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## BUV50

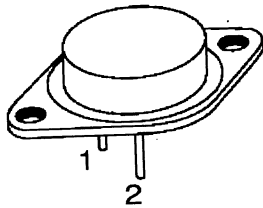
High Power NPN Silicon Transistor

### Application

Switching regulators  
Motor control

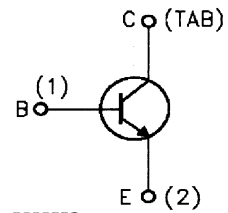
### Description

NPN transistor  
High current capability  
Fast switching speed  
Fully characterized



TO-3

### INTERNAL SCHEMATIC DIAGRAM



SC08820

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CEV}$	Collector-Emitter Voltage ( $V_{BE} = -1.5V$ )	250	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	125	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	25	A
$I_{CM}$	Collector Peak Current	50	A
$I_B$	Base Current	6	A
$I_{BM}$	Base Peak Current	12	A
$P_{Base}$	Reverse Bias Base Power Dissipation (B.E. junction in avalanche)	2	W
$P_{tot}$	Total Power Dissipation at $T_{case} \leq 25^\circ C$	150	W
$T_{stg}$	Storage Temperature	-65 to 200	$^\circ C$
$T_j$	Max Operating Junction Temperature	150	$^\circ C$



Quality Semi-Conductors

## BUV50

### THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.17	$^{\circ}C/W$
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### ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CER}$	Collector Cut-off Current ( $R_{BE} = 10\Omega$ )	$V_{CE} = V_{CEV}$			1	mA
		$V_{CE} = V_{CEV}$ $T_C = 100^{\circ}C$			5	mA
$I_{CEV}$	Collector Cut-off Current	$V_{CE} = V_{CEV}$ $V_{BE} = -1.5V$			1	mA
		$V_{CE} = V_{CEV}$ $V_{BE} = -1.5V$ $T_C = 100^{\circ}C$			5	mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 5V$			1	mA
$V_{CEO(sus)*}$	Collector-Emitter Sustaining Voltage	$I_C = 0.2A$ $L = 25mH$	125			V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	$I_E = 50mA$	7			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 10A$ $I_B = 0.5A$		0.4	0.8	V
		$I_C = 20A$ $I_B = 2A$		0.6	0.9	V
		$I_C = 24A$ $I_B = 3A$		0.7	1.2	V
		$I_C = 10A$ $I_B = 0.5A$ $T_j = 100^{\circ}C$		0.5	0.9	V
		$I_C = 20A$ $I_B = 2A$ $T_j = 100^{\circ}C$		0.75	1.5	V
$I_C = 24A$ $I_B = 3A$ $T_j = 100^{\circ}C$		0.9	1.8	V		
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 20A$ $I_B = 2A$		1.25	1.6	V
		$I_C = 24A$ $I_B = 3A$		1.35	1.7	V
		$I_C = 20A$ $I_B = 2A$ $T_j = 100^{\circ}C$		1.25	1.7	V
		$I_C = 24A$ $I_B = 3A$ $T_j = 100^{\circ}C$		1.45	1.9	V
$di_c/d_t^*$	Rate of Rise of on-state Collector Current	$V_{CC} = 100V$ $I_{B1} = 3A$ $R_C = 0$ $T_j = 25^{\circ}C$ $T_j = 100^{\circ}C$	50 45	100 85		A/ $\mu s$ A/ $\mu s$
$V_{CE(2\mu s)}$	Collector-Emitter Dynamic Voltage	$V_{CC} = 100V$ $I_{B1} = 2A$ $R_C = 5\Omega$ $T_j = 25^{\circ}C$ $T_j = 100^{\circ}C$		1.4	3	V
				2.1	4	V
$V_{CE(4\mu s)}$	Collector-Emitter Dynamic Voltage	$V_{CC} = 100V$ $I_{B1} = 2A$ $R_C = 5\Omega$ $T_j = 25^{\circ}C$ $T_j = 100^{\circ}C$		1.1	2	V
				1.5	2.5	V

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

**ELECTRICAL CHARACTERISTICS** (continued)

**TURN-OFF SWITCHING CHARACTERISTICS**

**On Inductive Load** (with negative bias)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$t_{si}$	$T_j = 25\text{ }^\circ\text{C}$	$I_C = 20\text{A}$ $I_B = 2\text{A}$ $V_{BB} = -5\text{V}$ $V_{CC} = 100\text{V}$ $V_{CLAMP} = 125\text{V}$ $L_C = 0.25\text{ mH}$ $R_{B2} = 1.3\Omega$		0.85	1.4	$\mu\text{s}$
	$T_j = 100\text{ }^\circ\text{C}$			1.2	1.7	
$t_{fi}$	$T_j = 25\text{ }^\circ\text{C}$			0.09	0.2	
	$T_j = 100\text{ }^\circ\text{C}$			0.17	0.3	
$t_{ti}$	$T_j = 25\text{ }^\circ\text{C}$			0.04	0.05	
	$T_j = 100\text{ }^\circ\text{C}$			0.07	0.1	
$t_c$	$T_j = 25\text{ }^\circ\text{C}$		0.16	0.3		
	$T_j = 100\text{ }^\circ\text{C}$		0.3	0.5		

**TURN-OFF SWITCHING CHARACTERISTICS**

**On Inductive Load** (without negative bias)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$t_{si}$	$T_j = 25\text{ }^\circ\text{C}$	$I_C = 20\text{A}$ $I_B = 2\text{A}$ $V_{BB} = 0$ $V_{CC} = 100\text{V}$ $V_{CLAMP} = 125\text{V}$ $L_C = 0.25\text{ mH}$ $R_{B2} = 4.7\Omega$		2.1		$\mu\text{s}$
	$T_j = 100\text{ }^\circ\text{C}$			3.2		
$t_{fi}$	$T_j = 25\text{ }^\circ\text{C}$			0.7		
	$T_j = 100\text{ }^\circ\text{C}$			1.2		
$t_{ti}$	$T_j = 25\text{ }^\circ\text{C}$			0.28		
	$T_j = 100\text{ }^\circ\text{C}$			0.55		

\*Pulsed : Duration = 300ms, Duty Cycle = 2%

**Figure 1** : Switching Times Test Circuit (resistive load)

