

Low voltage high performance PNP power transistor

Datasheet — production data

Features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Small, thin, leadless SMD plastic package with excellent thermal behavior

Applications

- Power management
- DC-DC converters

Description

This device is an PNP transistor manufactured using new low voltage planar technology with double metal process. The result is a transistor which boasts exceptionally high gain performance coupled with very low saturation voltage.

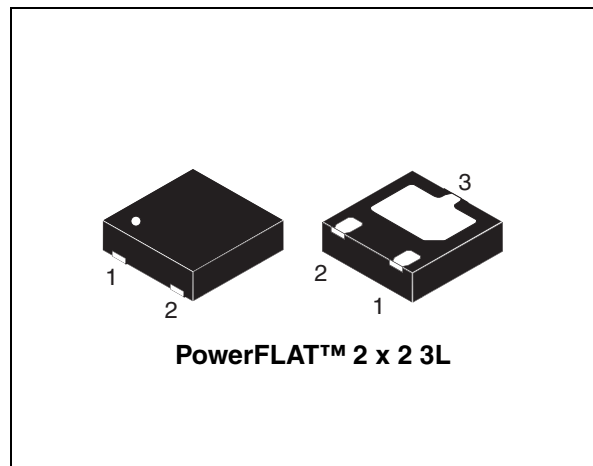


Figure 1. Internal schematic diagram

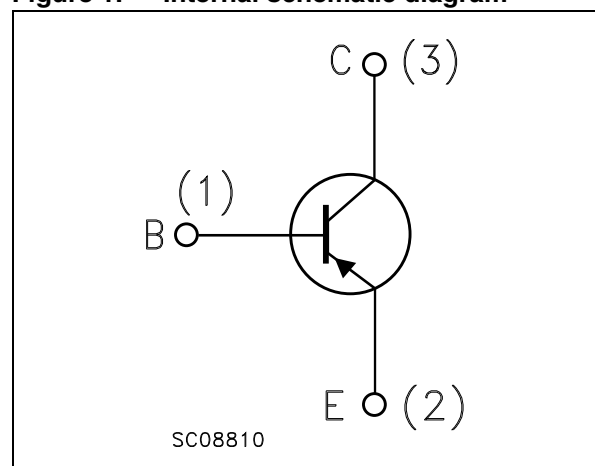


Table 1. Device summary

Order code	Marking	Package	Packaging
3STL2540	L2540	PowerFLAT™ 2 x 2	Tape and reel

1 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage ($I_E = 0$)	-40	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	-40	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	-6	V
I_C	Collector current	-5	A
I_{CM}	Collector peak current ($t_P < 5$ ms)	-10	A
I_B	Base current	-0.5	A
I_{BM}	Base peak current ($t_P < 5$ ms)	-1	A
$P_{TOT}^{(1)}$	Total dissipation at $T_A = 25$ °C	1.2	W
T_{STG}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

1. Device mounted on a PCB area of 1 cm²

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thJA}^{(1)}$	Thermal resistance junction-ambient max	104	°C/W
$R_{thJA}^{(2)}$	Thermal resistance junction-ambient max	75	°C/W
R_{thJC}	Thermal resistance junction-case max	45	°C/W

1. Device mounted on a PCB area of 1 cm²

2. Device mounted on a PCB area of 6 cm²

2 Electrical characteristics

$T_J = 25\text{ °C}$; unless otherwise specified.

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current ($I_E = 0$)	$V_{CB} = -40\text{ V}$			-100	nA
I_{EBO}	Emitter cut-off current ($I_C = 0$)	$V_{EB} = -6\text{ V}$			-100	nA
$V_{BE(on)}$	Base-emitter on voltage	$V_{CE} = -2\text{ V}$ $I_C = -100\text{ mA}$		-670		mV
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = -1\text{ A}$ $I_B = -10\text{ mA}$ $I_C = -2\text{ A}$ $I_B = -100\text{ mA}$ $I_C = -5\text{ A}$ $I_B = -250\text{ mA}$		-150 -300	-200	mV
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = -1\text{ A}$ $I_B = -10\text{ mA}$		800		mV
$h_{FE}^{(1)}$	DC current gain	$V_{CE} = -2\text{ V}$ $I_C = -0.5\text{ A}$ $V_{CE} = -2\text{ V}$ $I_C = -2\text{ A}$ $V_{CE} = -2\text{ V}$ $I_C = -5\text{ A}$		280 210 100		
		$V_{CE} = -0.2 \div -2\text{ V}$ $I_C = -1\text{ A}$ $T_J = -30\text{ °C} \div 150\text{ °C}$	100		900	
t_d	Resistive load Delay time	$I_C = -2\text{ A}$ $V_{CC} = -10\text{ V}$ $V_{BE(off)} = 5\text{ V}$, - $I_{B(on)} = I_{B(off)} = 200\text{ mA}$		25		ns
t_r	Rise time			140		ns
t_s	Storage time			290		ns
t_f	Fall time			60		ns
f_T	Transition frequency	$I_C = -0.1\text{ A}$ $V_{CE} = -10\text{ V}$		130		MHz

