



2STF1360 2STN1360

LOW VOLTAGE FAST-SWITCHING NPN POWER TRANSISTORS

Features

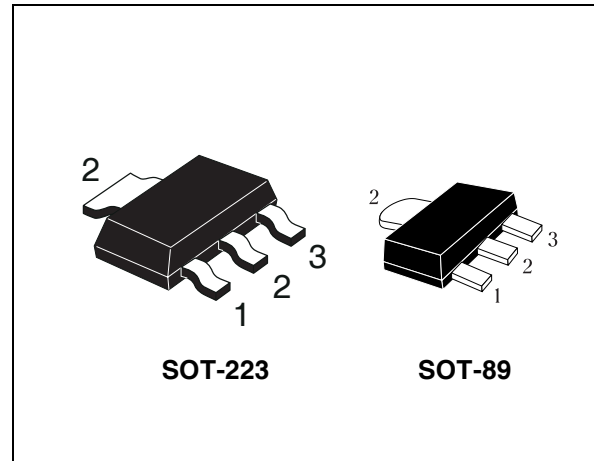
- VERY LOW COLLECTOR-EMITTER SATURATION VOLTAGE
- HIGH CURRENT GAIN CHARACTERISTIC
- FAST-SWITCHING SPEED
- IN COMPLIANCE WITH THE 2002/93/EC EUROPEAN DIRECTIVE
- SURFACE MOUNTING DEVICES IN MEDIUM POWER SOT-223 AND SOT-89 PACKAGES
- AVAILABLE IN TAPE & REEL PACKING

Applications

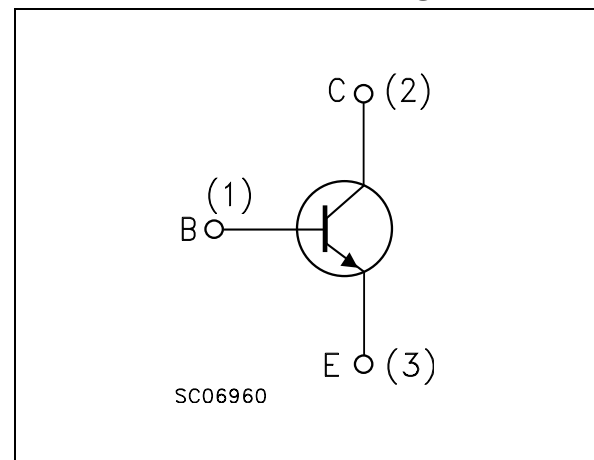
- EMERGENCY LIGHTING
- LED
- CCFL DRIVERS (BACK LIGHTING)
- VOLTAGE REGULATION
- RELAY DRIVER

Description

The 2STF1360 and 2STN1360 are NPN transistors manufactured using new "PB-HDC" (Power Bipolar High Density Current) technology. The resulting transistor shows exceptional high gain performances coupled with very low saturation voltage.



Internal Schematic Diagram



Order Codes

Part Number	Marking	Package	Packing
2STF1360	1360	SOT-89	Tape & Reel
2STN1360	N1360	SOT-223	Tape & Reel

1 Absolute Maximum Ratings

Table 1. Absolute Maximum Rating

Symbol	Parameter	Value		Unit
		2STF1360	2STN1360	
		SOT-89	SOT-223	
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
I_B	Base Current	0.2		A
I_{BM}	Base Peak Current ($t_P < 5ms$)	0.4		A
P_{TOT}	Total dissipation at $T_C = 25^\circ C$	1.4	1.6	W
T_{stg}	Storage Temperature	-65 to 150		$^\circ C$
T_J	Max. Operating Junction Temperature	150		$^\circ C$

Table 2. Thermal Data

Symbol	Parameter	SOT-89	SOT-223	
$R_{thJA}^{#}$	Thermal Resistance Junction-Ambient Max	89	78	$^\circ C/W$

Note: # Device mounted on a PCB area of 1 cm^2 .

