

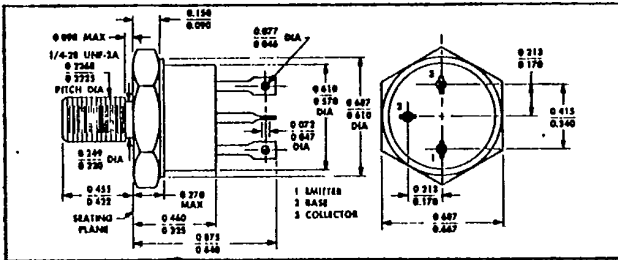
**2N5330**  
**30 AMP**  
**HIGH SPEED NPN TRANSISTOR**  
**150 VOLTS**



14830 Valley View Avenue  
 La Mirada, California 90638  
 (213) 921-9660  
 TWX 910-583-4807  
 FAX 213-921-2396

**CASE STYLE T**  
**JEDEC TO-61**  
**ALL TERMINALS ISOLATED FROM CASE**

**FEATURES**



- RADIATION TOLERANT
- FAST SWITCHING, 350 NSEC MAX  $t_{on}$
- HIGH FREQUENCY, TYPICAL  $f_T$  100 MHZ
- $V_{CEO}$  90 VOLTS MIN, TYPICALLY 150 VOLTS
- HIGH LINEAR GAIN, LOW SATURATION VOLTAGE
- 200°C OPERATING, GOLD EUTECTIC DIE ATTACH
- DESIGNED FOR COMPLEMENTARY USE WITH SPT5330

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector - Emitter Voltage	$V_{CEO}$	90	Volts
Collector - Base Voltage	$V_{CBO}$	150	Volts
Emitter - Base Voltage	$V_{EBO}$	8	Volts
Collector Current	$I_C$	30	Amps
Base Current	$I_B$	5	Amps
Total Device Dissipation @ $T_C = 100^\circ C$	$P_D$	80	Watts
Derate above 100 °C		800	mW/°C
Operating and Storage Temperature	$T_j, T_{stg}$	-65 to +200	°C

**THERMAL CHARACTERISTICS**

Characteristics	Symbol	Value	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.25	°C/W

**ELECTRICAL CHARACTERISTICS**

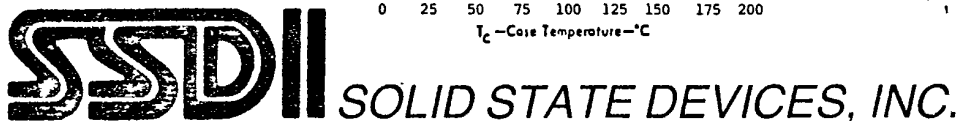
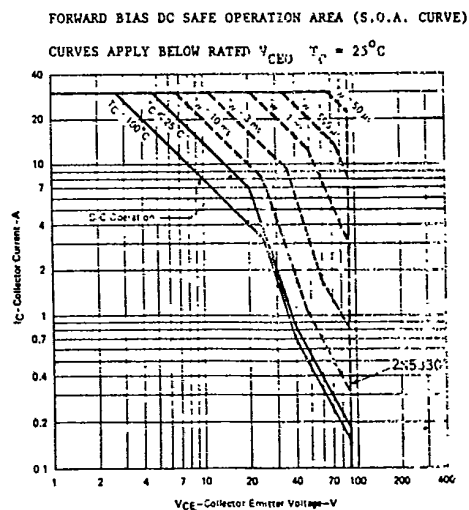
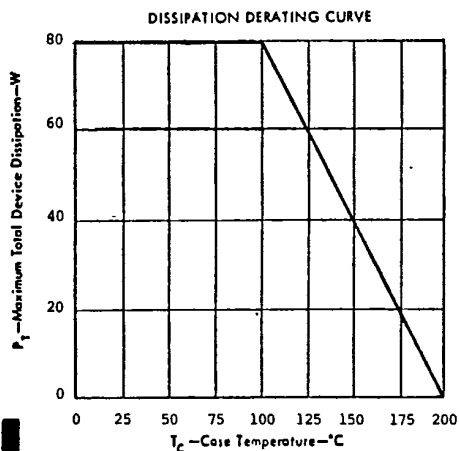
Characteristics	Symbol	Min.	Max.	Unit
Collector - Emitter Breakdown Voltage* ( $I_C = 100$ mA dc)	$BV_{CEO}$	90		Vdc
Collector - Base Breakdown Voltage ( $I_C = 200$ uA dc)	$BV_{CBO}$	150		Vdc
Emitter - Base Breakdown Voltage ( $I_E = 200$ uA dc)	$BV_{EBO}$	8		Vdc

