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T-33-13

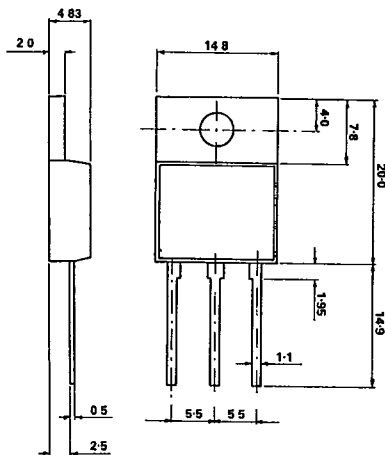
BUW 51

NPN MULTI-EPITAXIAL POWER TRANSISTOR

Suitable for high current, high speed,
low voltage applications

MECHANICAL DATA

Dimensions in mm



FEATURES

- LOW $V_{CE(SAT)}$
- FAST SWITCHING
- HIGH CURRENT
- HIGH RELIABILITY

APPLICATIONS

- HIGH FREQUENCY AND EFFICIENCY CONVERTERS
- SWITCHING REGULATORS
- MOTOR CONTROLS

SOT 93
(ALSO AVAILABLE IN CHIP FORM)

ABSOLUTE MAXIMUM RATINGS ($T_{CASE} = 25^{\circ}C$ unless otherwise stated)

V_{CEX}	Collector-emitter voltage ($V_{BE} = -1.5V$)	300V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	200V
V_{EBO}	Emitter-base voltage	7V
I_C	Collector current	20A
$I_{C(PK)}$	Peak collector current	28A
I_B	Base current	4A
$I_{B(PK)}$	Peak base current	7A
P_{tot}	Total dissipation at $T_{CASE} = 25^{\circ}C$	150W
T_{stg}	Storage temperature	-55 to 200°C
T_J	Maximum operating junction temperature	200°C
R_{th}	Thermal resistance (junction-case)	Max. 1.0°C/W

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ELECTRICAL CHARACTERISTICS ($T_{CASE} = 25^{\circ}C$ unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE0(sus)}$ Collector-emitter sustaining voltage	$I_B = 0, I_C = 0.2A$ $L = 25mH$	200			V
$V_{(BR)EBO}$ Emitter base breakdown voltage	$I_C = 0$ $I_E = 50mA$	7			V
I_{CEX} Collector cut-off current	$V_{BE} = -1.5V$ $V_{CE} = V_{CEX}$ $T_J = 100^{\circ}C$			0.5 2.0	mA mA
I_{CER} Collector cut-off current	$R_{BE} = 10\Omega$ $V_{CE} = V_{CEX}$ $T_J = 100^{\circ}C$			0.5 2.5	mA mA
I_{EBO} Emitter cut-off current	$I_C = 0$ $V_{BE} = -5V$			1.0	mA
$V_{CE(sat)*}$ Collector-emitter saturation voltage	$I_C = 10A$ $I_B = 1A$ $T_J = 100^{\circ}C$	0.45	0.9		V
		0.6	1.5		V
	$I_C = 5A$ $I_B = 0.25A$ $T_J = 100^{\circ}C$	0.4	0.8		V
		0.4	0.9		V
$V_{BE(sat)*}$ Emitter-base saturation voltage	$I_C = 10A$ $I_B = 1A$ $T_J = 100^{\circ}C$	1.1	1.4		V
		1.0	1.4		V

SWITCHING CHARACTERISTICS ($T_{CASE} = 25^{\circ}C$ unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
SWITCHING TIMES ON RESISTIVE LOAD					
t_r Rise time	$I_C = 14A$ $V_{CC} = 160V$ $V_{BB} = -5V$ $R_{B2} = 1.4\Omega$ $t_p = 30\mu s$ $I_{B1} = 1.7A$	0.3	0.6		μs
t_s Storage time		0.6	1.4		μs
t_f Fall time		0.12	0.3		μs
TURN-ON SWITCHING CHARACTERISTICS					
di_c/dt On state collector current current rate of rise	$R_C = 0$ $V_{CC} = 160V$ $I_{B1} = 1.5A$ $T_J = 100^{\circ}C$	35 30	75 65		$A/\mu s$ $A/\mu s$
$V_{CE}(2\mu s)$ Collector-emitter voltage after applied base drive	$V_{CC} = 160V$ $R_C = 16\Omega$ $I_{B1} = 1A$ $T_J = 100^{\circ}C$	1.8	3.0		V
$V_{CE}(4\mu s)$		3.0	5.0		V
		1.1	1.7		V
		1.4	2.5		V
TURN-OFF SWITCHING CHARACTERISTICS - INDUCTIVE LOAD, WITH NEGATIVE BIAS					
t_{si} Carrier storage time	$I_C = 10A$ $V_{clamp} = 200V$ $T_J = 100^{\circ}C$ $I_B = 1A$ $L_C = 0.8mH$ $V_{CC} = 160V$ $R_{B2} = 2.5\Omega$ $T_J = 100^{\circ}C$ $V_{BB} = -5V$ $T_J = 100^{\circ}C$	0.7	1.5		μs
		1.1	2.0		μs
t_{fi} Fall time		0.06	0.2		μs
		0.12	0.3		μs
t_c V_{CE}/I_C Crossover time		0.13	0.3		μs
		0.24	0.5		μs
TURN-OFF SWITCHING CHARACTERISTICS - INDUCTIVE LOAD, WITHOUT NEGATIVE BIAS					
t_{si} Carrier storage time	$I_C = 10A$ $V_{clamp} = 200V$ $T_J = 100^{\circ}C$ $I_B = 1A$ $L_C = 0.8mH$	1.5			μs
		2.7			μs
t_{fi} Fall time	$V_{CC} = 160V$ $R_{B2} = 4.7\Omega$ $V_{BB} = 0V$ $T_J = 100^{\circ}C$	0.5			μs
		0.85			μs

* Pulse test $t_p = 300\mu s$ $\delta \leq 2\%$

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