

DESCRIPTION

The device is manufactured using high voltage multi-epitaxial planar technology for high switching speeds and high voltage capability. It uses a cellular emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

FEATURES

- ◆ High Voltage
- ◆ High speed switching
- ◆ Solenoid and Relay drivers
- ◆ Switch Regulators
- ◆ PWM Inverters and Motor Controls
- ◆ Low spread of dynamic parameters
- ◆ Minimum lot-to-lot spread for reliable operation

APPLICATION:

- ◆ Electronic ballast for fluorescent lighting (CFL)
- ◆ SMPS for battery charger

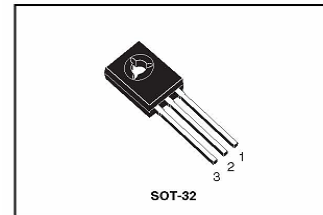
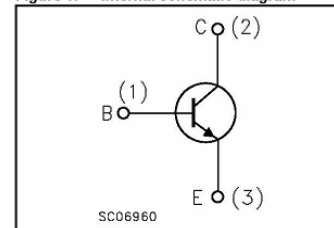
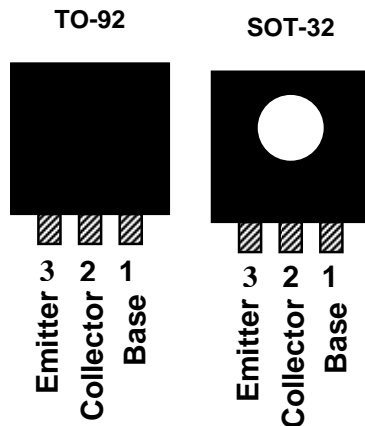


Figure 1. Internal schematic diagram



SOT-32:
1-Base 2-Collector 3-Emitter

PIN CONFIGURATION – Top View

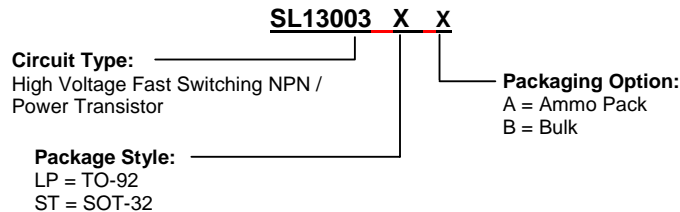


PACKAGE TOP MARKING: (TO-92):

SL13003
FYMXXS
GYYWW

- Line 1: Device
- Line 2: Lot No. Code
F – Foundry Code (G)
YMXXX – 5 Character Lot No.
S – Split Code
- Line 3: Date Code
G – Assembly Vendor Code
YY – Year
WW – Workweek

ORDERING INFORMATION





ELECTRICAL RATINGS

Table 2. Absolute Maximum Ratings

SYMBOL	PARAMETER	SL13003	SL1300-K	UNIT
		LIMIT		
Vcbo	Collector-Base Voltage	700		V
Vces	Collector-emitter voltage ($V_{BE} = 0$)		700	V
Vceo	Collector-Emitter Voltage	400	400 ($I_B = 0$)	V
VEBO	Emitter-Base Voltage	9	V _{(BR) EBO}	V
Ic	Collector Current		1.5	A
	Collector Current	DC	1.5	A
		Pulse	3	
ICM	Collector Peak Current ($t_P < 5\text{ms}$)		3	A
IB	Base Current		0.75	A
IBM	Base Peak Current ($t_P < 5\text{ms}$)		1.5	A
Pd	Collector Power Dissipation	TO-92	0.6	W
Ptot	Total Dissipation at $T_c = 25^\circ\text{C}$		40	W
Tstg	Operating Junction and Storage Temperature Range	-55 to +150	-55 to 150	°C
Tj	Operating Junction Temperature / Max. Operating Junction Temperature	+125	150	°C



