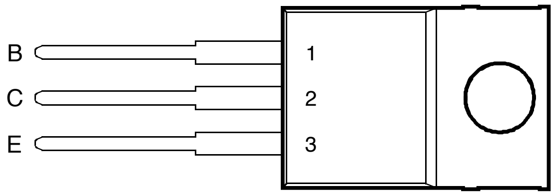
BOURNS®

BU406, BU407 NPN SILICON POWER TRANSISTORS

- **7 A Continuous Collector Current**
- **15 A Peak Collector Current**
- **60 W at 25°C Case Temperature**

This series is obsolete and not recommended for new designs.

**TO-220 PACKAGE
(TOP VIEW)**



Pin 2 is in electrical contact with the mounting base.

MDTRACA

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage (I_E = 0)	BU406	V_{CBO}	400	V
	BU407		330	
Collector-emitter voltage (V_{BE} = -2 V)	BU406	V_{CEX}	400	V
	BU407		330	
Collector-emitter voltage (I_B = 0)	BU406	V_{CEO}	200	V
	BU407		150	
Emitter-base voltage		V_{EB}	6	V
Continuous collector current		I_C	7	A
Peak collector current (see Note 1)		I_{CM}	15	A
Continuous base current		I_B	4	A
Continuous device dissipation at (or below) 25°C case temperature		P_{tot}	60	W
Operating junction temperature range		T_j	-55 to +150	°C
Storage temperature range		T_{stg}	-55 to +150	°C

NOTE 1: This value applies for $t_p \leq 10$ ms, duty cycle ≤ 2%.

AUGUST 1978 - REVISED SEPTEMBER 2002

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

PARAMETER		TEST CONDITIONS				MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C = 30 mA	I_B = 0			140			V
I_{CES}	Collector-emitter cut-off current	V_{CE} = 400 V	V_{BE} = 0		BU406			5	mA
		V_{CE} = 330 V	V_{BE} = 0		BU407			5	
		V_{CE} = 250 V	V_{BE} = 0		BU406			0.1	
		V_{CE} = 200 V	V_{BE} = 0		BU407			0.1	
		V_{CE} = 250 V	V_{BE} = 0	T_C = 150°C	BU406			1	
		V_{CE} = 200 V	V_{BE} = 0	T_C = 150°C	BU407			1	
I_{EBO}	Emitter cut-off current	V_{EB} = 6 V	I_C = 0					1	mA
h_{FE}	Forward current transfer ratio	V_{CE} = 10 V	I_C = 4 A	(see Notes 2 and 3)		12			
		V_{CE} = 10 V	I_C = 0.5 A			20			
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = 0.5 A	I_C = 5 A	(see Notes 2 and 3)				1	V
$V_{BE(sat)}$	Base-emitter saturation voltage	I_B = 0.5 A	I_C = 5 A	(see Notes 2 and 3)				1.2	V
f_t	Current gain bandwidth product	V_{CE} = 5 V	I_C = 0.5 A	f = 1 MHz	(see Note 4)		6		MHz
C_{ob}	Output capacitance	V_{CB} = 20 V	I_E = 0	f = 1 MHz			60		pF

NOTES: 2. These parameters must be measured using pulse techniques, t_p = 300 µs, duty cycle ≤ 2%.
3. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.
4. To obtain f_t the $|h_{FE}|$ response is extrapolated at the rate of -6 dB per octave from f = 1 MHz to the frequency at which $|h_{FE}|$ = 1.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			2.08	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance			70	°C/W

inductive-load-switching characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_s	Storage time	I_C = 5 A	$I_{B(end)}$ = 0.5A	(see Figures 1 and 2)		2.7		µs
$t_{(off)}$	Turn off time						750	ns

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

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PARAMETER MEASUREMENT INFORMATION

