

## FAST-SWITCHING POWER TRANSISTOR

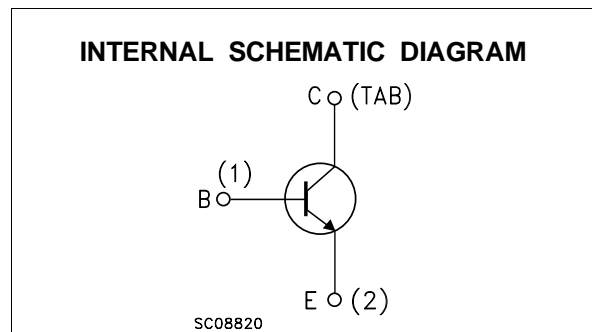
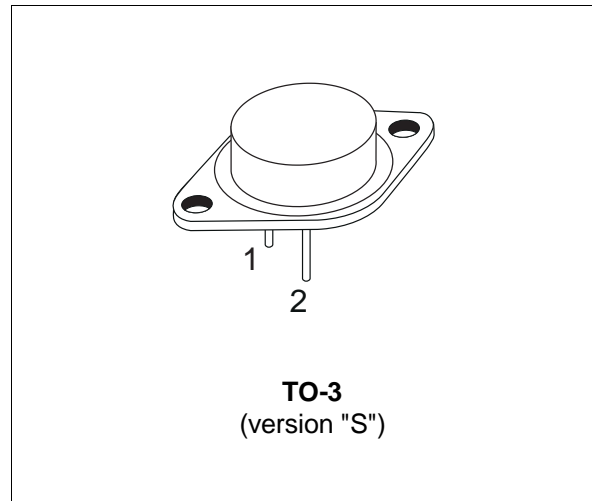
- STMicroelectronics PREFERRED SALESTYPE
- NPN TRANSISTOR
- $h_{FE} > 10$  AT  $I_C = 35A$
- HIGH EFFICIENCY SWITCHING
- VERY LOW SATURATION VOLTAGE
- RECTANGULAR SAFE OPERATING AREA
- WIDE ACCIDENTAL OVERLOAD AREA

### APPLICATIONS

- UNINTERRUPTABLE POWER SUPPLY
- SWITCH MODE POWER SUPPLIES
- MOTOR CONTROL

### DESCRIPTION

The BUT92 is a Multi-epitaxial Planar NPN Transistor in TO-3 package. It is intended for use in high frequency and efficiency converters, switching regulators and motor control.



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CEV}$	Collector-Emitter Voltage ( $V_{BE} = -1.5 V$ )	350	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	250	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_E$	Emitter Current	50	A
$I_{EM}$	Emitter Peak Current ( $t_p = 10 ms$ )	75	A
$I_B$	Base Current	10	A
$I_{BM}$	Base Peak Current ( $t_p = 10 ms$ )	15	A
$P_{tot}$	Total Power Dissipation at $T_{case} \leq 25 ^\circ C$	250	W
$T_{stg}$	Storage Temperature	-65 to 200	$^\circ C$
$T_j$	Junction Temperature	200	$^\circ C$

## BUT92

### THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.7	$^{\circ}\text{C}/\text{W}$
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### ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CER}$	Collector Cut-off Current ( $R_{BE} = 10\ \Omega$ )	$V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ $T_c = 100^{\circ}\text{C}$			0.4 4	mA mA
$I_{CEV}$	Collector Cut-off Current ( $V_{BE} = -1.5\text{V}$ )	$V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ $T_c = 100^{\circ}\text{C}$			0.2 2	mA mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 7\ \text{V}$			1	mA
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 0.2\ \text{A}$ $L = 25\ \text{mH}$	250			V
$V_{EB0}$	Emitter-Base Voltage ( $I_C = 0$ )	$I_E = 50\ \text{mA}$	7			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 35\ \text{A}$ $I_B = 3.5\ \text{A}$ $I_C = 35\ \text{A}$ $I_B = 3.5\ \text{A}$ $T_c = 100^{\circ}\text{C}$		0.8 1.25	1.2 1.9	V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 35\ \text{A}$ $I_B = 3.5\ \text{A}$ $I_C = 35\ \text{A}$ $I_B = 3.5\ \text{A}$ $T_c = 100^{\circ}\text{C}$		1.2 1.2	1.5 1.5	V V
$di_C/dt$	Rated of Rise on-state Collector Current	$V_{CC} = 200\text{V}$ $I_{B1} = 5.25\ \text{A}$ $R_C = 0$ $t_p = 3\ \mu\text{s}$ $T_c = 100^{\circ}\text{C}$	125	200		A/ $\mu\text{s}$
$V_{CE(3\mu\text{s})}^*$	Collector-Emitter Dynamic Voltage	$V_{CC} = 200\text{V}$ $I_{B1} = 5.25\ \text{A}$ $R_C = 5.7\ \Omega$ $T_c = 100^{\circ}\text{C}$		3	6	V
$V_{CE(5\mu\text{s})}^*$	Collector-Emitter Dynamic Voltage	$V_{CC} = 200\text{V}$ $I_{B1} = 5.25\ \text{A}$ $R_C = 5.7\ \Omega$ $T_c = 100^{\circ}\text{C}$		1.8	3	V

