

# SWITCHMODE™ Series NPN Silicon Power Transistors

The BUS50 transistor is designed for low voltage, high-speed, power switching in inductive circuits where fall time is critical. It is particularly suited for battery SWITCHMODE applications such as:

- Switching Regulators
- Inverters
- Solenoid and Relay Drivers
- Motor Controls
- Fast Turn-Off Times  
300 ns Inductive Fall Time  $-25^{\circ}\text{C}$  (Typ)
- Operating Temperature Range  $-65$  to  $+200^{\circ}\text{C}$

## MAXIMUM RATINGS

Rating	Symbol	BUS50	Unit
Collector-Emitter Voltage	$V_{\text{CEO(sus)}}$	125	Vdc
Collector-Emitter Voltage	$V_{\text{CEV}}$	200	Vdc
Emitter Base Voltage	$V_{\text{EB}}$	7	Vdc
Collector Current — Continuous	$I_{\text{C}}$	70	Adc
— Peak (1)	$I_{\text{CM}}$	140	
— Overload	$I_{\text{ol}}$		
Base Current — Continuous	$I_{\text{B}}$	20	Adc
— Peak (1)	$I_{\text{BM}}$		
Total Power Dissipation — $T_{\text{C}} = 25^{\circ}\text{C}$	$P_{\text{D}}$	350	Watts
— $T_{\text{C}} = 100^{\circ}\text{C}$		200	
Derate above $25^{\circ}\text{C}$		2	W/ $^{\circ}\text{C}$
Operating and Storage Junction Temperature Range	$T_{\text{J}}, T_{\text{stg}}$	$-65$ to $+200$	$^{\circ}\text{C}$

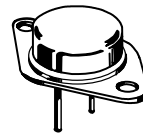
## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta\text{JC}}$	0.5	$^{\circ}\text{C/W}$
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_{\text{L}}$	275	$^{\circ}\text{C}$

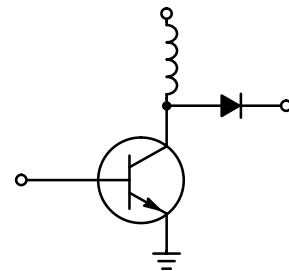
(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle  $\leq 10\%$ .

## BUS50

70 AMPERES  
NPN SILICON  
POWER TRANSISTOR  
125 VOLTS (BVCEO)  
350 WATTS  
200 V (BVCEV)



CASE 197A-05  
TO-204AE



# BUS50

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

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS<sup>2</sup>

Collector–Emitter Sustaining Voltage ( $I_C = 200\text{ mA}$ , $I_B = 0$ , $L = 25\text{ mH}$ )	$V_{CEO(sus)}$	125		Vdc
Collector Cutoff Current at Reverse Bias ( $V_{CE} = 200\text{ V}$ , $V_{BE} = -1.5\text{ V}$ ) ( $V_{CE} = 200\text{ V}$ , $V_{BE} = -1.5\text{ V}$ , $T_C = 125^\circ\text{C}$ )	$I_{CEX}$		0.2 2	mAdc
Collector–Emitter Cutoff Current ( $V_{CE} = 125\text{ V}$ )	$I_{CEO}$		1	mAdc
Emitter Cutoff Current ( $V_{EB} = 7\text{ V}$ )	$I_{EBO}$		0.2	mAdc

### ON CHARACTERISTICS<sup>2</sup>

DC Current Gain ( $I_C = 5\text{ A}$ , $V_{CE} = 4\text{ V}$ ) ( $I_C = 50\text{ A}$ , $V_{CE} = 4\text{ V}$ )	$h_{FE}$	20 15		
Collector–Emitter Saturation Voltage ( $I_C = 35\text{ A}$ , $I_B = 2\text{ A}$ ) ( $I_C = 70\text{ A}$ , $I_B = 7\text{ A}$ )	$V_{CE(sat)}$		1 1.2	Vdc
Base–Emitter Saturation Voltage ( $I_C = 35\text{ A}$ , $I_B = 2\text{ A}$ ) ( $I_C = 70\text{ A}$ , $I_B = 7\text{ A}$ )	$V_{BE(sat)}$		1.8 2	Vdc

### SWITCHING CHARACTERISTICS (Resistive Load) $t_{on}$ and (Inductive Load) $t_{sv}$ , $t_{fi}$

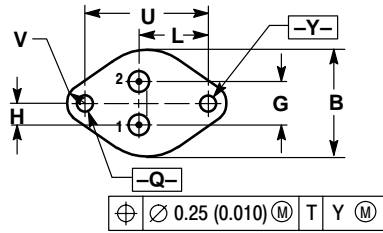
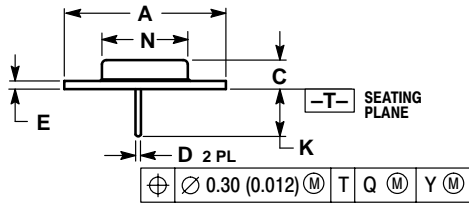
Turn–On Time	$I_C = 70\text{ A}$ , $I_{B1} = 7\text{ A}$ $V_{BE(off)} = -5\text{ V}$ ( $V_{CC} = 125\text{ V}$ )	$t_{on}$	1.2	$\mu\text{s}$
Storage Time		$t_{sv}$	1.5	
Fall Time		$t_{fi}$	0.3	

<sup>2</sup> Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

# BUS50

## PACKAGE DIMENSIONS


TO-204AE (TO-3)  
CASE 197A-05  
ISSUE J



- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.530 REF		38.86 REF	
B	0.990	1.050	25.15	26.67
C	0.250	0.335	6.35	8.51
D	0.057	0.063	1.45	1.60
E	0.060	0.070	1.53	1.77
G	0.430 BSC		10.92 BSC	
H	0.215 BSC		5.46 BSC	
K	0.440	0.480	11.18	12.19
L	0.665 BSC		16.89 BSC	
N	0.760	0.830	19.31	21.08
Q	0.151	0.165	3.84	4.19
U	1.187 BSC		30.15 BSC	
V	0.131	0.188	3.33	4.77

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