

## HIGH POWER NPN SILICON TRANSISTOR

- NPN TRANSISTOR
- HIGH CURRENT CAPABILITY
- FAST SWITCHING SPEED
- FULLY CHARACTERIZED AT 125°C

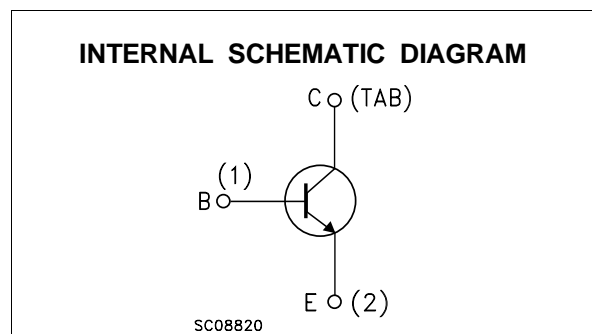
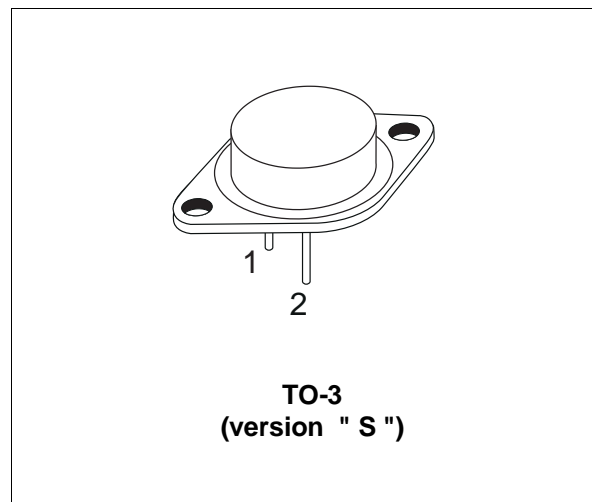
### APPLICATION

- SWITCHING REGULATORS
- MOTOR CONTROL

### DESCRIPTION

The BUV61 is a Multi-Epitaxial planar NPN transistor in TO-3 metal case.

It is intended for use in high frequency and efficiency converters such as motor controllers and industrial equipment.



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CEV}$	Collector-emitter Voltage ( $V_{BE} = -1.5V$ )	300	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	200	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	50	A
$I_{CM}$	Collector Peak Current	75	A
$I_B$	Base Current	8	A
$I_{BM}$	Base Peak Current	15	A
$P_{Base}$	Reverse Bias Base Dissipation (B.E. junction in avalanche)	2	W
$P_{tot}$	Total Power Dissipation at $T_{case} < 25\text{ }^\circ\text{C}$	250	W
$T_{stg}$	Storage Temperature	-65 to 200	°C
$T_j$	Max Operating Junction Temperature	200	°C

