

HIGH VOLTAGE NPN POWER TRANSISTOR

- n HIGH VOLTAGE SPECIAL DARLINGTON STRUCTURE
- n VERY RUGGED BIPOLAR TECHNOLOGY
- n HIGH OPERATION JUNCTION TEMPERATURE
- n HIGH DC CURRENT GAIN

APPLICATIONS

- n DRIVER FOR SOLENOID, RELAY AND MOTOR

DESCRIPTION

The 2ST501T is a High Voltage NPN silicon transistor in monolithic special Darlington configuration mounted in Jedec TO-220 plastic package.

Figure 1: Package

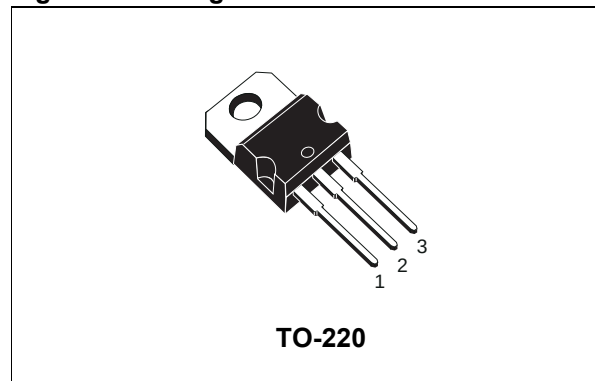


Figure 2: Internal Schematic Diagram

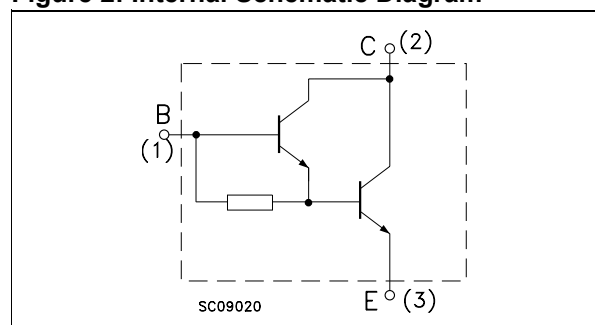


Table 1: Order Codes

Part Number	Marking	Package	Packaging
2ST501T	2ST501T	TO-220	TUBE

Table 2: Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	500	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	350	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	5	V
I_C	Collector Current	4	A
I_{CM}	Collector Peak Current ($t_p < 5ms$)	8	A
I_B	Base Current	0.5	A
I_{BM}	Base Peak Current ($t_p < 5ms$)	2.5	A
P_{tot}	Total Dissipation at $T_C = 25^\circ C$	100	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ C$
T_J	Max. Operating Junction Temperature	150	$^\circ C$

Table 3: Thermal Data

$R_{thj-case}$	Thermal Resistance Junction-Case	Max	1.25	°C/W
----------------	----------------------------------	-----	------	------

Table 4: Electrical Characteristics ($T_{case} = 25\text{ °C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($I_E = 0$)	$V_{CE} = 500\text{ V}$				100	μA
		$V_{CE} = 500\text{ V}$	$T_{case} = 125\text{ °C}$			500	μA
I_{CEO}	Collector Cut-off Current ($I_B = 0$)	$V_{CE} = 350\text{ V}$				100	μA
		$V_{CE} = 350\text{ V}$	$T_{case} = 125\text{ °C}$			500	μA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 5\text{ V}$				10	μA
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage ($I_B = 0$)	$I_C = 10\text{ mA}$	$L = 10\text{ mH}$	350			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 2\text{ A}$	$I_B = 2\text{ mA}$			1.5	V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 2\text{ A}$	$I_B = 2\text{ mA}$			2	V
h_{FE}	DC Current Gain	$I_C = 2\text{ A}$	$V_{CE} = 2\text{ V}$	2000			
t_s t_f	INDUCTIVE LOAD Storage Time	$V_{CC} = 12\text{ V}$ $L = 4\text{ mH}$	$V_{clamp} = 250\text{ V}$ $I_C = 2\text{ A}$		15		μs
	Fall Time	$I_B = 20\text{ mA}$	$V_{BE} = -3\text{ V}$		1.5		μs

* Pulsed: Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$.