SL13003

High Voltage Fast Switching NPN/Power Transistor

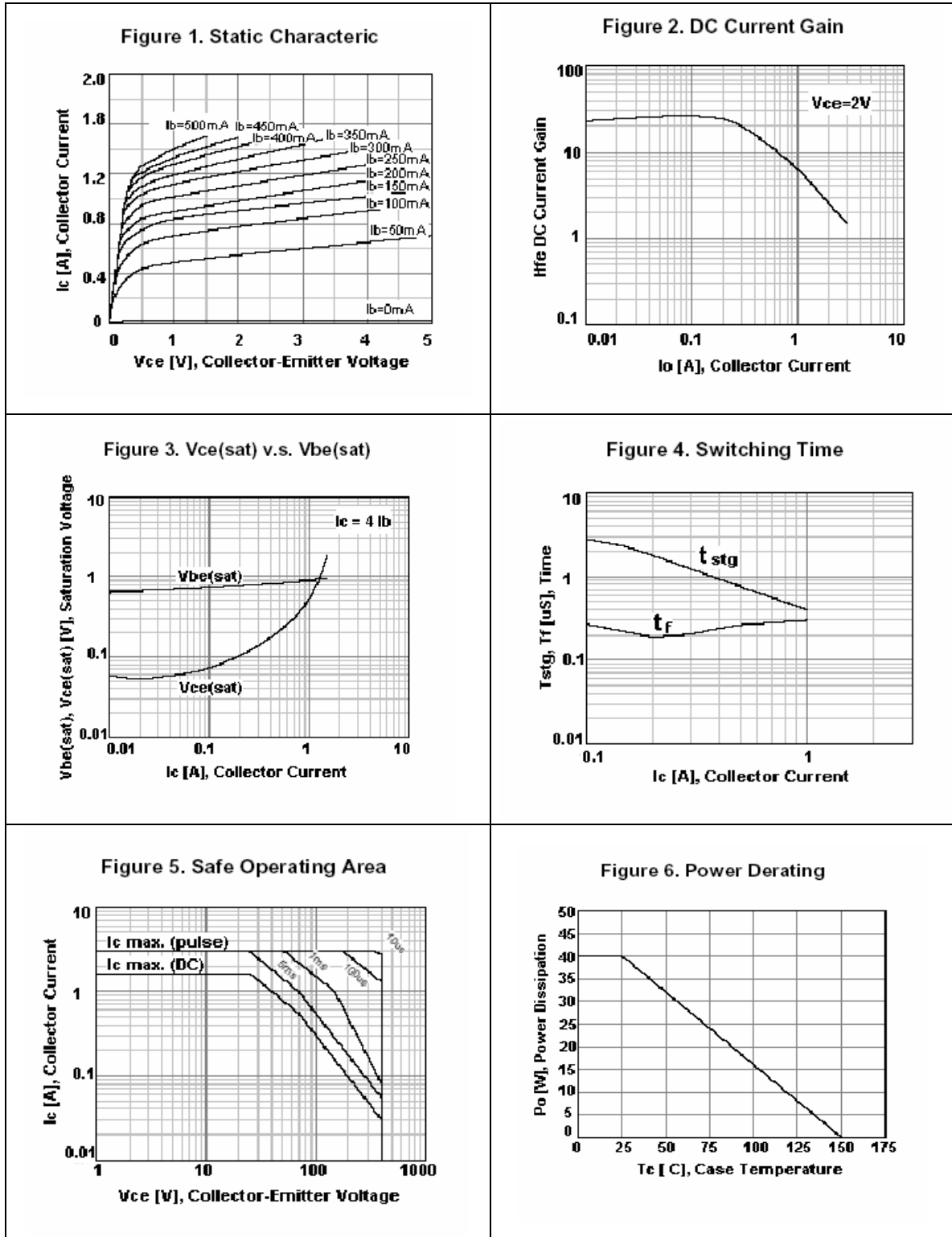
ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Table 3. Electrical Characteristics