# BUV61

## THERMAL DATA

R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	0.7	°C/W
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## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CER</sub>	Collector Cut-off Current (R <sub>BE</sub> = 10Ω)	V <sub>CE</sub> = 300 V V <sub>CE</sub> = 300 V T <sub>C</sub> = 100°C			1 5	mA mA
I <sub>CEV</sub>	Collector Cut-off Current (V <sub>BE</sub> = -1.5V)	V <sub>CE</sub> = 300V V <sub>CE</sub> = 300V T <sub>C</sub> =100°C			1 4	mA mA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 5 V			1	mA
V <sub>CEO(sus)*</sub>	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 0.2A L = 25 mH	200			V
V <sub>EBO</sub>	Emitter-base Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 50 mA	7			V
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 12.5A I <sub>B</sub> = 0.625A I <sub>C</sub> = 25A I <sub>B</sub> = 2.5A I <sub>C</sub> = 40A I <sub>B</sub> = 5A I <sub>C</sub> = 12.5A I <sub>B</sub> = 0.625A T <sub>j</sub> = 100°C I <sub>C</sub> = 25A I <sub>B</sub> = 2.5A T <sub>j</sub> = 100°C I <sub>C</sub> = 40A I <sub>B</sub> = 5A T <sub>j</sub> = 100°C		0.65 0.4 0.6 0.5 0.5 0.75	0.9 0.9 1.2 1.2 1.5 1.9	V V V V V V
V <sub>BE(sat)*</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = 25A I <sub>B</sub> = 2.5A I <sub>C</sub> = 40A I <sub>B</sub> = 5A I <sub>C</sub> = 25A I <sub>B</sub> = 2.5A T <sub>j</sub> = 100°C I <sub>C</sub> = 40A I <sub>B</sub> = 5A T <sub>j</sub> = 100°C		1.05 1.35 1.1 1.35	1.4 1.8 1.7 1.8	V V V V
di <sub>c</sub> /dt*	Rated of Rise of on-state Collector Current	V <sub>CC</sub> = 160V R <sub>C</sub> = 0 I <sub>B1</sub> = 3.75A T <sub>j</sub> = 25°C T <sub>j</sub> = 100°C	70 60	130 110		A/μs A/μs
V <sub>CE(2μs)</sub>	Collector Emitter Dynamic Voltage	V <sub>CC</sub> = 160V R <sub>C</sub> = 6.4Ω I <sub>B1</sub> = 2.5A T <sub>j</sub> = 25°C T <sub>j</sub> = 100°C		1.3 1.8	3 5	V V
V <sub>CE(4μs)</sub>	Collector Emitter Dynamic Voltage	V <sub>CC</sub> = 160V R <sub>C</sub> = 6.4Ω I <sub>B1</sub> = 2.5A T <sub>j</sub> = 25°C T <sub>j</sub> = 100°C		0.95 1.1	2 3	V V