Figure 3: DC Current Gain

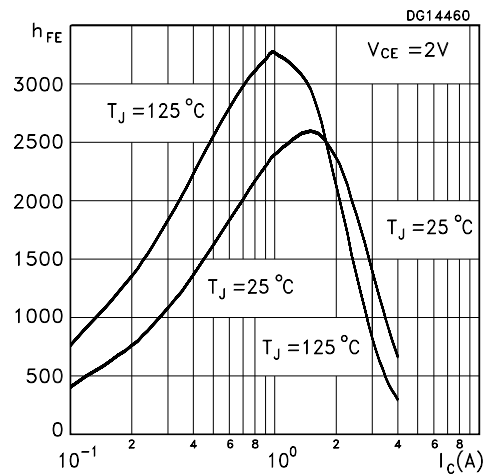


Figure 4: Collector-Source On Voltage

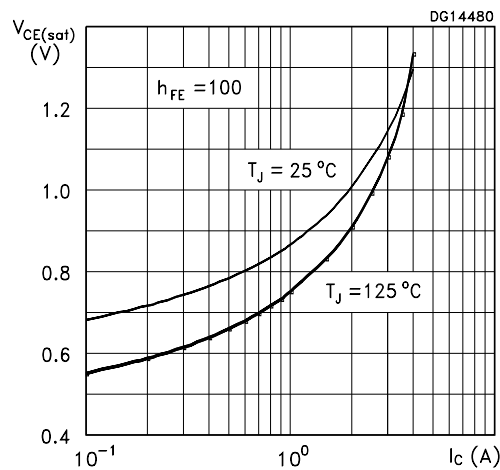


Figure 5: DC Current Gain

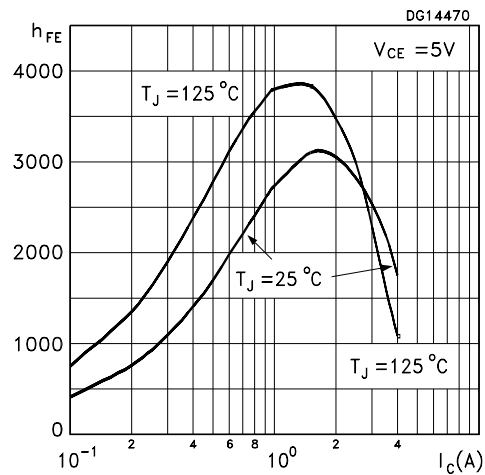
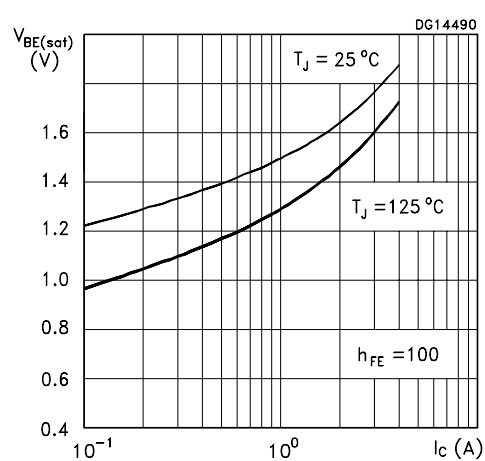


Figure 6: Base-Source On Voltage



TO-220 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.60		0.620
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
øP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116

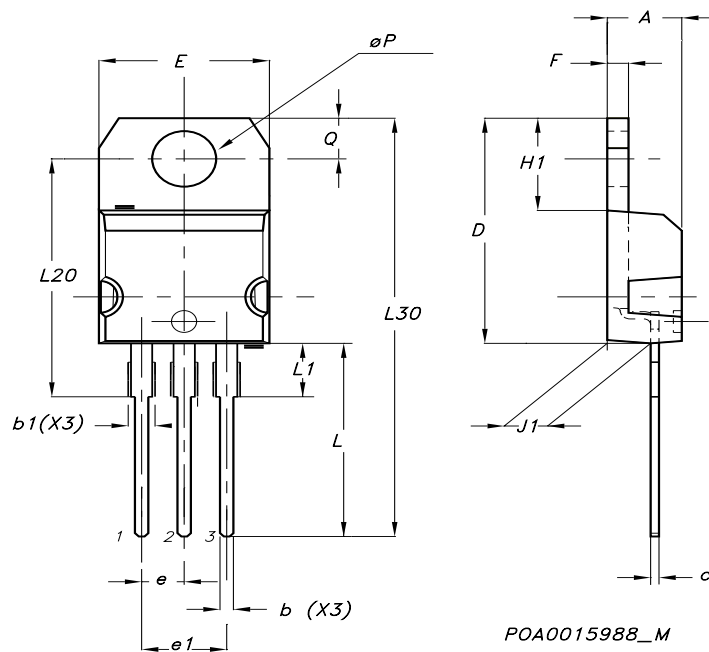


Table 5: Revision History

Version	Release Date	Change Designator
25-Feb-2005	1	First Release.

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

All other names are the property of their respective owners

© 2005 STMicroelectronics - All Rights Reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America
www.st.com