SYMBOL	PARAMETER	TEST CONDITIONS	SL13003 TO-92			SL13003-K SOT-32			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
BVcbo	Collector-Base Voltage	$I_C = 5\text{mA}, I_B = 0$	700						V
Bvceo	Collector-Emitter Breakdown Voltage	$I_C = 5\text{mA}, I_E = 0$	400						V
Bvebo	Emitter-Base Breakdown Voltage	$I_E = 1\text{mA}, I_C = 0$	9						V
Icbo	Collector Cut off Current	$V_{CB} = 700\text{V}, I_E = 0$			100				μA
Iebo	Emitter Cut off Current	$V_{EB} = 9\text{V}, I_C = 0$			10				μA
Vce(sat)1	Collector-Emitter Saturation Voltage	$I_C / I_B = 1.5\text{A} / 0.5\text{A}$			3				V
Vce(sat)2		$I_C / I_B = 0.5\text{A} / 0.1\text{A}$			0.5				
HFE	DC Current Gain	$V_{CE} = 2\text{V}, I_C = 0.5\text{A}$	8		40				
f _T	Frequency	$V_{CE} = 10\text{V}, I_C = 0.1\text{A}$	4						MHz
Cob	Output Capacitance	$V_{CB}=10\text{V}, f = 0.1\text{MHz}$		21					pF
t _{ON}	Turn On Time	$V_{CC}=125\text{V}, I_C=1\text{A}$ $I_{B1}=0.2\text{A}, I_{B2}=-0.2\text{A}$ $R_L = 125\text{ohm}$		1.1					μs
t _{STG}	Storage Time			2.2	4				μs
t _f	Fall Time				0.7				μs
I _{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 700\text{V}$ $V_{CE} = 700\text{V } T_C = 125^\circ\text{C}$						1 5	mA mA
V _{(BR)EBO}	Emitter-Base Breakdown Voltage ($I_C = 0$)	$I_E = 10\text{mA}$				9		18	V
V _{CEO(sus)} ⁽¹⁾	Collector-Emitter Sustaining Voltage ($I_B = 0$)	$I_C = 10\text{mA}$				400			
V _{CE(sat)} ⁽¹⁾	Collector-Emitter Saturation Voltage	$I_C = 0.5\text{A } I_B = 0.1\text{A}$ $I_C = 1\text{A } I_B = 0.1\text{A}$ $I_C = 1.5\text{A } I_B = 0.1\text{A}$						0.5 1 1.5	V
V _{BE(sat)} ⁽¹⁾	Base-Emitter Saturation Voltage	$I_C = 0.5\text{A } I_B = 0.1\text{A}$ $I_C = 1\text{A } I_B = 0.25\text{A}$						1 1.2	V
h _{FE}	DC Current Gain	$I_C = 0.5\text{A } V_{CE} = 2\text{V}$ $I_C = 1\text{A } V_{CE} = 2\text{V}$				8 5		20 25	
t _r	Resistive Load	$V_{CC} = 125\text{V } I_C = 1\text{A}$ $I_{B1} = 0.2\text{A } I_{B2} = 0.2\text{A}$ $T_p = 25\mu\text{s}$						1	μs
t _s	Rise Time							4	
t _f	Storage Time							0.7	
t _f	Fall Time							0.7	
t _s	Inductive Load Storage Time	$I_C = 1\text{A } I_{B1} = 0.2\text{A}$ $V_{BE} = -5\text{V } L = 50\text{mH}$ $V_{Clamp} = 300\text{V}$					0.8		μs

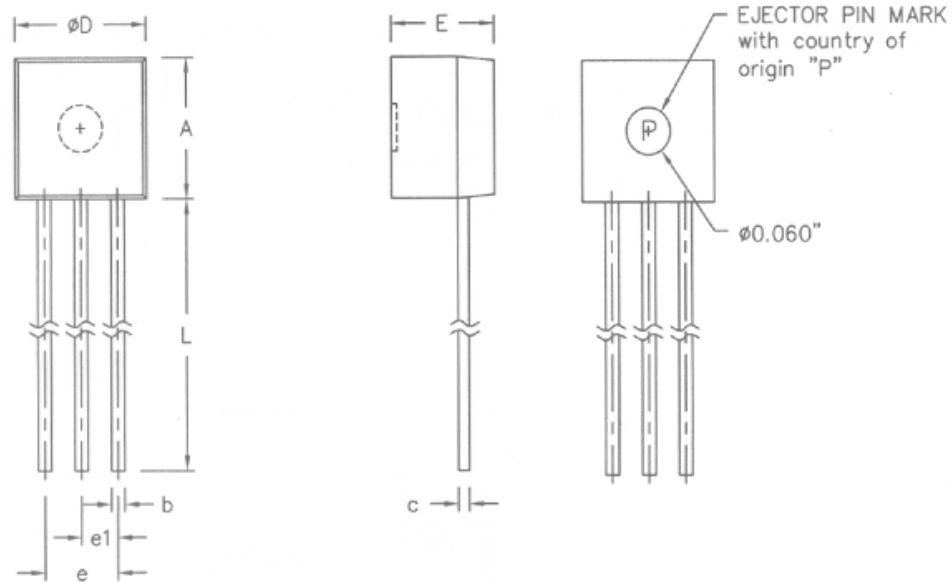
* Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$ (applicable for SOT-32)

ELECTRICAL CHARACTERISTICS CURVE:



PACKAGE DIMENSION:

