

HIGH POWER NPN SILICON TRANSISTOR

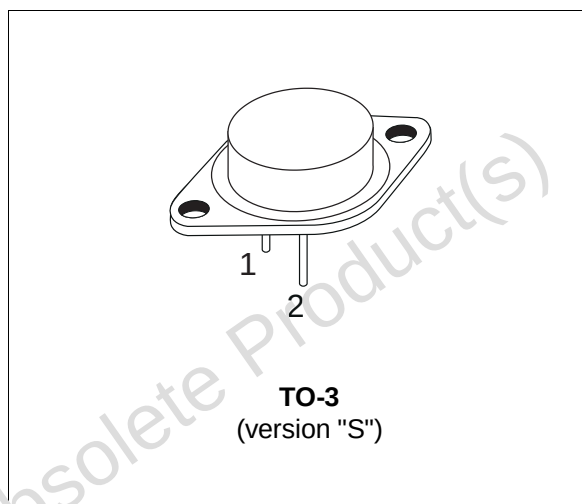
- NPN TRANSISTOR
- HIGH CURRENT CAPABILITY
- FAST SWITCHING SPEED
- HIGH RUGGEDNESS
- LOW COLLECTOR-EMITTER SATURATION

APPLICATIONS

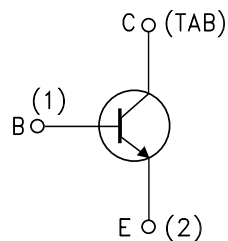
- UNINTERRUPTABLE POWER SUPPLY
- MOTOR CONTROL
- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

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.



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CEV}	Collector-Emitter Voltage ($V_{BE} = -1.5\text{ V}$)	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 ($t_p = 10\text{ ms}$)	120	A
I_B	Base Current	12	A
I_{BM}	Base Peak Current ($t_p = 10\text{ ms}$)	32	A
P_{tot}	Total Power Dissipation at $T_{case} \leq 25\text{ }^{\circ}\text{C}$	250	W
T_{stg}	Storage Temperature	-65 to 200	$^{\circ}\text{C}$
T_j	Max Operating Junction Temperature	200	$^{\circ}\text{C}$

BUT90

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-case	Max	0.7	°C/W
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ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CER}	Collector Cut-off Current (R _{BE} = 10 Ω)	V _{CE} = V _{CEV} V _{CE} = V _{CEV} T _c = 100 °C			0.4 4	mA mA
I _{CEV}	Collector Cut-off Current (V _{BE} = -1.5V)	V _{CE} = V _{CEV} V _{CE} = V _{CEV} T _c = 100 °C			0.2 2	mA mA
I _{EBO}	Emitter Cut-off Current (I _C = 0)	V _{EB} = 7 V			1	mA
V _{CEO(sus)*}	Collector-Emitter Sustaining Voltage (I _B = 0)	I _C = 0.2 A L = 25 mH	125			V
V _{EBO}	Emitter-Base Voltage (I _C = 0)	I _E = 50 mA	10			V
V _{CE(sat)*}	Collector-Emitter Saturation Voltage	I _C = 35 A I _B = 1.75 A I _C = 70 A I _B = 7 A I _C = 35 A I _B = 1.75 A T _c = 100 °C I _C = 70 A I _B = 7 A T _c = 100 °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 A I _B = 1.75 A I _C = 70 A I _B = 7 A I _C = 35 A I _B = 1.75 A T _c = 100 °C I _C = 70 A I _B = 7 A T _c = 100 °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	Rise Time	V _{CC} = 100 V I _C = 70 A		0.8	1.2	μs
t _s	Storage Time	I _{B1} = - I _{B2} = 7 A t _p = 30 μs		0.9	1.5	μs
t _f	Fall Time			0.2	0.4	μs
t _r	Rise Time	V _{CC} = 100 V I _C = 70 A		1.1	1.6	μs
t _s	Storage Time	I _{B1} = - I _{B2} = 7 A t _p = 30 μs		1.2	2	μs
t _f	Fall Time	T _j = 100 °C		0.3	0.6	μs

