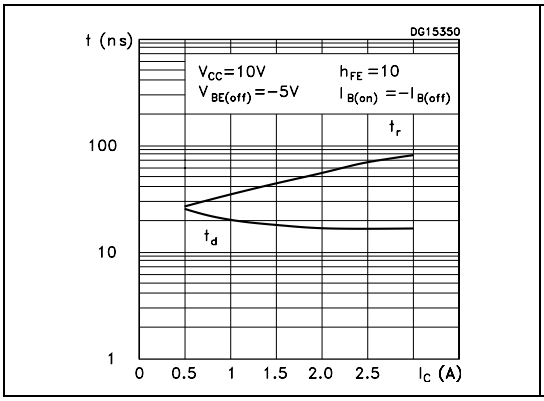


Figure 7. Resistive load switching time

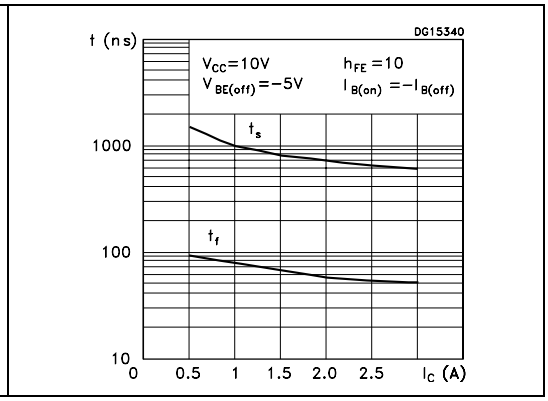
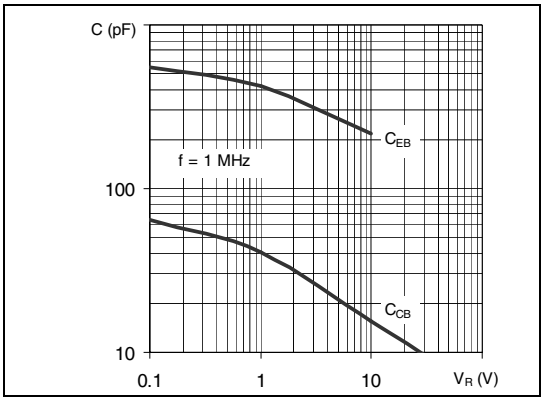
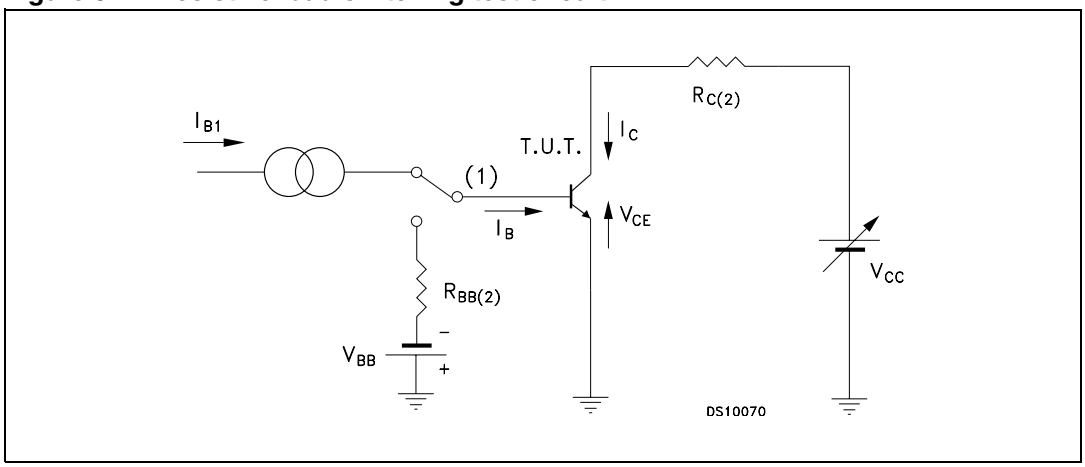


