TYPES 2N3551, 2N3552
N-P-N TRIPLE-DIFFUSED MESA SILICON TRANSISTORS

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HIGH-SPEED POWER SWITCH, ISOLATED COLLECTOR
FORMERLY TIX210, TIX211

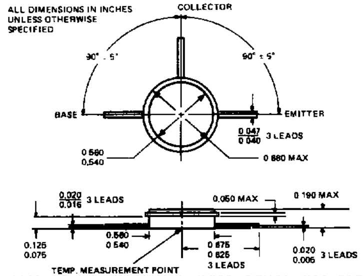
- **40 Watts at 100°C Case Temperature**
- **Maximum r_{CS} of 0.1 Ohm at 10 Amperes I_C**
- **Maximum V_{BE} of 1.4 Volts at 10 Amperes I_C**
- **Maximum t_{on} of 300 nsec**

mechanical data

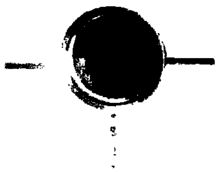
These transistors are in precision welded, hermetically sealed enclosures. Extreme cleanliness during the assembly process prevents sealed-in contamination. The approximate unit weight is 3.8 grams.

*OUTLINE DRAWING

*ALL LEADS INSULATED FROM CASE



DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED



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

	2N3551	2N3552
Collector-Base Voltage	115 v	140 v
Collector-Emitter Voltage (See Note 1)	60 v	80 v
Emitter-Base Voltage	7 v	
Continuous Collector Current	12 a	
Continuous Base Current	5 a	
Continuous Emitter Current	−12 a	
Safe Operating Region at 100°C Case Temperature	See Figures 3 and 4	
Continuous Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 2)	1.2 w	
Continuous Device Dissipation at (or below) 100°C Case Temperature (See Note 3)	40 w	
Operating Collector Junction Temperature	175°C	
Operating Case Temperature Range	−65°C to + 175°C	
Storage Temperature Range	−65°C to + 200°C	
Lead Temperature 1/16 Inch from Case for 12 Seconds	235°C	

NOTES: 1. These values apply when the base-emitter diode is open-circuited.
2. Derate linearly to 175°C free-air temperature at the rate of 8 mw/C°.
3. Derate linearly to 175°C case temperature at the rate of 0.53 w/C°.

*JEDEC registered data

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

PARAMETER		TEST CONDITIONS	2N3551		2N3552		UNIT
			MIN	MAX	MIN	MAX	
BV_{CBO}	Collector-Base Breakdown Voltage	I_C = 10 ma, I_E = 0, See Note 4	115		140		v
BV_{CEO}	Collector-Emitter Breakdown Voltage	I_C = 200 ma, I_B = 0, See Note 4	60		80		v
I_{CEV}	Collector Cutoff Current	V_{CE} = 110 v, V_{BE} = −1.5 v		10			ma
		V_{CE} = 135 v, V_{BE} = −1.5 v				10	
		V_{CE} = 60 v, V_{BE} = −1.5 v, T_C = 150°C		10			
		V_{CE} = 80 v, V_{BE} = −1.5 v, T_C = 150°C				10	
I_{EBO}	Emitter Cutoff Current	V_{EB} = 5 v, I_C = 0		0.1		0.1	ma
		V_{EB} = 7 v, I_C = 0		1		1	
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 2 v, I_C = 5 a, See Note 4	25		25		
		V_{CE} = 2 v, I_C = 10 a, See Note 4	20	90	20	90	
		V_{CE} = 2 v, I_C = 10 a, T_C = −55°C, See Note 4	10		10		
V_{BE}	Base-Emitter Voltage	I_B = 0.5 a, I_C = 5 a, See Note 4		1.2		1.2	v
		I_B = 1 a, I_C = 10 a, See Note 4		1.4		1.4	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_B = 0.5 a, I_C = 5 a, See Note 4		0.5		0.5	v
		I_B = 1 a, I_C = 10 a, See Note 4		1.0		1.0	
$\|h_{fe}\|$	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = 10 v, I_C = 3 a, f = 10 Mc	4		4		
C_{ob}	Common-Base Open-Circuit Output Capacitance	V_{CB} = 10 v, I_E = 0, f = 1 Mc		850		850	pf

NOTE 4: These parameters must be measured using pulse techniques. PW = 300 μsec, Duty Cycle ≤ 2%.

thermal characteristics

PARAMETER		MAX	UNIT
$\theta_{J\text{-}C}$	Junction-to-Case Thermal Resistance	1.875	C°/w
$\theta_{J\text{-}A}$	Junction-to-Free-Air Thermal Resistance	125	C°/w