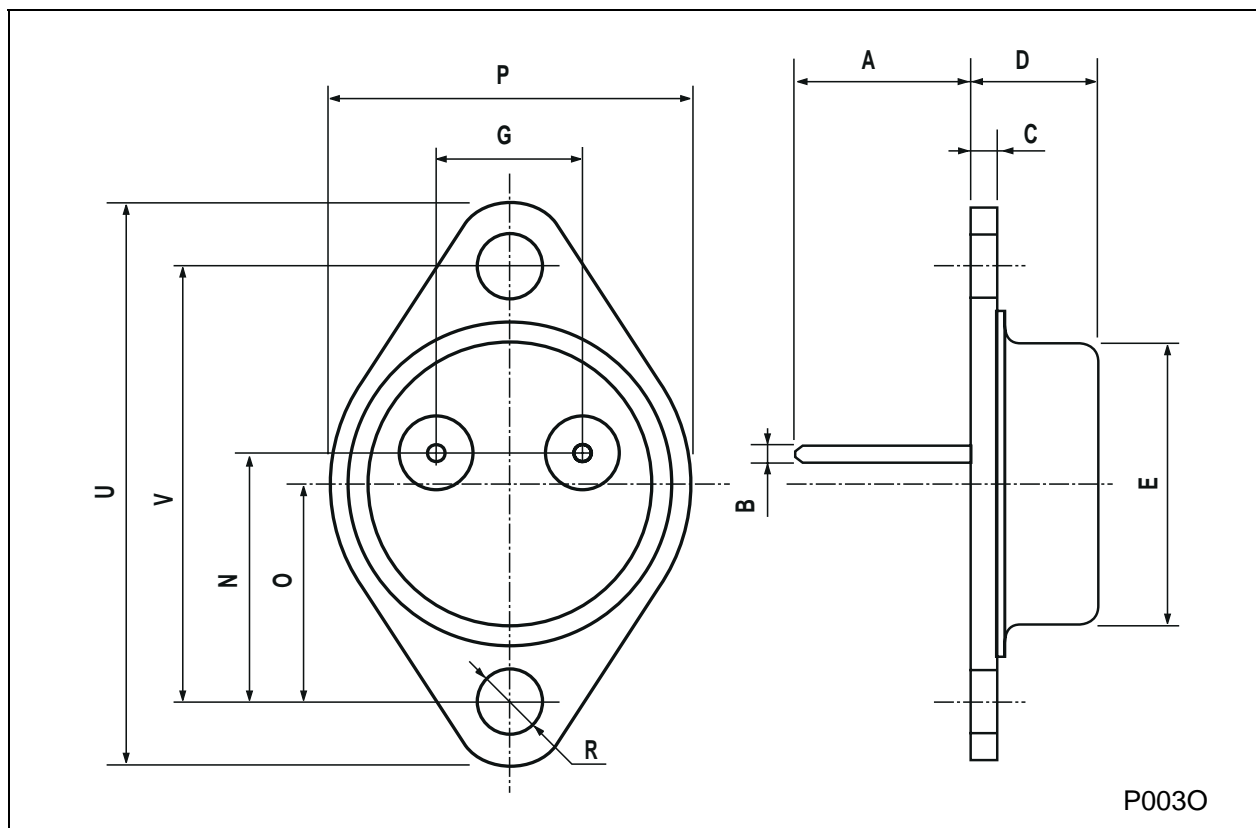
### INDUCTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_s$	Storage Time	$V_{CC} = 200\ \text{V}$ $V_{Clamp} = 250\ \text{V}$		1.4	3	$\mu\text{s}$
$t_f$	Fall Time	$I_C = 35\ \text{A}$ $I_{B1} = 3.5\ \text{A}$		0.15	0.4	$\mu\text{s}$
$t_c$	Crossover Time	$V_{BB} = -5\ \text{V}$ $L_C = 0.28\ \text{mH}$ $R_{B2} = 0.7\ \Omega$ $T_c = 100^{\circ}\text{C}$		0.3	0.7	$\mu\text{s}$
$V_{CEW}$	Maximum Collector Emitter Voltage without Snubber	$V_{CC} = 50\ \text{V}$ $I_{C\text{Woff}} = 52\ \text{A}$ $V_{BB} = -5\ \text{V}$ $I_{B1} = 3.5\ \text{A}$ $L_C = 48\ \mu\text{H}$ $R_{B2} = 0.7\ \Omega$ $T_c = 125^{\circ}\text{C}$	250			V

\* Pulsed : Pulse duration = 300  $\mu\text{s}$ , duty cycle = 2%

**TO-3 (version S) MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.00		13.10	0.433		0.516
B	1.47		1.60	0.058		0.063
C	1.50		1.65	0.059		0.065
D	8.32		8.92	0.327		0.351
E	19.00		20.00	0.748		0.787
G	10.70		11.10	0.421		0.437
N	16.50		17.20	0.649		0.677
P	25.00		26.00	0.984		1.023
R	4.00		4.09	0.157		0.161
U	38.50		39.30	1.515		1.547
V	30.00		30.30	1.187		1.193



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