**ELECTRICAL CHARACTERISTICS**

Characteristics	Symbol	Min.	Max.	Unit		
Collector Cutoff Current ( $V_{CE} = 150 \text{ Vdc}$ , $V_{BE} = 500 \text{ mVdc}$ )	$I_{CEV}$		10**	mAdc		
Collector Cutoff Current ( $V_{CE} = 150 \text{ Vdc}$ , $V_{BE} = 500 \text{ mVdc}$ , $TC = 150^{\circ}\text{C}$ )	$I_{CEV}$		50***	mAdc		
Emitter Cutoff Current ( $V_{EB} = 8 \text{ Vdc}$ )	$I_{EBO}$		5	mAdc		
DC Current Gain* ( $I_C = 10 \text{ Adc}$ , $V_{CE} = 2 \text{ Vdc}$ ) ( $I_C = 30 \text{ Adc}$ , $V_{CE} = 3 \text{ Vdc}$ )	$h_{FE}$	40 10	120 50			
Collector - Emitter Saturation Voltage* ( $I_C = 10 \text{ Adc}$ , $I_B = 500 \text{ mAdc}$ ) ( $I_C = 30 \text{ Adc}$ , $I_B = 3 \text{ Adc}$ )	$V_{CE (SAT)}$		0.6 1.8	vdc		
Base - Emitter Saturation Voltage* ( $I_C = 10 \text{ Adc}$ , $I_B = 300 \text{ mAdc}$ ) ( $I_C = 30 \text{ Adc}$ , $I_B = 3 \text{ Adc}$ )	$V_{BE (SAT)}$		1.3 1.8	Vdc		
Current - Gain - Bandwith Product ( $I_C = 3 \text{ Adc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 10 \text{ MHz}$ )	$f_T$	80		MHz		
Output Capacitance ( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $f = 1 \text{ MHz}$ )	$C_{ob}$		500	pf		
Input Capacitance ( $V_{BE} = 1.0 \text{ Vdc}$ , $I_C = 0$ , $f = 1 \text{ MHz}$ )	$C_{ib}$		1250	pf		
Delay Time ( $V_{CC} = 21 \text{ Vdc}$ )	$t_d$ $t_r$ $t_s$ $t_f$	+	350	ns		
Rise Time					$(t_{on})$	
Storage Time						$(t_{off})$
Fall Time						
$I_C = 10 \text{ Adc}$ , $I_{B1} = I_{B2} = 500 \text{ mAdc}$						

\*Pulse Test: Pulse width = 300 us, DutyCycle = 2%    \*\*Typically 1 uAdc    \*\*\*Typically 50 uAdc

**TYPICAL OPERATING CURVES**



# 2N6322 AND 2N6324

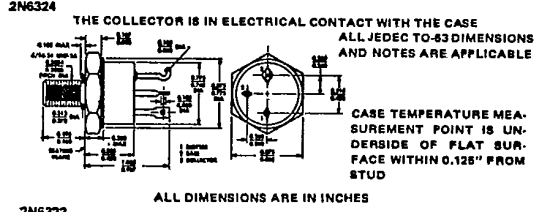
## 30 AMP NPN

### HIGH VOLTAGE/HIGH ENERGY

### 200 VOLTS

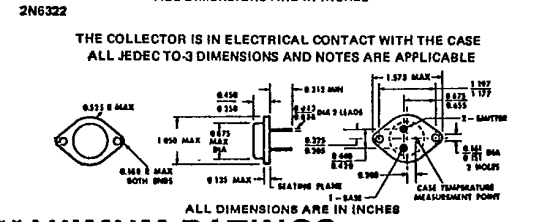


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### FEATURES

- MINIMUM BVCEO 200V
- MINIMUM UNCLAMPED ES/B 100mJ
- 200 WATTS AT 100°C CASE TEMPERATURE
- 30 AMP CONTINUOUS COLLECTOR CURRENT
- 200°C OPERATING, GOLD EUTECTIC DIE ATTACH



### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage	$V_{CE0}$	200	Volts
Collector - Base Voltage	$V_{CB0}$	300	Volts
Emitter - Base Voltage	$V_{EB0}$	5	Volts
Collector Current	$I_C$	30	Amps
Base Current	$I_B$	10	Amps
Total Device Dissipation @ $T_C = 100^\circ C$ Derate above $100^\circ C$	$P_D$	200	Watts mW/°C
Operating and Storage Temperature	$T_j, T_{stg}$	-65 to +200	°C

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Value	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.5	°C/W

### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min.	Max.	Unit
Collector - Emitter Breakdown Voltage* ( $I_C = 30 \text{ mA dc}$ )	$BV_{CE0}^*$	200		Vdc
Collector - Base Breakdown Voltage ( $I_C = 20 \text{ uA dc}$ )	$BV_{CB0}$	300		Vdc
Emitter - Base Breakdown Voltage ( $I_E = 20 \text{ uA dc}$ )	$BV_{EB0}$	5		Vdc

**ELECTRICAL CHARACTERISTICS**

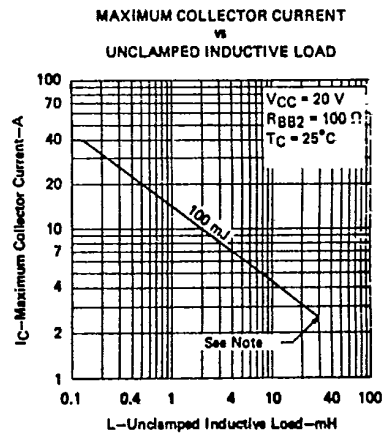
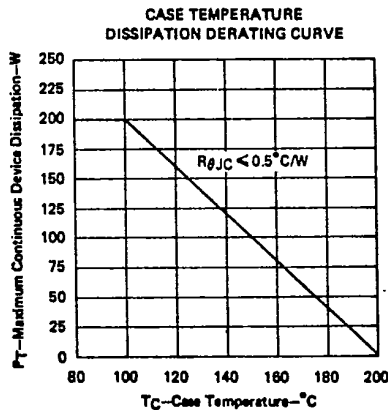
Characteristics	Symbol	Min.	Max.	Unit
Collector Cutoff Current $V_{CE} = 300V$ $V_{BE} = 0V$	$I_{CES}$		2	mAdc
Collector Cutoff Current ( $V_{CE} = 100V$ )	$I_{CBO}$		5	mAdc
Emitter Cutoff Current ( $V_{EB} = 5V$ )	$I_{EBO}$		5	mAdc
DC Current Gain* $(I_C = 5$ Adc. $V_{CE} = 5$ Vdc) $(I_C = 20$ Adc. $V_{CE} = 5$ Vdc) $(I_C = 30$ Adc. $V_{CE} = 5$ Vdc)	$h_{FE}$	40 12 6	150	
Collector - Emitter Saturation Voltage* $(I_C = 20$ Adc. $I_B = 2$ Adc) $(I_C = 30$ Adc. $I_B = 6$ Adc)	$V_{CE(SAT)}$		1.5 3.0	Vdc
Base - Emitter Voltage* $(I_C = 30$ Adc. $V_{CE} = 5$ V)	$V_{BE(ON)}$ *		2.5	Vdc
Current - Gain - Bandwidth Product $(I_C = 1$ Adc. $V_{CE} = 10$ Vdc. $f = 5$ MHz)	$f_T$	10		MHz

**SWITCHING TIMES**

Delay Time	$(V_{CC} = 40$ Vdc. $V_{EB(Off)} = 3$ Vdc. $I_C = 20$ Adc)	$t_d$			
Rise Time		$t_r$ +	800	ns	
Storage Time		$t_s$ +			
Fall Time	$I_{B1} = I_{B2} = 2$ Adc)	$t_f$	3.0	us	

\*Pulse Test: Pulse width = 300 us, DutyCycle = 2%

**TYPICAL OPERATING CURVES**



NOTE: ABOVE THIS POINT THE SAFE OPERATING AREA HAS NOT BEEN DEFINED.



# SFT5671 AND SFT5672

## 30 AMP

### HIGH POWER NPN TRANSISTORS

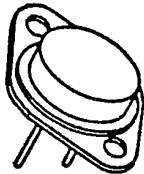
## 200 AND 250 VOLTS



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#### CASE STYLE R

TO-3 WITH .060 PINS



#### FEATURES

- BV<sub>CEO</sub> TO 250 VOLTS
- HIGH POWER 150 WATTS
- 200°C OPERATING TEMPERATURE
- GOLD EUTECTIC DIE ATTACH
- SUPERIOR PERFORMANCE TO 2N5671 AND 2N5672

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage SFT5671	V <sub>CEO</sub>	120	Volts
Collector - Base Voltage SFT5672	V <sub>CBO</sub>	140	Volts
Collector - Base Voltage SFT5671 : SFT5672	V <sub>CBO</sub>	200 : 250	Volts
Emitter - Base Voltage	V <sub>EBO</sub>	8	Volts
Collector Current	I <sub>C</sub>	30	Amps
Base Current	I <sub>B</sub>	10	Amps
Total Device Dissipation @ TC = 25 °C	P <sub>D</sub>	150	Watts
Derate above 25 °C		1.0	W/ °C
Operating and Storage Temperature	T <sub>j</sub> , T <sub>stg</sub>	-65 to 200	°C