2 Electrical Characteristics

Table 3. Electrical Characteristics ($T_{CASE} = 25^{\circ}C$; unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current ($I_E = 0$)	$V_{CB} = 80\text{ V}$			100	nA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 6\text{ V}$			100	nA
V_{BE}	Base-Emitter Voltage	$V_{CE} = 2\text{ V}$ $I_C = 100\text{ mA}$	630	670	730	mV
$V_{CE(sat)}$ <i>Note: 1</i>	Collector-Emitter Saturation Voltage	$I_C = 2\text{ A}$ $I_B = 100\text{ mA}$		150	300	mV
		$I_C = 3\text{ A}$ $I_B = 150\text{ mA}$		210	500	mV
$V_{BE(sat)}$ <i>Note: 1</i>	Base-Emitter Saturation Voltage	$I_C = 2\text{ A}$ $I_B = 100\text{ mA}$		0.89	1.2	V
h_{FE} <i>Note: 1</i>	DC Current Gain	$I_C = 100\text{ mA}$ $V_{CE} = 2\text{ V}$	80			
		$I_C = 1\text{ A}$ $V_{CE} = 2\text{ V}$	160	280	400	
t_d	RESISTIVE LOAD Delay Time	$V_{CC} = 10\text{ V}$ $I_C = 3\text{ A}$ $I_{B1} = - I_{B2} = 300\text{ mA}$ (see figure 8)		17	20	ns
t_r	Rise Time			81	100	ns
t_s	Storage Time			620	720	ns
t_f	Fall Time			54	65	ns
f_T	Transition Frequency	$I_C = 0.1\text{ A}$ $V_{CE} = 10\text{ V}$		130		MHz

Note: 1 Pulsed duration = 300 μ s, duty cycle $\leq 1.5\%$.

2.1 Typical Characteristics

Figure 1. DC Current Gain

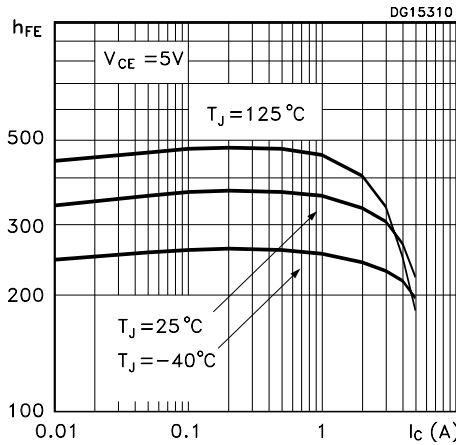


Figure 2. DC Current Gain

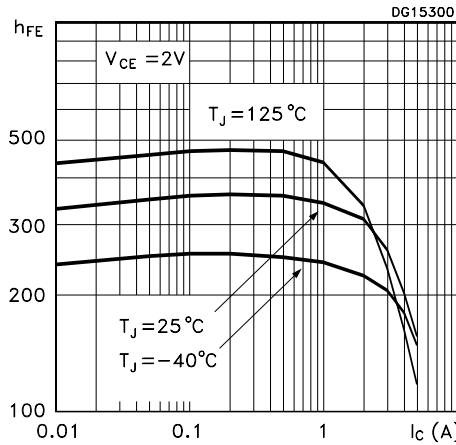


Figure 3. Collector Emitter Saturation Voltage Figure 4. Base Emitter Saturation Voltage

