

# 3STL2540

## 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.

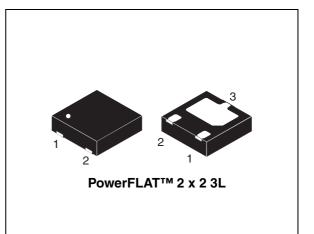
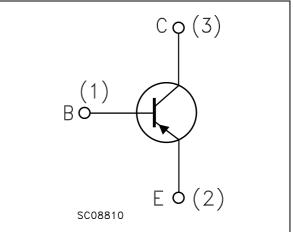


Figure 1. Internal schematic diagram



#### Table 1. Device summary

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

Doc ID 022059 Rev 2

This is information on a product in full production.

# 1 Absolute maximum ratings

Table 2.	Absolute	maximum	ratings
	Absolute	maximum	ruungo

Symbol	Parameter	Value	Unit
V <sub>CBO</sub>	Collector-base voltage (I <sub>E</sub> = 0)	-40	V
V <sub>CEO</sub>	Collector-emitter voltage (I <sub>B</sub> = 0)	-40	V
V <sub>EBO</sub>	Emitter-base voltage (I <sub>C</sub> = 0)	-6	V
۱ <sub>C</sub>	Collector current	-5	А
I <sub>CM</sub>	Collector peak current (t <sub>P</sub> < 5 ms)	-10	А
Ι <sub>Β</sub>	Base current	-0.5	А
I <sub>BM</sub>	Base peak current (t <sub>P</sub> < 5 ms)	-1	А
P <sub>TOT</sub> <sup>(1)</sup>	Total dissipation at $T_A = 25 \ ^{\circ}C$	1.2	W
T <sub>STG</sub>	Storage temperature	-65 to 150	°C
TJ	Max. operating junction temperature	150	°C

1. Device mounted on a PCB area of 1  $cm^2$ 

#### Table 3. Thermal data

Symbol	Parameter	Value	Unit
R <sub>thJA</sub> <sup>(1)</sup>	Thermal resistance junction-ambient max	104	°C/W
R <sub>thJA</sub> <sup>(2)</sup>	Thermal resistance junction-ambient max	75	°C/W
R <sub>thJC</sub>	Thermal resistance junction-case max	45	°C/W

1. Device mounted on a PCB area of 1 cm<sup>2</sup>

2. Device mounted on a PCB area of 6 cm<sup>2</sup>



## 2 Electrical characteristics

 $T_J$  = 25 °C; unless otherwise specified.

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I <sub>CBO</sub>	Collector cut-off current $(I_E = 0)$	V <sub>CB</sub> = - 40 V			-100	nA
I <sub>EBO</sub>	Emitter cut-off current $(I_{C} = 0)$	V <sub>EB</sub> = - 6 V			-100	nA
V <sub>BE(on)</sub>	Base-emitter on voltage	$V_{CE} = -2 V$ $I_{C} = -100 mA$		-670		mV
V <sub>CE(sat)</sub>	Collector-emitter saturation voltage	$ \begin{array}{ll} I_{C} = -1 \ A & I_{B} = -10 \ mA \\ I_{C} = -2 \ A & I_{B} = -100 \ mA \\ I_{C} = -5 \ A & I_{B} = -250 \ mA \end{array} $		-150 -300	-200	mV
V <sub>BE(sat)</sub>	Base-emitter saturation voltage	I <sub>C</sub> = - 1 A I <sub>B</sub> = - 10 mA		800		mV
h <sub>FE</sub> <sup>(1)</sup>	DC current gain	$V_{CE} = -2 V  I_C = -0.5 A$ $V_{CE} = -2 V  I_C = -2 A$ $V_{CE} = -2 V  I_C = -5 A$		280 210 100		
		$V_{CE}$ = -0.2 ÷ - 2 V I <sub>C</sub> = -1 A T <sub>j</sub> = -30 °C ÷ 150 °C	100		900	
t <sub>d</sub> t <sub>r</sub> t <sub>s</sub> t <sub>f</sub>	Resistive load Delay time Rise time Storage time Fall time	$I_{C} = -2 A$ $V_{CC} = -10 V$ $V_{BE(off)} = 5 V$ , $- I_{B(on)} = I_{B(off)} = 200 mA$		25 140 290 60		ns ns ns ns
f <sub>T</sub>	Transition frequency	$I_{\rm C} = -0.1  {\rm A}  {\rm V}_{\rm CE} = -10  {\rm V}$		130		MHz