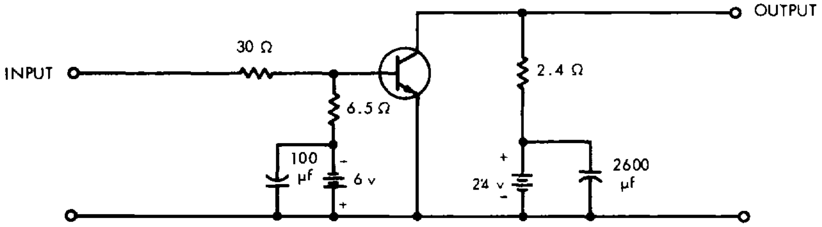
*switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS‡	MAX	UNIT
t_{on}	Turn-On Time	I_C = 10 a, $I_{B(1)}$ = 1 a, $I_{B(2)}$ = −1 a	0.3	μsec
t_{off}	Turn-Off Time	$V_{BE(off)}$ = −6 v, R_L = 2.4Ω, See Figure 1	2.5	μsec

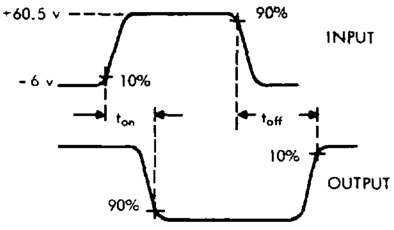
‡Voltage and current values shown are nominal; exact values vary slightly with device parameters.

*JEDEC Registered Data

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

FIGURE 1

NOTES: a. The input waveform is supplied by a generator with the following characteristics: $t_r \leq 20$ nsec, $t_f \leq 20$ nsec, $Z_{out} = 1500\ \Omega$, PW $= 5\ \mu$sec, Duty Cycle $\leq 0.5\%$.

b. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 5$ nsec, $R_{in} \geq 1$ MΩ, $C_{in} \leq 5$ pf.

c. Resistors must be noninductive types.

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THERMAL INFORMATION

FREE-AIR TEMPERATURE
DISSIPATION DERATING CURVE

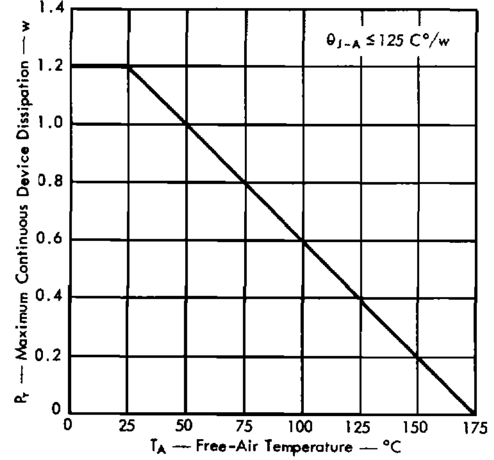

FIGURE 1

CASE TEMPERATURE
DISSIPATION DERATING CURVE

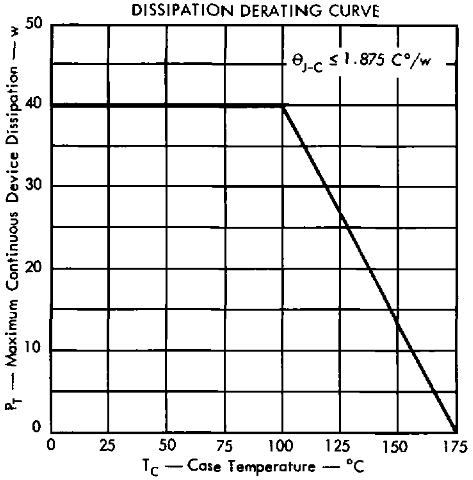

FIGURE 2

MAXIMUM SAFE OPERATING REGIONS

2N3551

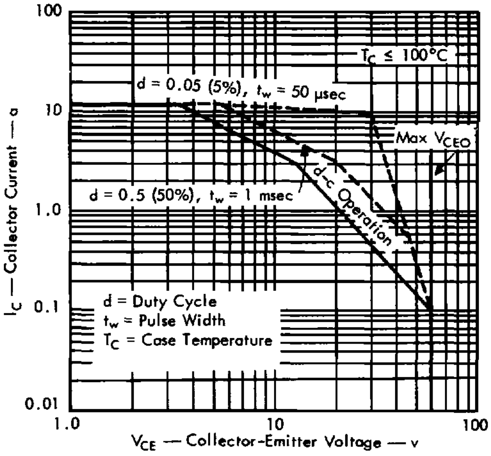

FIGURE 3

2N3552

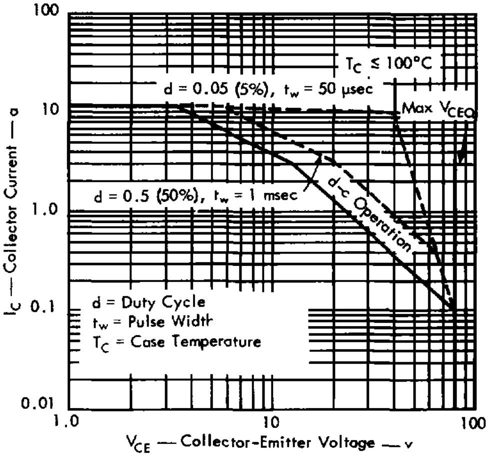

FIGURE 4

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