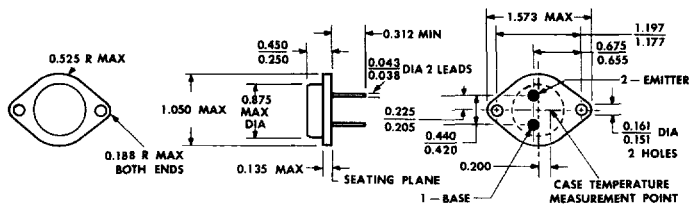
TYPES 2N5881, 2N5882
N-P-N SINGLE-DIFFUSED SILICON POWER TRANSISTORS

FOR POWER-AMPLIFIER AND HIGH-SPEED-SWITCHING APPLICATIONS
DESIGNED FOR COMPLEMENTARY USE WITH 2N5879, 2N5880

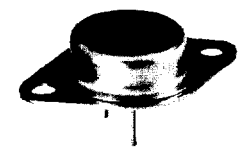
- 160 Watts at 25°C Case Temperature
- 15-A Rated Continuous Collector Current
- Min f_T of 4 MHz at 10 V, 1 A
- 90-mJ Reverse Energy Rating

***mechanical data**

ALL JEDEC TO-3 DIMENSIONS AND NOTES ARE APPLICABLE
THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE



DIMENSIONS ARE IN INCHES



absolute maximum ratings at 25°C case temperature (unless otherwise noted)

	2N5881	2N5882
Collector-Base Voltage	60 V*	80 V*
Collector-Emitter Voltage (See Note 1)	60 V*	80 V*
Emitter-Base Voltage	5 V*	5 V*
Continuous Collector Current	15 A†; 12 A*	
Peak Collector Current (See Note 2)	20 A	
Continuous Base Current	4 A*	
Safe Operating Area at (or below) 25°C Case Temperature	See Figure 1	
Continuous Device Dissipation at (or below) 25°C Case Temperature (See Note 3)	160 W*	
Continuous Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 4)	5 W	
Unclamped Inductive Load Energy (See Note 5)	90 mJ	
Operating Collector Junction Temperature Range	−65°C to 200°C*	
Storage Temperature Range	−65°C to 200°C*	
Terminal Temperature 1/16 Inch from Case for 10 Seconds	250°C*	

NOTES: 1. These values apply when the base-emitter diode is open-circuited.
2. This value applies for $t_w \leq 1$ ms, duty cycle ≤ 10%.
3. Derate linearly to 200°C case temperature at the rate of 0.915 W/°C.
4. Derate linearly to 200°C free-air temperature at the rate of 28.6 mW/°C.
5. This rating is based on the capability of the transistors to operate safely in the unclamped inductive load circuit of Section 3.2 of the forthcoming JEDEC publication *Suggested Standards on Power Transistors.*‡ L = 20 mH, R_{BB1} = 20 Ω, R_{BB2} = 100 Ω, V_{BB1} = 10 V, V_{BB2} = 0 V, R_L = 0.1 Ω, V_{CC} = 10 V, I_{CM} = 3 A. Energy ≈ $I_C^2 L/2$.

*JEDEC registered data. This data sheet contains all applicable registered data in effect at the time of publication.
†Texas Instruments guarantees this value in addition to the JEDEC registered value which is also shown.
‡This circuit appears on page 5-1 of this data book.

TYPES 2N5881, 2N5882
N-P-N SINGLE-DIFFUSED SILICON POWER TRANSISTORS

*electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS			2N5881 MIN	2N5881 MAX	2N5882 MIN	2N5882 MAX	UNIT
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 0.2 A,	I_B = 0,	See Note 6	60		80		V
I_{CEO}	Collector Cutoff Current	V_{CE} = 30 V,	I_B = 0			1			mA
		V_{CE} = 40 V,	I_B = 0					1	
I_{CEV}	Collector Cutoff Current	V_{CE} = 60 V,	V_{BE} = −1.5 V			0.5			mA
		V_{CE} = 80 V,	V_{BE} = −1.5 V					0.5	
		V_{CE} = 60 V,	V_{BE} = −1.5 V,	T_C = 150°C		5			
		V_{CE} = 80 V,	V_{BE} = −1.5 V,	T_C = 150°C				5	
I_{CBO}	Collector Cutoff Current	V_{CB} = 60 V,	I_E = 0			0.5			mA
		V_{CB} = 80 V,	I_E = 0					0.5	
I_{EBO}	Emitter Cutoff Current	V_{EB} = 5 V,	I_C = 0			1		1	mA
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 4 V,	I_C = 2 A	See Notes 6 and 7	35		35		
		V_{CE} = 4 V,	I_C = 6 A		20	100	20	100	
		V_{CE} = 4 V,	I_C = 12 A		5		5		
V_{BE}	Base-Emitter Voltage	I_B = 0.7 A,	I_C = 7 A	See Notes 6 and 7		1.6		1.6	V
		V_{CE} = 4 V,	I_C = 12 A			2.5		2.5	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_B = 0.7 A,	I_C = 7 A	See Notes 6 and 7		1		1	V
		I_B = 2.4 A,	I_C = 12 A			4		4	
h_{fe}	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = 4 V,	I_C = 2 A,	f = 1 kHz	20		20		
$\|h_{fe}\|$	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = 10 V,	I_C = 1 A,	f = 1 MHz	4		4		
C_{obo}	Common-Base Open-Circuit Output Capacitance	V_{CB} = 10 V,	I_E = 0,	f = 1 MHz		400		400	pF

NOTES: 6. *These parameters must be measured using pulse techniques. t_w = 300 μs, duty cycle ≤ 2%.*

7. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 0.125 inch from the device body.

*switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS†			MIN	MAX	UNIT
t_r	Rise Time	I_C = 6 A,	$I_{B(1)}$ = 0.6 A,	$I_{B(2)}$ = −0.6 A,		0.7	μs
t_s	Storage Time	$V_{BE(off)}$ = −5 V,	R_L = 5 Ω,	See Note 8		1	
t_f	Fall Time					0.8	

†Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

*JEDEC *registered data.*

NOTE 8: These characteristics are measured in the circuit of clause 3.3.13.2 of the forthcoming JEDEC publication *Suggested Standards on Power Transistor.*‡ V_{BB1} = 23 V, V_{BB2} = 5 V, V_{CC} = 30 V, V_{on} = 20.5 V, R_{BB1} = 16 Ω, R_{BB2} = 10 Ω.

‡This circuit appears on page 5-1 of this data book.

MAXIMUM SAFE OPERATING AREA

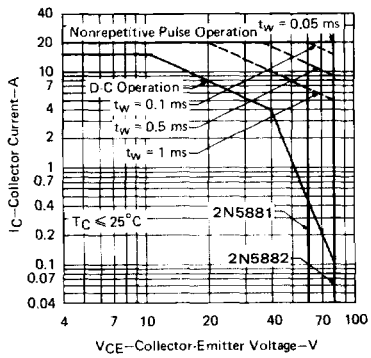


FIGURE 1

THERMAL CHARACTERISTICS

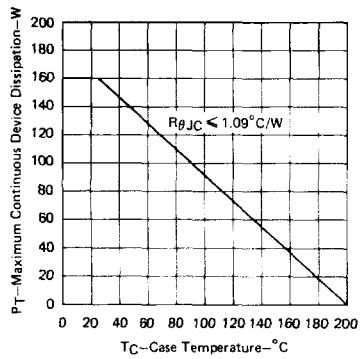


FIGURE 2

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