

HIGH POWER NPN SILICON TRANSISTOR

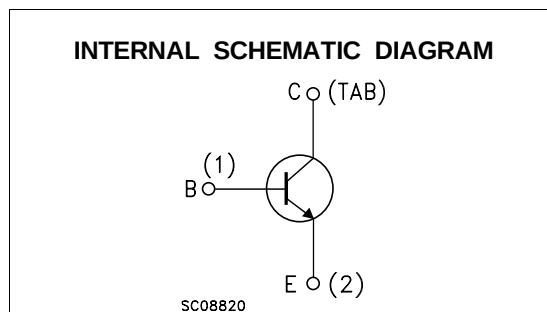
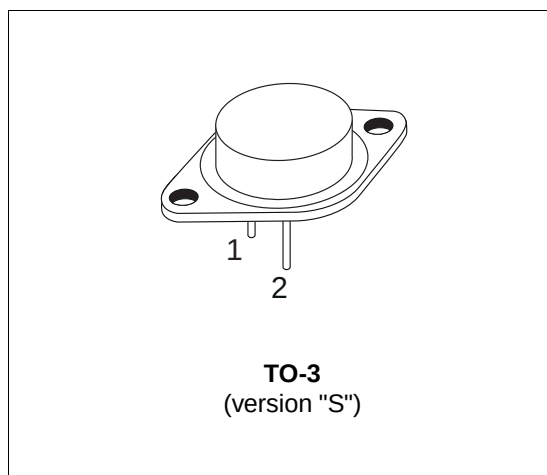
- NPN TRANSISTOR
- HIGH CURRENT CAPABILITY
- FAST SWITCHING SPEED
- HIGH RUGGEDNESS
- LOW COLLECTOR EMITTER SATURATION

APPLICATIONS

- UNINTERRUPTABLE POWER SUPPLY
- MOTOR CONTROL
- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

DESCRIPTION

The BUT90 is a Multiepitaxial 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)	200	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	125	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	10	V
I_C	Collector Current	50	A
I_{CM}	Collector Peak Current ($t_p = 10$ ms)	120	A
I_B	Base Current	12	A
I_{BM}	Base Peak Current ($t_p = 10$ ms)	32	A
P_{tot}	Total Power Dissipation at $T_{case} \leq 25$ °C	250	W
T_{stg}	Storage Temperature	-65 to 200	°C
T_j	Max Operating Junction Temperature	200	°C

BUT90

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.7	$^{\circ}\text{C/W}$
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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 ($I_B = 0$)	$I_C = 0.2\text{ A}$ $L = 25\text{ mH}$	125			V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	$I_E = 50\text{ mA}$	10			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 35\text{ A}$ $I_B = 1.75\text{ A}$ $I_C = 70\text{ A}$ $I_B = 7\text{ A}$ $I_C = 35\text{ A}$ $I_B = 1.75\text{ A}$ $T_c = 100^{\circ}\text{C}$ $I_C = 70\text{ A}$ $I_B = 7\text{ A}$ $T_c = 100^{\circ}\text{C}$		0.55 0.8 0.75 1.2	0.9 0.9 1.2 1.5	V V V V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 35\text{ A}$ $I_B = 1.75\text{ A}$ $I_C = 70\text{ A}$ $I_B = 7\text{ A}$ $I_C = 35\text{ A}$ $I_B = 1.75\text{ A}$ $T_c = 100^{\circ}\text{C}$ $I_C = 70\text{ A}$ $I_B = 7\text{ A}$ $T_c = 100^{\circ}\text{C}$		1 1.45 1 1.65	1.3 1.8 1.4 2	V V V V

RESISTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_r t_s t_f	Rise Time Storage Time Fall Time	$V_{CC} = 100\text{ V}$ $I_C = 70\text{ A}$ $I_{B1} = -I_{B2} = 7\text{ A}$ $t_p = 30\ \mu\text{s}$		0.8 0.9 0.2	1.2 1.5 0.4	μs μs μs
t_r t_s t_f	Rise Time Storage Time Fall Time	$V_{CC} = 100\text{ V}$ $I_C = 70\text{ A}$ $I_{B1} = -I_{B2} = 7\text{ A}$ $t_p = 30\ \mu\text{s}$ $T_j = 100^{\circ}\text{C}$		1.1 1.2 0.3	1.6 2 0.6	μs μs μs

