

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

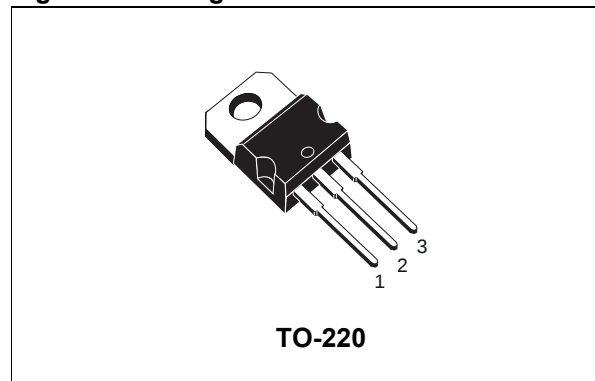


Figure 2: Internal Schematic Diagram

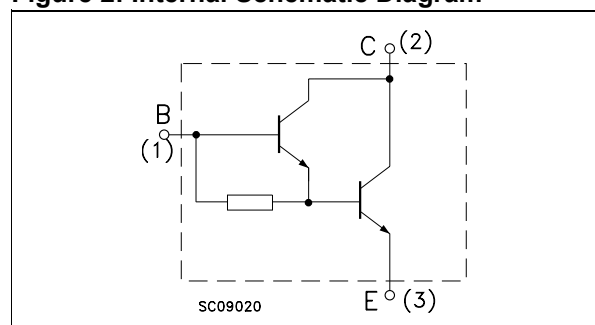


Table 1: Order Codes

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
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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	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
t_f	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

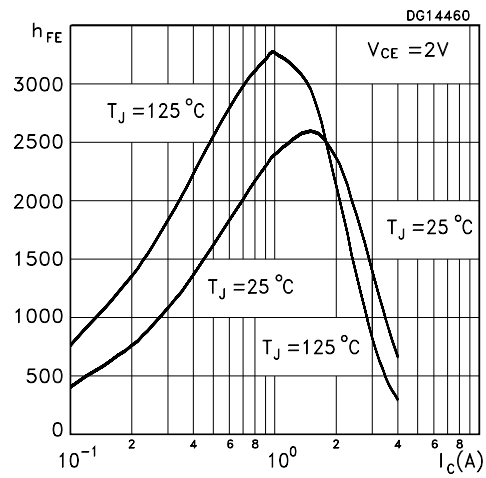


Figure 4: Collector-Source On Voltage

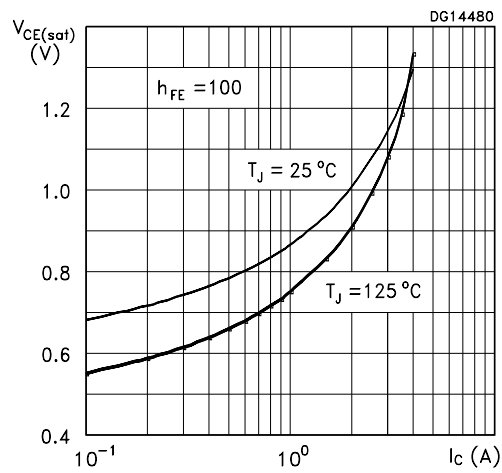


Figure 5: DC Current Gain

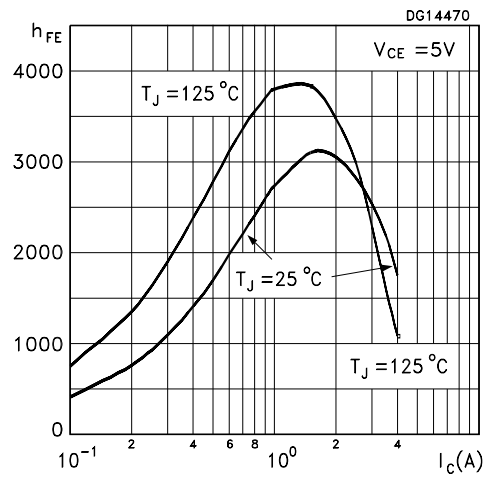
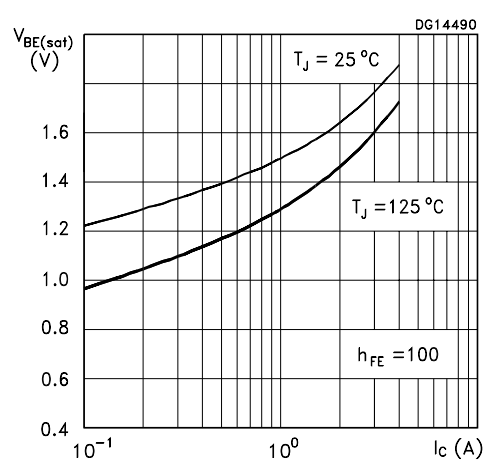


Figure 6: Base-Source On Voltage



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

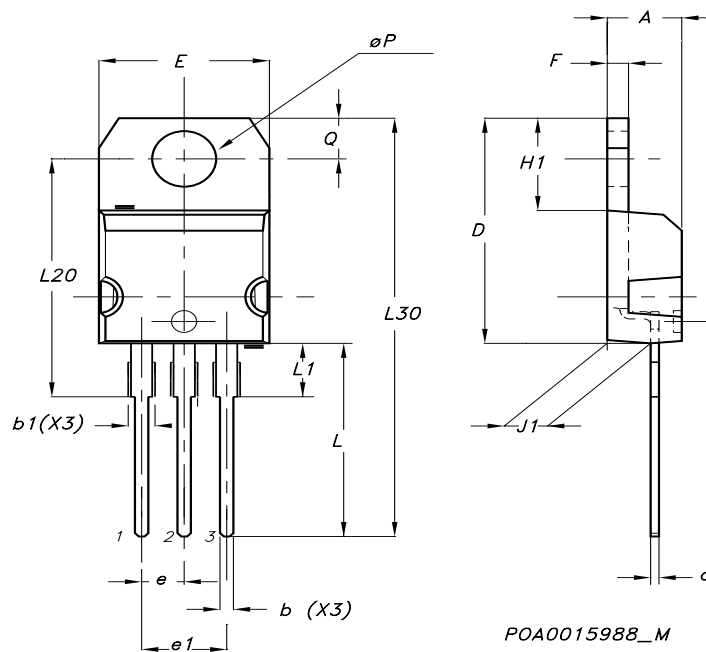


Table 5: Revision History

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

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