Figure 8. Capacitance



2.2 Test circuit

Figure 9. Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

3 Package mechanical data

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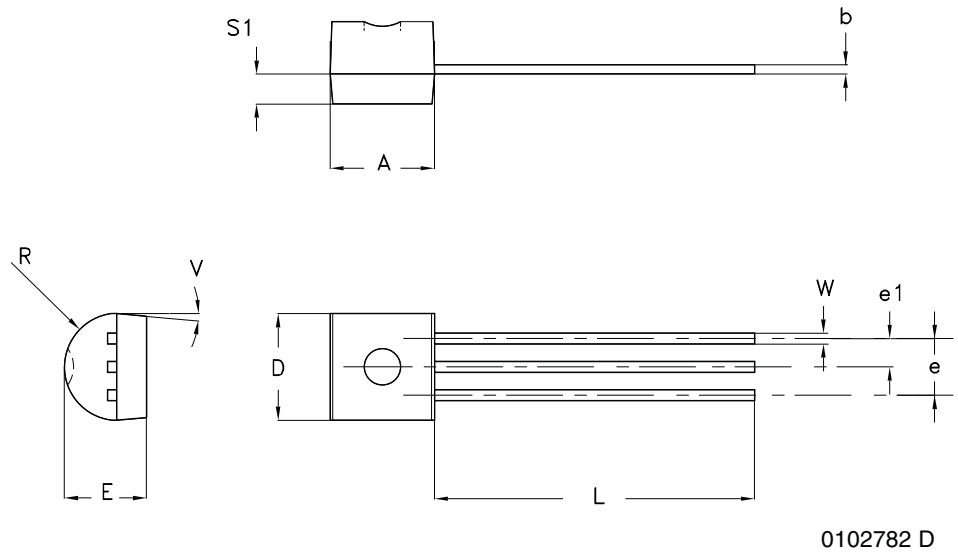
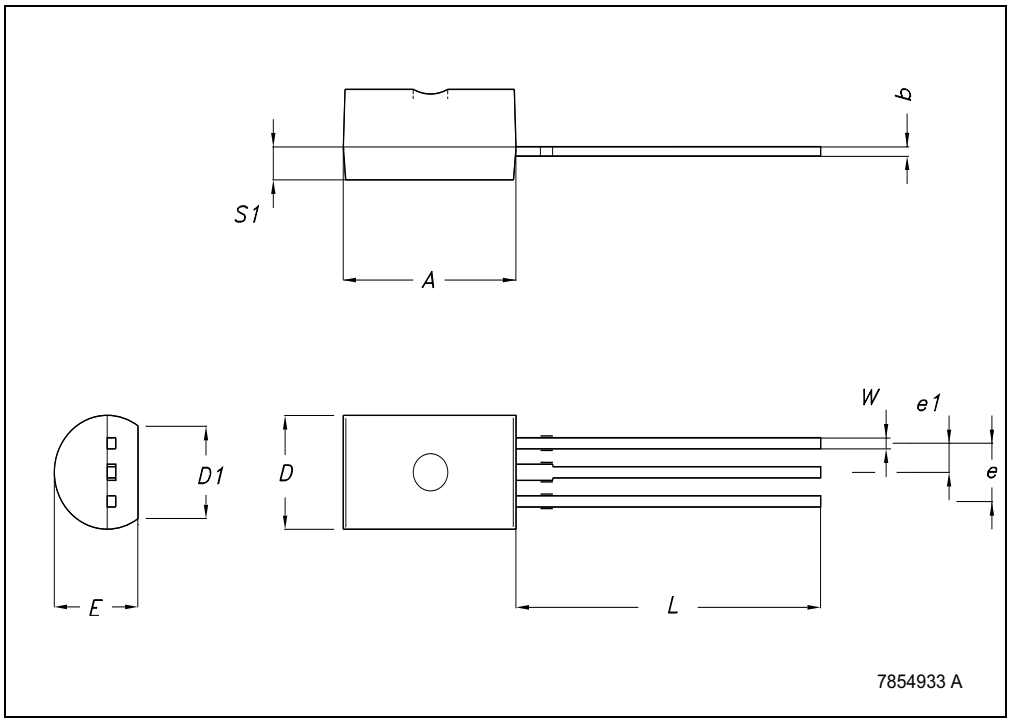
TO-92 bulk shipment mechanical data

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. Document revision history

Date	Revision	Changes
20-Oct-2006	1	Initial release
16-Jul-2007	2	Added figures 2, 3, 4, 5, 6, 7 and 8
29-Oct-2009	3	Updated *Figure 8 on page 4* and TO-92 package mechanical data

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