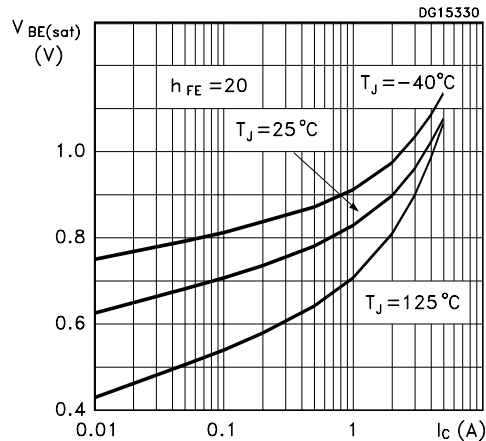
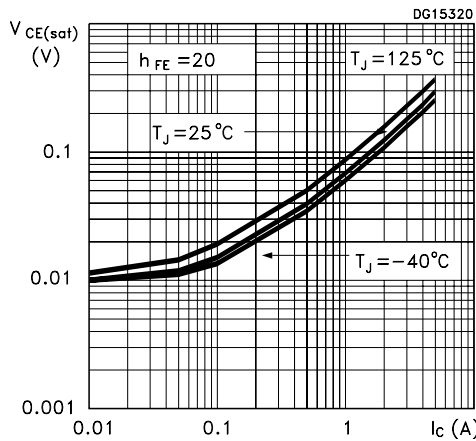


Figure 5. Resistive Load Switching Times

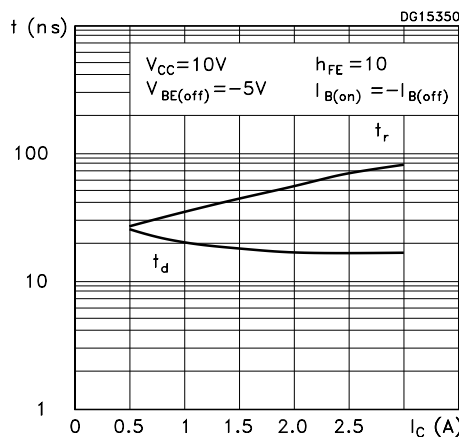


Figure 6. Resistive Load Switching Times

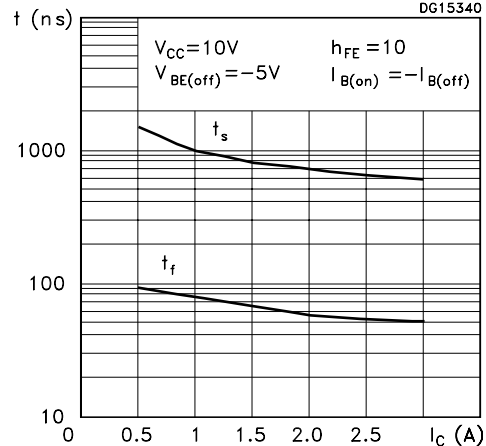
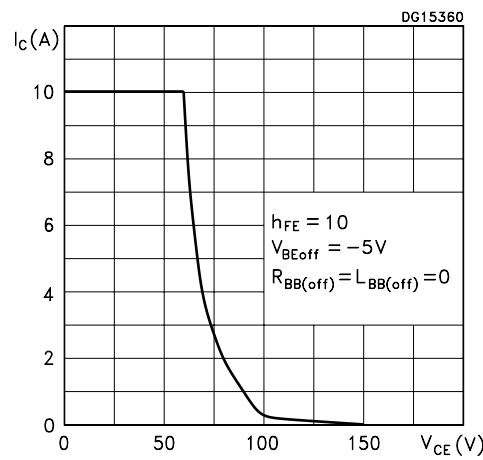
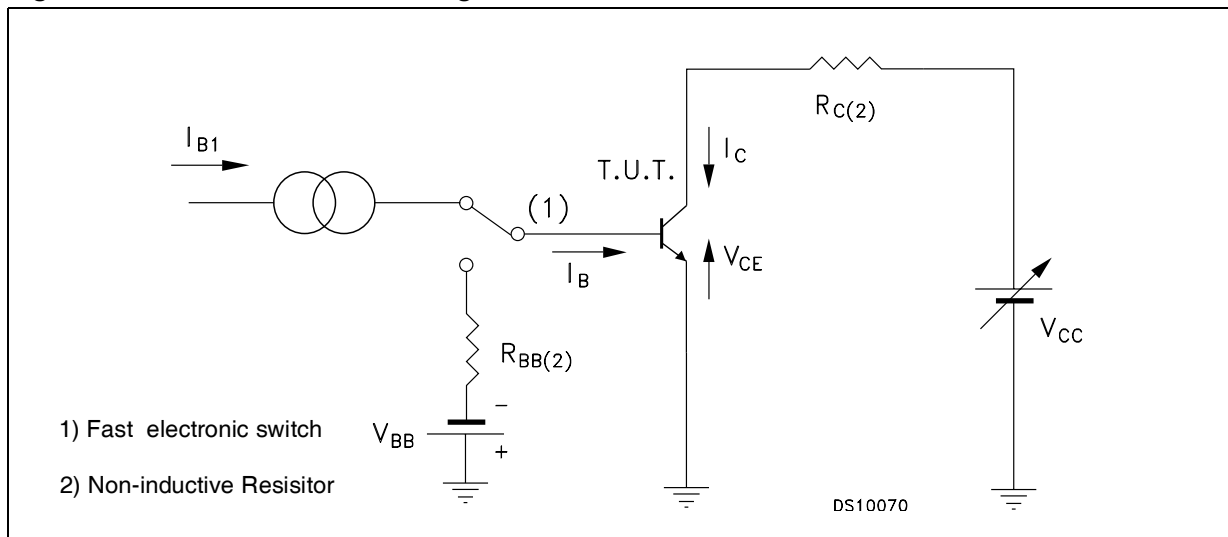