3-Lead TO-92 / SOT-32 Plastic Package
SLI Package Code: LP / ST

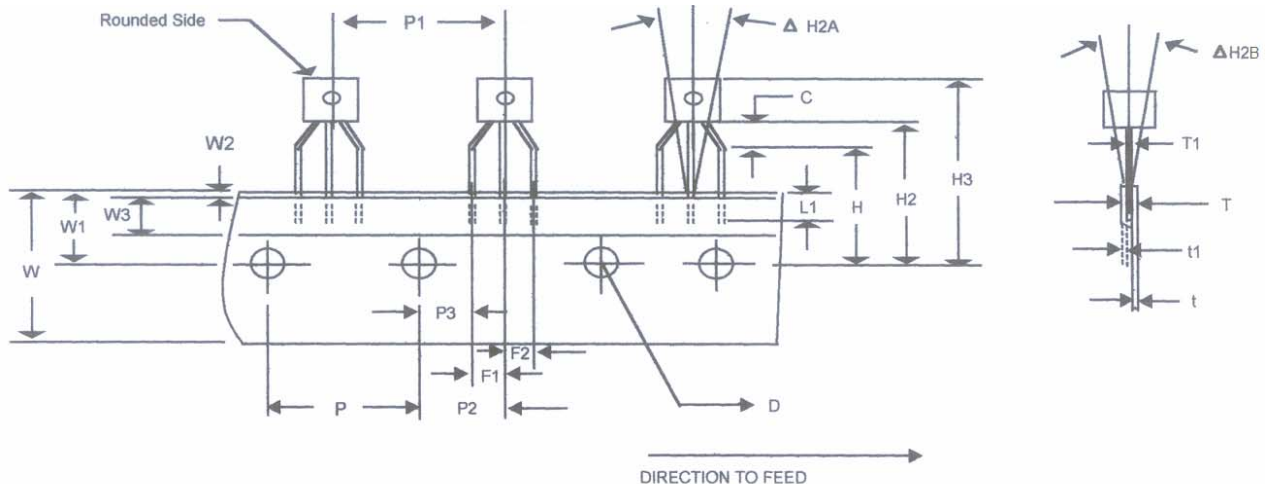


SYMBOL	INCHES		
	MIN	NOM	MAX
A	0.176	0.180	0.184
	0.015	0.018	0.022
c	0.014	0.015	0.020
øD	0.176	0.180	0.184
e	0.098	0.100	0.102
e1	0.048	0.050	0.052
E	0.136	0.140	0.144
j	0.166	0.170	0.174
L	0.530	0.550	0.570
S1	0.031	0.035	0.039

NOTES:

1. ALL DIMENSIONS IN INCHES.
2. A MECHANICAL TOLERANCE OF ± 0.002 " APPLIES TO ALL DIMENSIONS WHERE NO TOLERANCE IS EXPLICITLY GIVEN.
3. BASED FROM JEDEC T0-226 VARIATION AA OUTLINE.

TO-92 AMMO PACK SPECIFICATIONS



SYMBOL	DESCRIPTION	NOMINAL VALUE		TOLERANCES			
				min		max	
		mm	inch	mm	inch	mm	inch
D	Feed Hole Diameter	4.0	0.157	3.8	0.150	4.2	0.165
T1 (POD)	Component Lead Thickness	0.405	0.016	0.36	0.014	0.45	0.018
F1/F2	Lead Pitch (Left / Right)	2.54	0.100	2.4	0.094	2.8	0.110
C	Bottom of Component to Seating Plane	2.50	0.098	1.50	0.059	4.00	0.157
W1	Edge to Sprocket Hole Center	9.0	0.354	8.50	0.335	9.50	0.374
H2A	Deflection (Left or Right)	0.50	0.020	0	0	0.50	0.020
H2B	Deflection (Front or Rear)	1.0	0.039	0	0	1.0	0.039
H2 (H + C)	Feed Hole to Bottom of Component	18.5	0.728	17.00	0.669	20.50	0.087
H	Height of Seating Plane	16	0.630	15.5	0.610	16.5	0.650
H3	Feed Hole Center to Overall Transistor Height	27.75	1.092	23.5	0.925	32.0	1.260
L	Defective Unit Clipped Dimension	-	-	-	-	11.0	0.433
L1	Leadwire Enclosure	2.50	0.098	2.50	0.098	-	-
P	Feed Hole Pitch	12.7	0.500	12.40	0.488	13.0	0.512
P2	Center of Feed Hole to Center Lead	6.35	0.250	6.0	0.234	6.75	0.266
P3 (P2-F1)	First Lead Spacing Dimension	3.75	0.148	3.6	0.142	3.95	0.156
P1	Center Lead to Center Lead	12.7	0.500	12.2	0.500	13.2	0.520
t1	Adhesive Tape Thickness	0.18	0.007	0.16	0.006	0.20	0.008
T (t+t1+T1)	Overall Taped Package Thickness	-	-	-	-	1.55	0.061
T	Carrier Strip Thickness	0.37	0.015	0.27	0.011	0.47	0.018
W	Carrier Strip Width (18mm)	18.00	0.709	17.5	0.689	19.0	0.748
W3	Adhesive Tape Width (6mm)	6.00	0.236	5.5	0.217	6.3	0.248
W2	Adhesive Tape Position	0.25	0.010	0	0	0.50	0.020

TO-92 / SOT-32 Ammo/Packing Requirement			
PART No.	Package	Tape Width (W) mm	Fan Fold Box / Bulk
SL13003	TO-92 3L	18	2000
SL13003-K	SOT-32 3L	Antistatic Plastic Bag	2000