1. Pulse test: pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

2.1 Electrical characteristics (curves)

Figure 2. DC current gain ($V_{CE}=-2\text{ V}$)

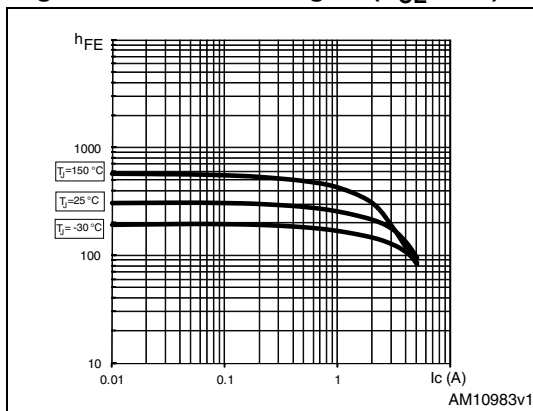


Figure 3. DC current gain ($V_{CE}=-5\text{ V}$)

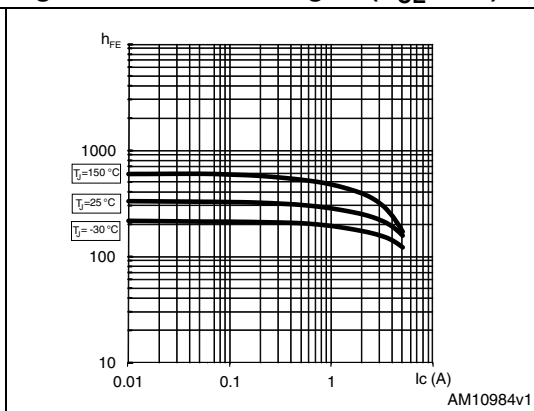


Figure 4. Collector-emitter saturation voltage (V_{CEsat} @ $h_{FE}=20$)

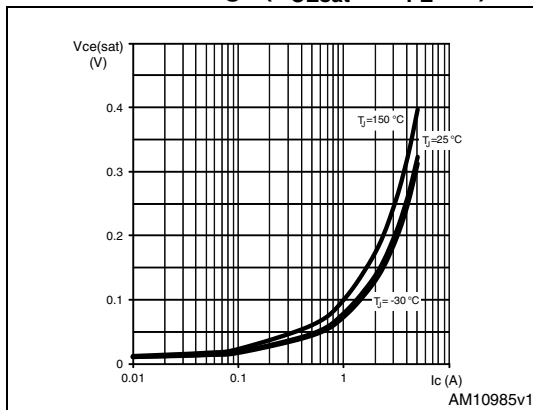


Figure 5. Collector-emitter saturation voltage (V_{CEsat} @ $h_{FE}=100$)

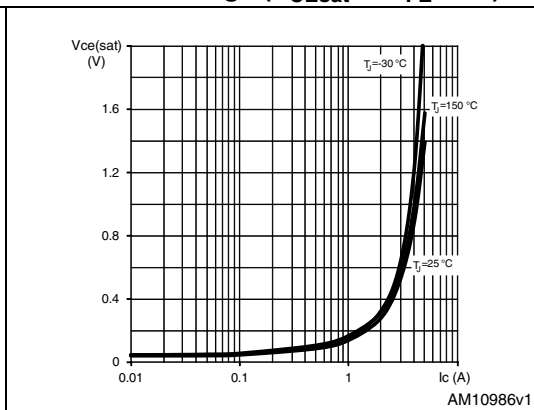


Figure 6. Base-emitter saturation voltage ($V_{be(sat)}$ @ $h_{FE}=20$)

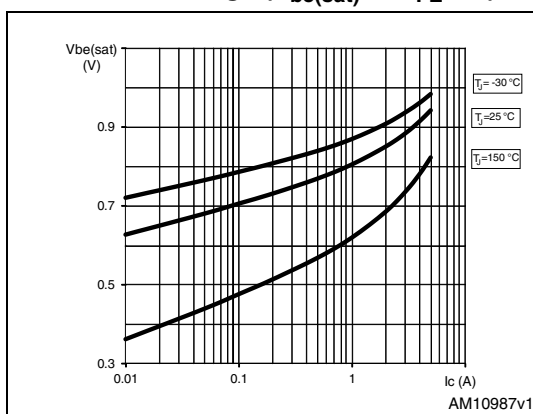


Figure 7. Base-emitter saturation voltage ($V_{be(sat)}$ @ $h_{FE}=100$)