Figure 7. Reverse Bised SOA



3 Test Circuits

Figure 8. Resistive Load Switching Test Circuit

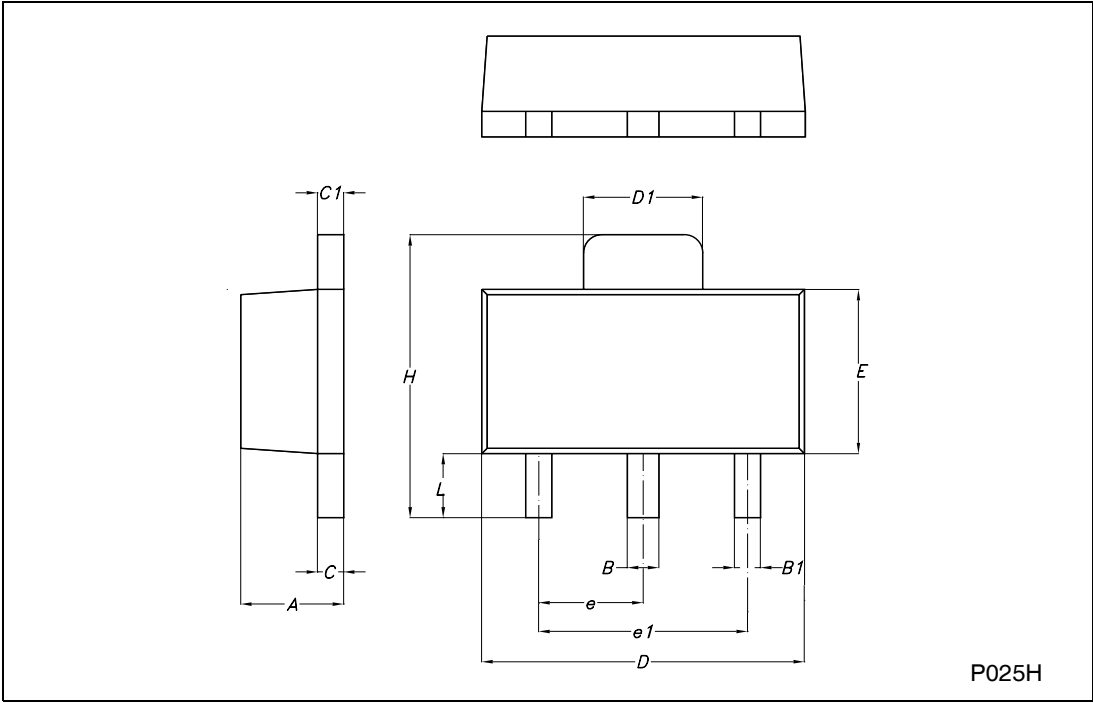


4 Package Mechanical Data

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

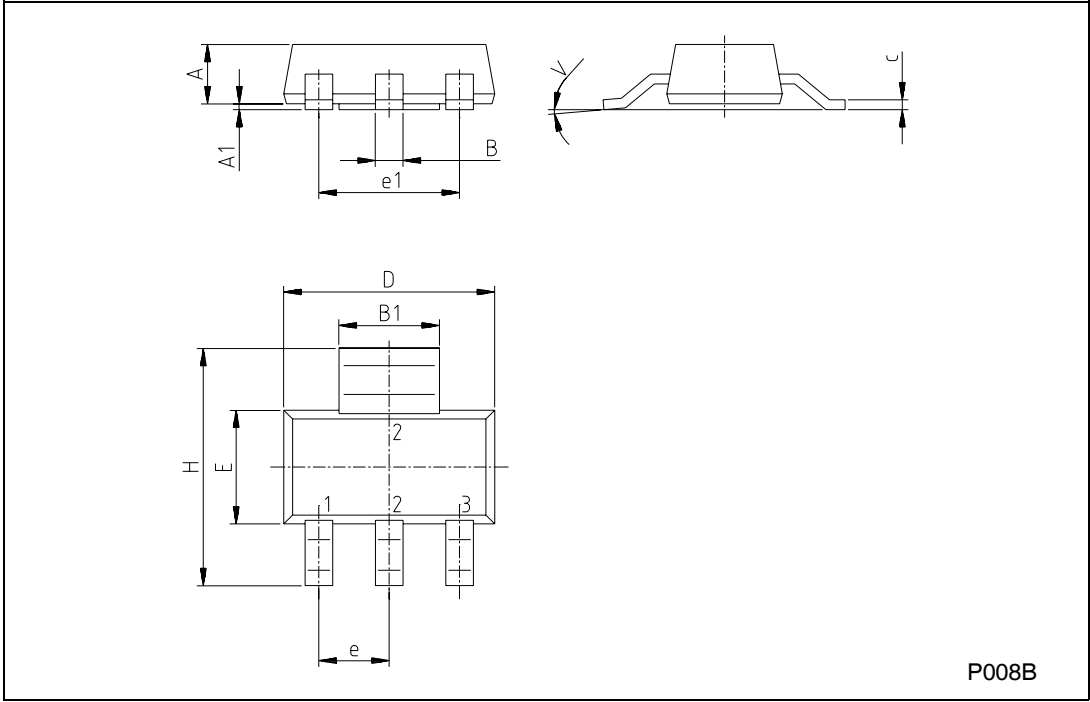
SOT-89 MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	1.4		1.6	55.1		63.0
B	0.44		0.56	17.3		22.0
B1	0.36		0.48	14.2		18.9
C	0.35		0.44	13.8		17.3
C1	0.35		0.44	13.8		17.3
D	4.4		4.6	173.2		181.1
D1	1.62		1.83	63.8		72.0
E	2.29		2.6	90.2		102.4
e	1.42		1.57	55.9		61.8
e1	2.92		3.07	115.0		120.9
H	3.94		4.25	155.1		167.3
L	0.89		1.2	35.0		47.2



SOT-223 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.80			0.071
B	0.60	0.70	0.80	0.024	0.027	0.031
B1	2.90	3.00	3.10	0.114	0.118	0.122
c	0.24	0.26	0.32	0.009	0.010	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
e		2.30			0.090	
e1		4.60			0.181	
E	3.30	3.50	3.70	0.130	0.138	0.146
H	6.70	7.00	7.30	0.264	0.276	0.287
V			10°			10°
A1		0.02				



5 Revision History

Date	Revision	Changes
21-Nov-2005	1	Initial Release

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