### Table 4. Electrical characteristics

1. Pulse test: pulse duration  $\leq$ 300 µs, duty cycle  $\leq$ 2 %.



#### 2.1 **Electrical characteristics (curves)**

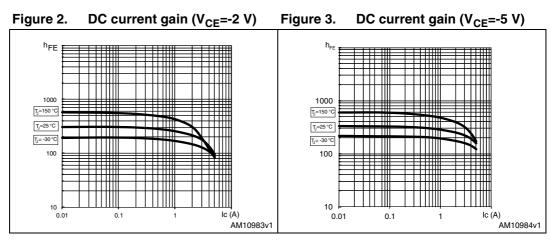
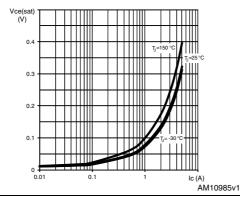
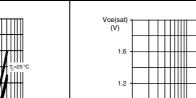


Figure 4. Figure 5. **Collector-emitter saturation** voltage (V<sub>CEsat</sub> @ h<sub>FE</sub>=20)







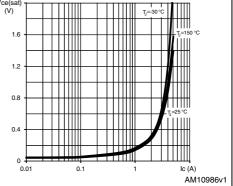
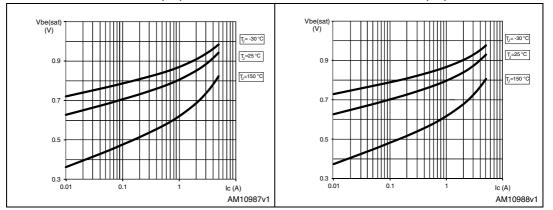
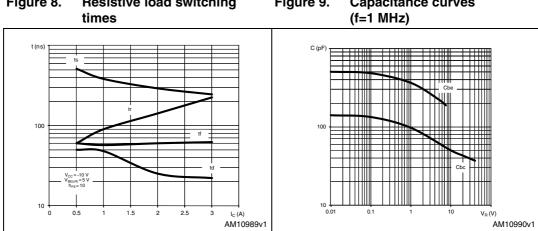


Figure 6. **Base-emitter saturation** voltage (V<sub>be(sat)</sub> @ h<sub>FE</sub>=20)

Figure 7. **Base-emitter saturation** 

voltage (V<sub>be(sat)</sub> @ h<sub>FE</sub>=100)





#### Figure 8. **Resistive load switching** 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<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK<sup>®</sup> is an ST trademark.



Dim.	mm.		
	Min.	Тур.	Max.
А	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
е	1.20	1.30	1.40
D2	0.95	1.05	1.15
E2	1.40	1.50	1.60
Н	0.20	0.25	0.30
К	0.20	0.30	0.40
L	0.35	0.40	0.45
R	0.15		

Table 5. PowerFLAT<sup>™</sup> 2 x 2 3L mechanical data



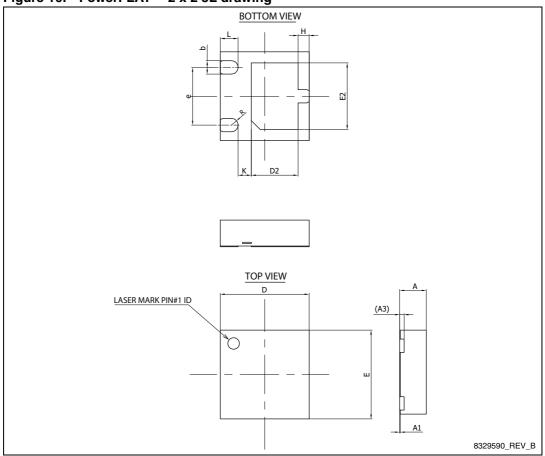


Figure 10. PowerFLAT<sup>™</sup> 2 x 2 3L drawing



# 4 Packaging mechanical data

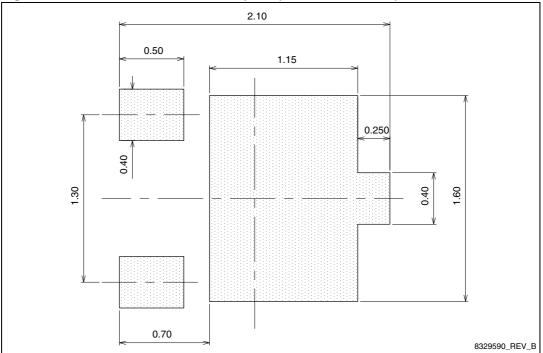


Figure 11. PowerFLAT<sup>™</sup> 2 x 2 3L footprint (dimension in mm.)



# 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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