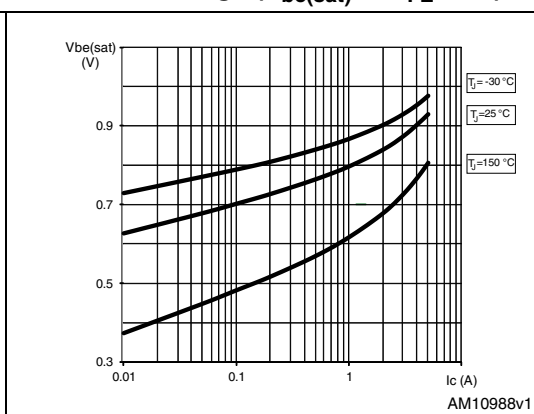


Figure 8. Resistive load switching times

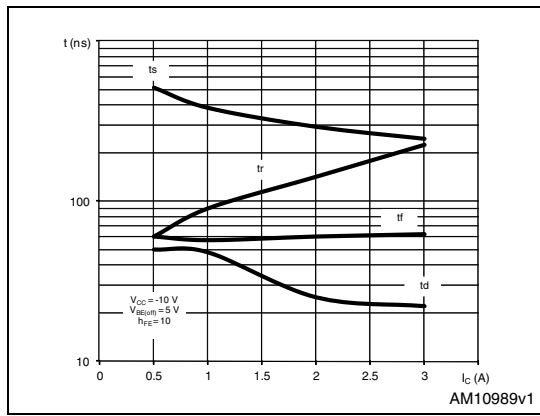
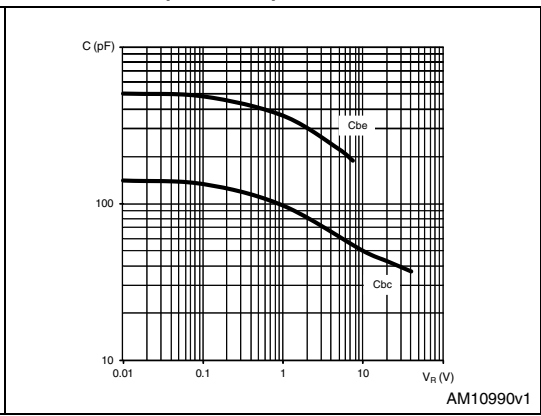


Figure 9. Capacitance curves (f=1 MHz)



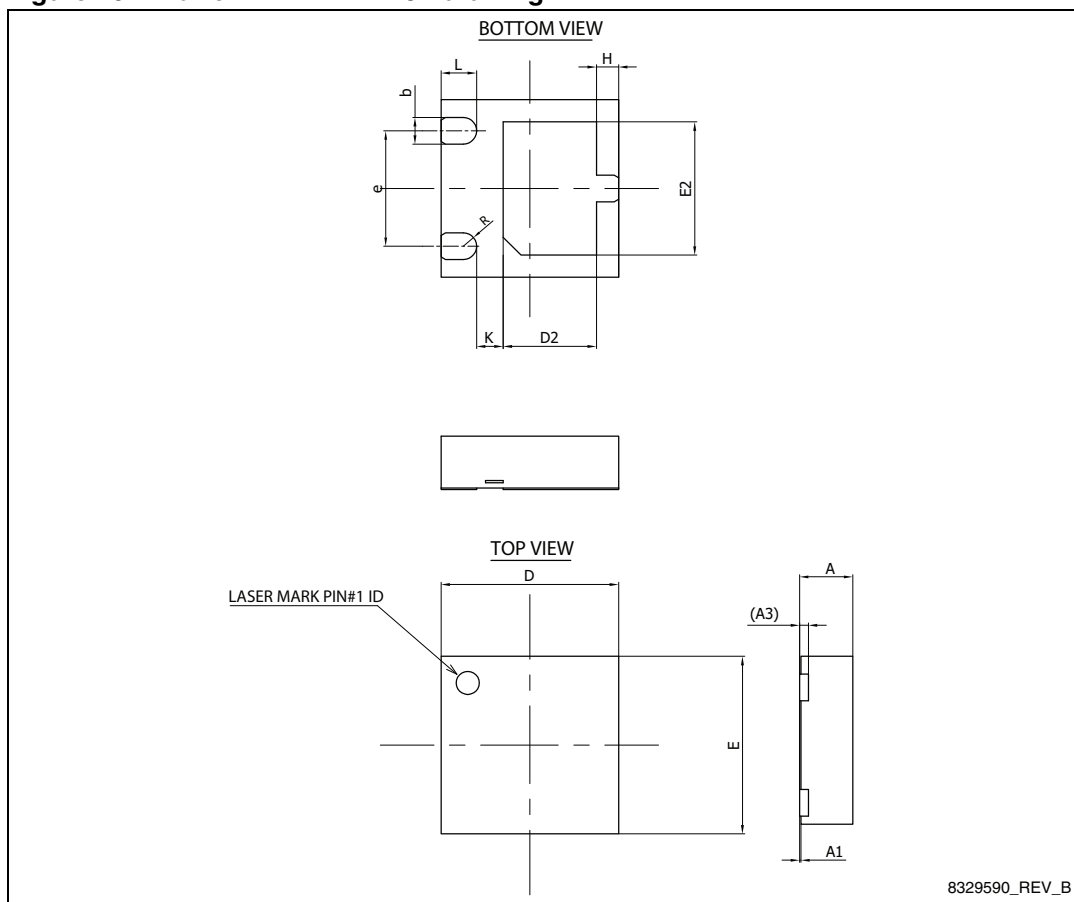
3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: www.st.com. ECOPACK[®] is an ST trademark.