#### THERMAL CHARACTERISTICS

Characteristics	Symbol	Value	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	1.0	°C/W

#### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min.	Max.	Unit
Collector - Emitter Breakdown Voltage* (I <sub>C</sub> = 200 mA)	BV <sub>CEO</sub> *	120		Vdc
Collector - Emitter Breakdown Voltage* (I <sub>C</sub> = 200 mA, R <sub>BE</sub> = 1000 ohms)	BV <sub>CER</sub> *	140		Vdc
Collector - Base Breakdown Voltage (I <sub>C</sub> = 200 mA)	BV <sub>CBO</sub>	200		Vdc
Collector - Base Breakdown Voltage (I <sub>C</sub> = 200 mA)	BV <sub>CBO</sub>	250		Vdc
Emitter - Base Breakdown Voltage (I <sub>E</sub> = 100 mA)	BV <sub>EBO</sub>	8		Vdc

**ELECTRICAL CHARACTERISTICS**

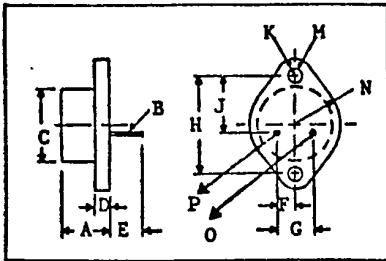
Characteristics	Symbol	Min.	Max.	Unit
Collector Cutoff Current $V_{CE} = 80 \text{ Vdc}$	$I_{CEO}$		50	$\mu\text{A dc}$
Collector Cutoff Current ( $V_{CB} = 150 \text{ Vdc}$ , SFT5671) ( $V_{CB} = 200 \text{ Vdc}$ , SFT5672)	$I_{CBO}$		10	$\mu\text{A dc}$
Emitter Cutoff Current ( $V_{EB} = 7 \text{ Vdc}$ )	$I_{EBO}$		5	$\mu\text{A dc}$
DC Current Gain* ( $I_C = 15 \text{ A dc}$ , $V_{CE} = 2 \text{ Vdc}$ ) ( $I_C = 20 \text{ A dc}$ , $V_{CE} = 5 \text{ Vdc}$ ) ( $I_C = 30 \text{ A dc}$ , $V_{CE} = 5 \text{ Vdc}$ )	$h_{FE}$	30 25 20	100	
Collector - Emitter Saturation Voltage* ( $I_C = 15 \text{ A dc}$ , $I_B = 1.2 \text{ A dc}$ ) ( $I_C = 30 \text{ A dc}$ , $I_B = 6 \text{ A dc}$ )	$V_{CE(SAT)}$		0.75 5.0	Vdc
Base - Emitter Saturation Voltage* ( $I_C = 15 \text{ A dc}$ , $I_B = 1.2 \text{ A dc}$ )	$V_{BE(SAT)}$		1.5	Vdc
Small Signal Common-Emitter Forward Current Transfer Ratio ( $I_C = 2 \text{ A dc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 5 \text{ MHz}$ )	$ h_{fe} $	30		
Output Capacitance ( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $f = 1 \text{ MHz}$ )	$C_{ob}$		500	pf

**SWITCHING TIME**

Turn on time ( $V_{CC} = 30 \text{ Vdc}$ , $I_C = 15 \text{ A dc}$ , $I_{B1} = 1.2 \text{ A dc}$ )	$t_{on}$		500	ns
Turn off time ( $V_{CC} = 30 \text{ Vdc}$ , $I_C = 15 \text{ A dc}$ , $I_{B1} = I_{B2} = 1.2 \text{ A dc}$ )	$t_{off}$		1.5	$\mu\text{s}$

\*Pulse Test: Pulse width = 300  $\mu\text{s}$ , DutyCycle = 2%

**PHYSICAL DIMENSIONS**



**KEY TO DIMENSIONS:**

- (Inches)
- A = .250 - .450
  - B = .057 - .062
  - C = .875 MAX.
  - D = .135 MAX.
  - E = .312 MIN.
  - F = .205 - .225
  - G = .420 - .440
  - H = 1.177 - 1.197
  - J = .655 - .675
  - K = .188 MAX.
  - M = .151 - .161
  - N = .525 MAX.
  - O = BASE
  - P = EMITTER

