

**BUL43B**

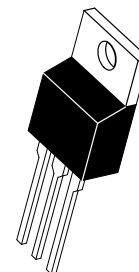
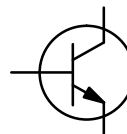
**POWER TRANSISTORS**  
**2 AMPERES**  
**700 VOLTS**  
**40 WATTS**

*Product Preview*

**SWITCHMODE NPN Silicon**  
**Planar Power Transistor**

The BUL43B has an application specific state-of-the-art die designed for use in 220 V line operated Switchmode Power supplies and electronic ballast ("light ballast"). The main advantages brought by this new transistor are:

- Improved Efficiency Due to Low Base Drive Requirements:
  - High and Flat DC Current Gain  $h_{FE}$
  - Fast and Tightened Switching Distributions
  - No Coil Required in Base Circuit for Fast Turn-Off (no current tail)



**CASE 221A-06**  
**TO-220AB**

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Sustaining Voltage	$V_{CEO}$	350	Vdc
Collector-Base Breakdown Voltage	$V_{CBO}$	650	Vdc
Collector-Emitter Breakdown Voltage	$V_{CES}$	650	Vdc
Emitter-Base Voltage	$V_{EBO}$	9	Vdc
Collector Current — Continuous	$I_C$	2	Adc
— Peak (1)	$I_{CM}$	4	
Base Current — Continuous	$I_B$	1	Adc
— Peak (1)	$I_{BM}$	2	
*Total Device Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	40	Watt
*Derate above $25^\circ\text{C}$		0.32	W/ $^\circ\text{C}$
Operating and Storage Temperature	$T_J, T_{stg}$	-65 to 150	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

Thermal Resistance			$^\circ\text{C}/\text{W}$
— Junction to Case	$R_{\theta JC}$	3.125	
— Junction to Ambient	$R_{\theta JA}$	62.5	
Maximum Lead Temperature for Soldering Purposes: 1/8" from case for 5 seconds	$T_L$	260	$^\circ\text{C}$

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle.

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**BUL43B****ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Sustaining Voltage ( $I_C = 100\text{ mA}$ , $L = 25\text{ mH}$ )	$V_{CEO(sus)}$	350			Vdc
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CEO}$ , $I_B = 0$ )	$I_{CEO}$			100	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CES}$ , $V_{EB} = 0$ )	$I_{CES}$			10 200	$\mu\text{Adc}$
Emitter–Cutoff Current ( $V_{EB} = 9\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$			100	$\mu\text{Adc}$

**ON CHARACTERISTICS**

Base–Emitter Saturation Voltage ( $I_C = 2\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ )	$V_{BE(sat)}$			1.25	Vdc
Collector–Emitter Saturation Voltage ( $I_C = 2\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ )	$V_{CE(sat)}$	@ $T_C = 25^\circ\text{C}$		1	Vdc
DC Current Gain ( $I_C = 1\text{ Adc}$ , $V_{CE} = 2\text{ Vdc}$ )	$h_{FE}$	@ $T_C = 25^\circ\text{C}$	8		—
( $I_C = 2\text{ Adc}$ , $V_{CE} = 5\text{ Vdc}$ )		@ $T_C = 25^\circ\text{C}$	6		—

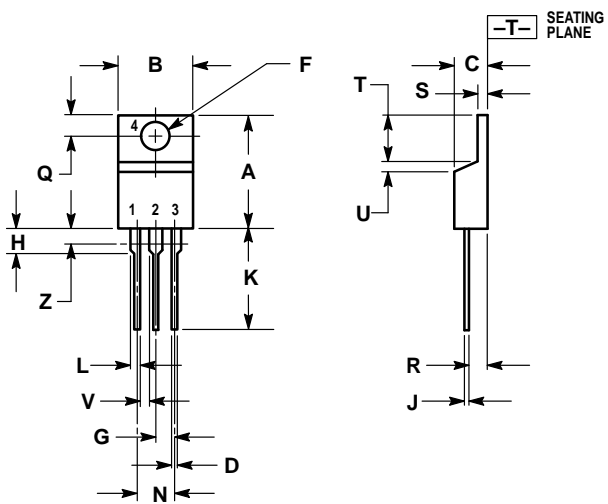
**DYNAMIC CHARACTERISTICS**

Current Gain Bandwidth ( $I_C = 0.5\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1\text{ MHz}$ )	$f_T$		13		MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1\text{ MHz}$ )	$C_{ob}$		40		pF
Input Capacitance ( $V_{EB} = 8\text{ V}$ )	$C_{ib}$		400		pF

**SWITCHING CHARACTERISTICS: Resistive Load** (D.C.  $\leq 10\%$ , Pulse Width = 20  $\mu\text{s}$ )

Turn–off Time	$I_C = 1.2\text{ Adc}$ , $I_{B1} = 0.4\text{ Adc}$ $I_{B2} = 0.1\text{ Adc}$ $V_{CC} = 300\text{ Vdc}$	@ $T_C = 25^\circ\text{C}$	$t_{off}$	4.7		5.8	$\mu\text{s}$
Fall Time	$I_C = 2.5\text{ Adc}$ , $I_{B1} = 0.5\text{ Adc}$ $I_{B2} = 0.5\text{ Adc}$ $V_{CC} = 150\text{ Vdc}$	@ $T_C = 25^\circ\text{C}$	$t_f$			800	ns

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	—	1.15	—
Z	—	0.080	—	2.04

- STYLE 1:
- PIN 1. BASE
  2. COLLECTOR
  3. EMITTER
  4. COLLECTOR

CASE 221A-06  
TO-220AB  
ISSUE Y

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