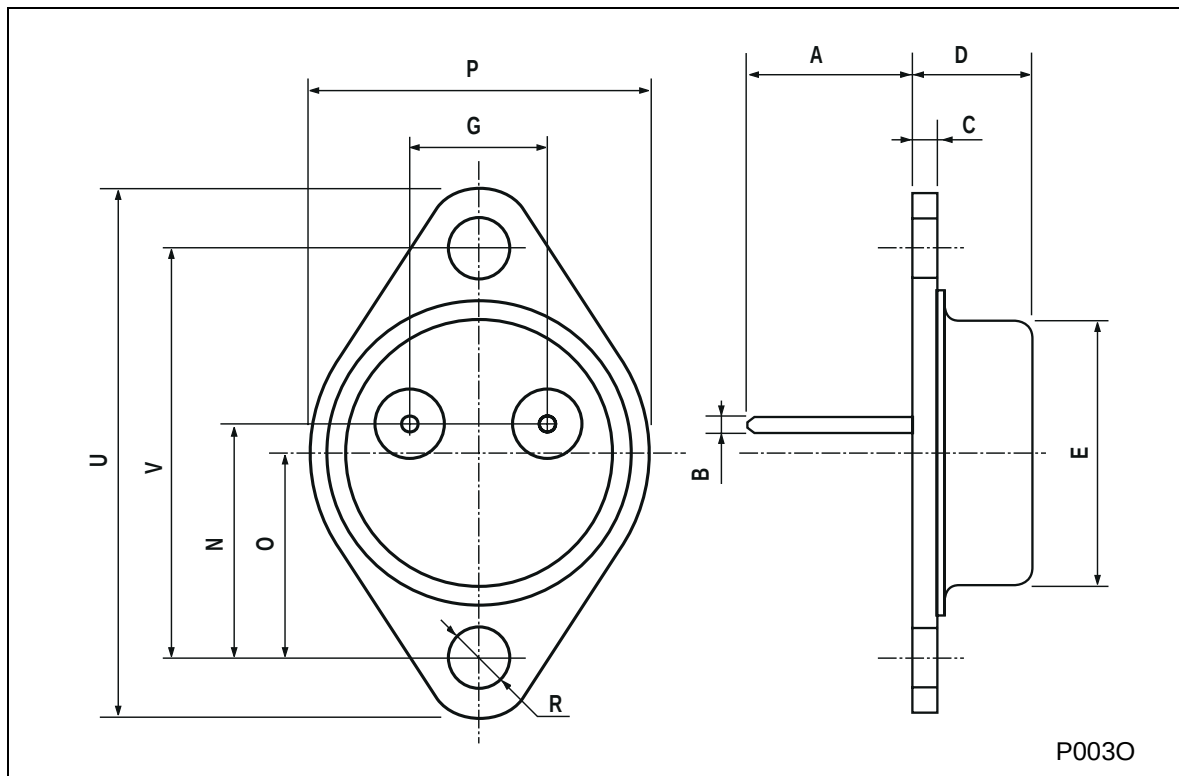
INDUCTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_s t_f	Storage Time Fall Time	$V_{CC} = 100\text{ V}$ $V_{Clamp} = 125\text{ V}$ $I_C = 70\text{ A}$ $I_{B1} = -I_{B2} = 7\text{ A}$ $L_C = 70\ \mu\text{H}$		1.25 0.16	2 0.3	ms μs
t_s t_f	Storage Time Fall Time	$V_{CC} = 100\text{ V}$ $V_{Clamp} = 125\text{ V}$ $I_C = 70\text{ A}$ $I_{B1} = -I_{B2} = 7\text{ A}$ $L_C = 70\ \mu\text{H}$ $T_j = 100^{\circ}\text{C}$		1.5 0.25	2.3 0.5	μs μs

* Pulsed : Pulse duration = 300 μs , 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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