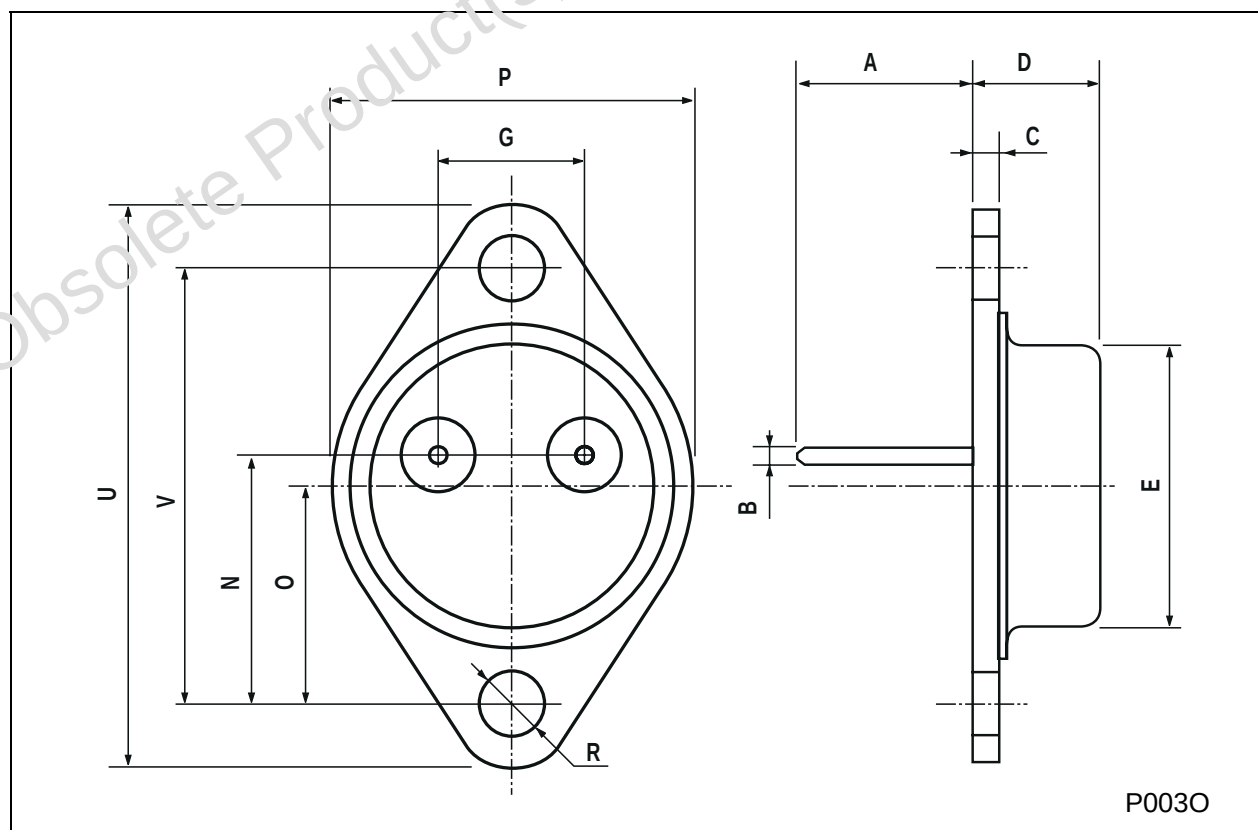
INDUCTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t _s	Storage Time	V _{CC} = 100 V V _{Clamp} = 125 V		1.25	2	ms
t _f	Fall Time	I _C = 70 A I _{B1} = - I _{B2} = 7 A L _C = 70 μH		0.16	0.3	μs
t _s	Storage Time	V _{CC} = 100 V V _{Clamp} = 125 V		1.5	2.3	μs
t _f	Fall Time	I _C = 70 A I _{B1} = - I _{B2} = 7 A L _C = 70 μH T _j = 100 °C		0.25	0.5	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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