\* Pulsed: Pulse duration = 300 μs, duty cycle = 2 %

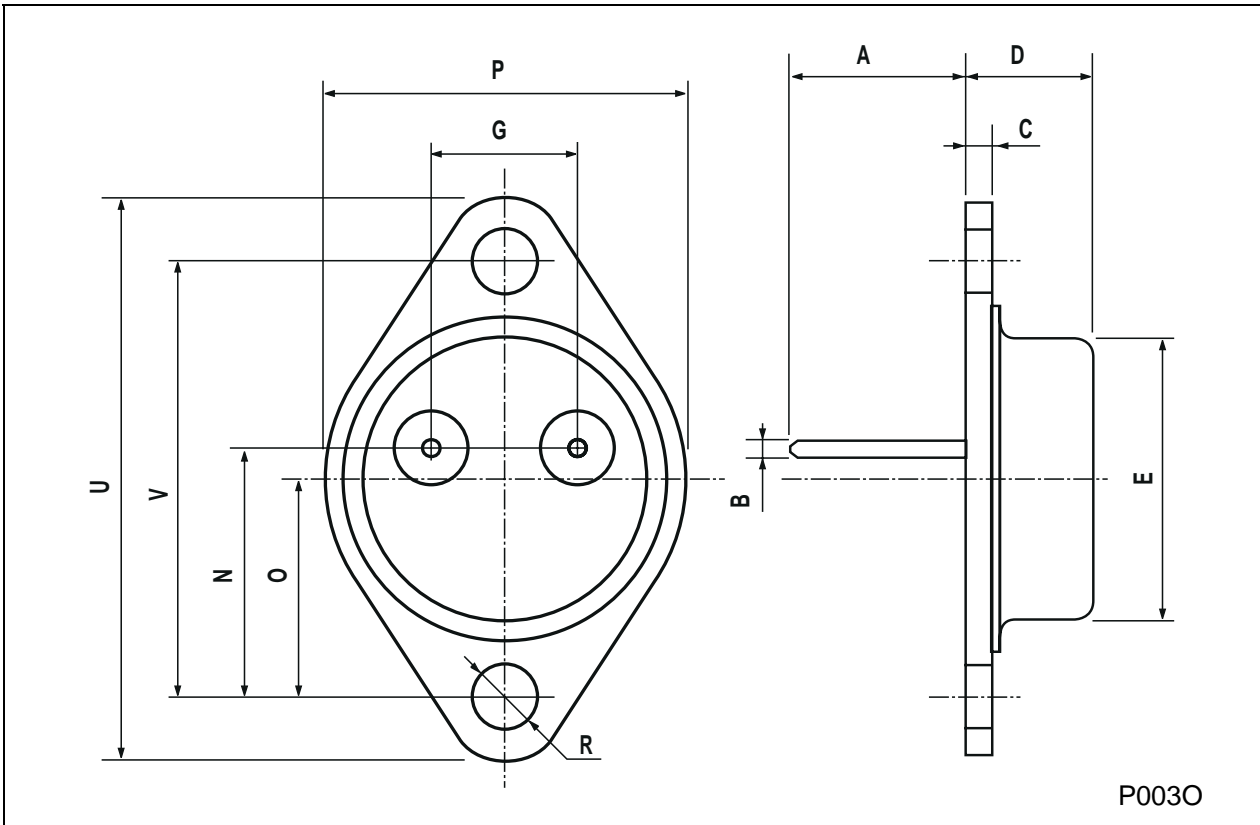
**ELECTRICAL CHARACTERISTICS** (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
	<b>RESISTIVE LOAD</b>					
$t_r$	Rise Time	$V_{CC} = 160V$ $I_C = 40A$		0.55	0.7	$\mu s$
$t_s$	Storage Time	$V_{BB} = -5V$ $I_{B1} = 5A$		0.6	1.2	$\mu s$
$t_f$	Fall Time	$R_{B2} = 0.5\Omega$ $T_p = 30\mu s$		0.07	0.3	$\mu s$
	<b>INDUCTIVE LOAD</b>					
$t_s$	Storage Time	$V_{CC} = 160V$ $V_{clamp} = 200V$		0.85	1.9	$\mu s$
$t_f$	Fall Time	$I_C = 25A$ $I_B = 2.5A$		0.06	0.15	$\mu s$
$t_t$	Tail Time in Turn-on	$V_{BB} = -5V$ $R_{B2} = 1\Omega$		0.01	0.07	$\mu s$
$t_c$	Crossover Time	$L_C = 0.32mH$		0.11	0.3	$\mu s$
$t_s$	Storage Time	$V_{CC} = 160V$ $V_{clamp} = 200V$		1.1	2.4	$\mu s$
$t_f$	Fall Time	$I_C = 25A$ $I_B = 2.5A$		0.08	0.25	$\mu s$
$t_t$	Tail Time in Turn-on	$V_{BB} = -5V$ $R_{B2} = 1\Omega$		0.02	0.15	$\mu s$
$t_c$	Crossover Time	$L_C = 0.32mH$ $T_j = 100^\circ C$		0.15	0.5	$\mu s$
$t_s$	Storage Time	$V_{CC} = 160V$ $V_{clamp} = 200V$		1.6		$\mu s$
$t_f$	Fall Time	$I_C = 25A$ $I_B = 2.5A$		0.7		$\mu s$
$t_t$	Tail Time in Turn-on	$V_{BB} = 0$ $R_{B2} = 2.7\Omega$		0.2		$\mu s$
		$L_C = 0.32mH$				
$t_s$	Storage Time	$V_{CC} = 160V$ $V_{clamp} = 200V$		2.7		$\mu s$
$t_f$	Fall Time	$I_C = 25A$ $I_B = 2.5A$		1		$\mu s$
$t_t$	Tail Time in Turn-on	$V_{BB} = 0$ $R_{B2} = 2.7\Omega$		0.3		$\mu s$
		$L_C = 0.32mH$ $T_j = 100^\circ C$				

\* Pulsed: Pulse duration = 300  $\mu s$ , 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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