Table 5. PowerFLAT™ 2 x 2 3L mechanical data

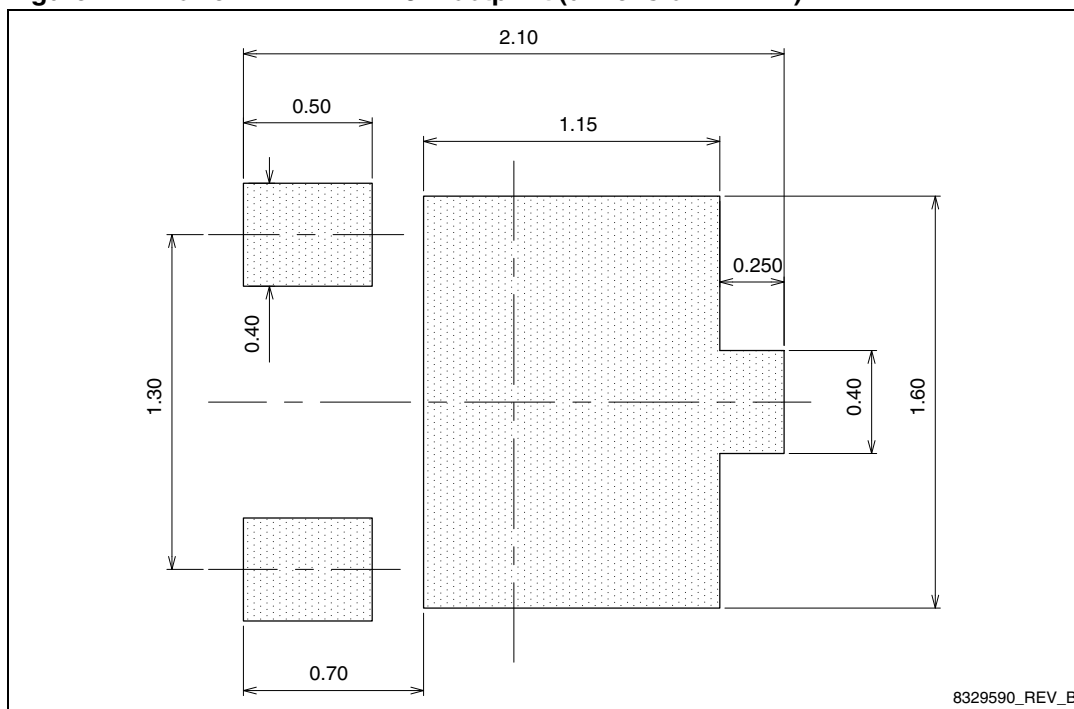
Dim.	mm.		
	Min.	Typ.	Max.
A	0.55	0.60	0.65
A1	0.00	0.02	0.05
A3		0.10	
b	0.25	0.30	0.35
D	1.90	2.00	2.10
E	1.90	2.00	2.10
e	1.20	1.30	1.40
D2	0.95	1.05	1.15
E2	1.40	1.50	1.60
H	0.20	0.25	0.30
K	0.20	0.30	0.40
L	0.35	0.40	0.45
R	0.15		

Figure 10. PowerFLAT™ 2 x 2 3L drawing



4 Packaging mechanical data

Figure 11. PowerFLAT™ 2 x 2 3L footprint (dimension in mm.)



5 Revision history

Table 6. Document revision history

Date	Revision	Changes
07-Dec-2011	1	Initial release
22-May-2012	2	Document status promoted from preliminary data to production data

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