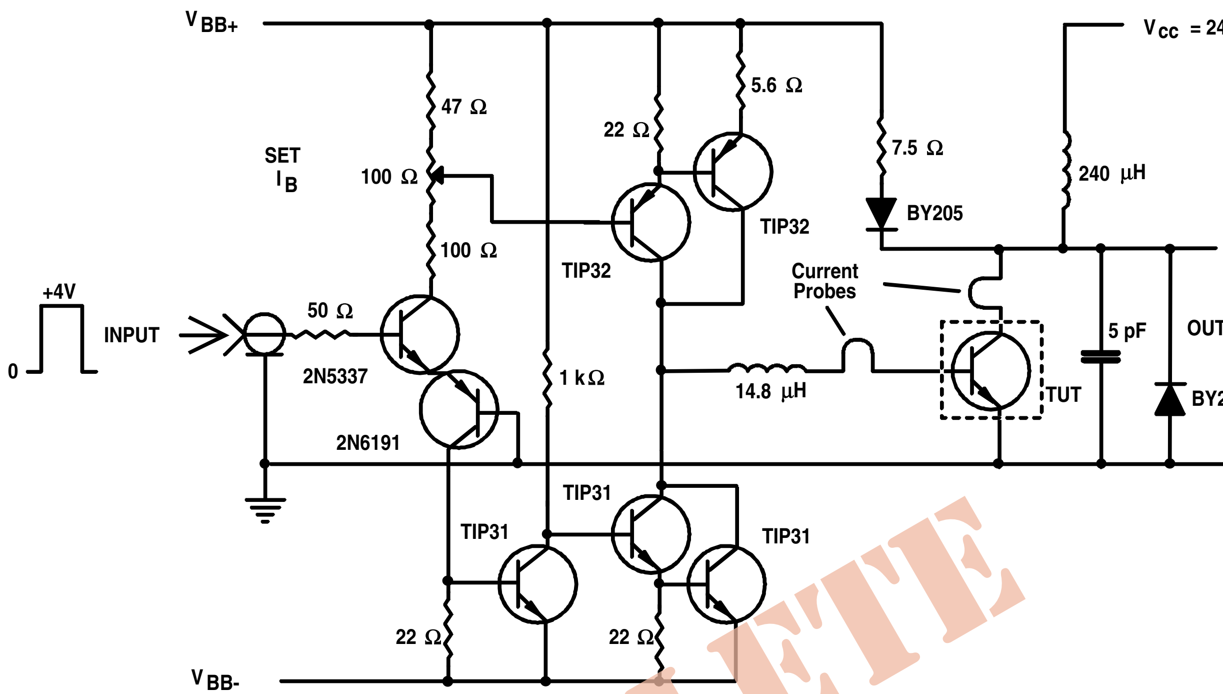
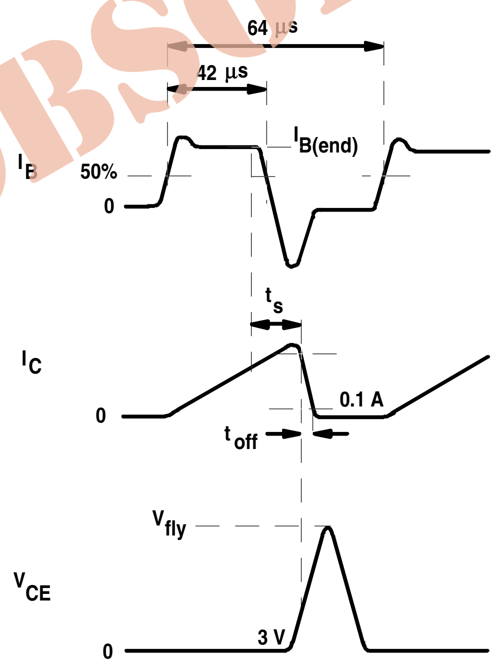


Figure 1. Inductive-Load Switching Test Circuit



t_{off} is the time for the collector current I_C to decrease to 0.1 A after the collector to emitter voltage V_{CE} has risen 3 V into its flyback excursion.

Figure 2. Inductive-Load Switching Waveforms

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN vs COLLECTOR CURRENT

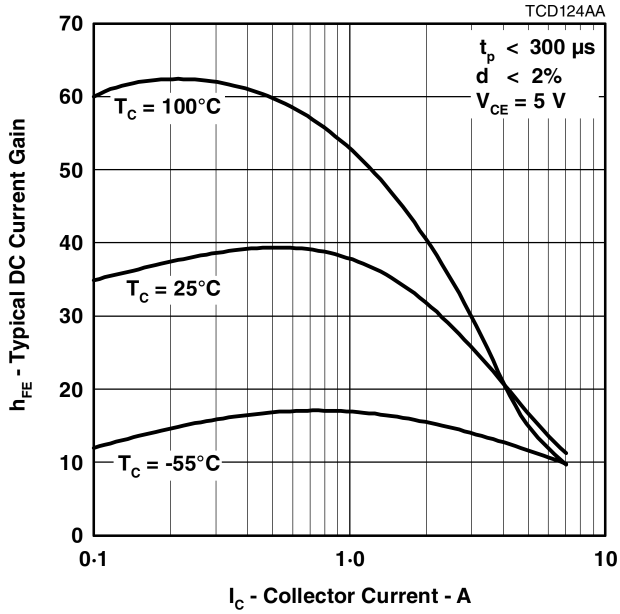


Figure 3.

TYPICAL DC CURRENT GAIN vs COLLECTOR CURRENT

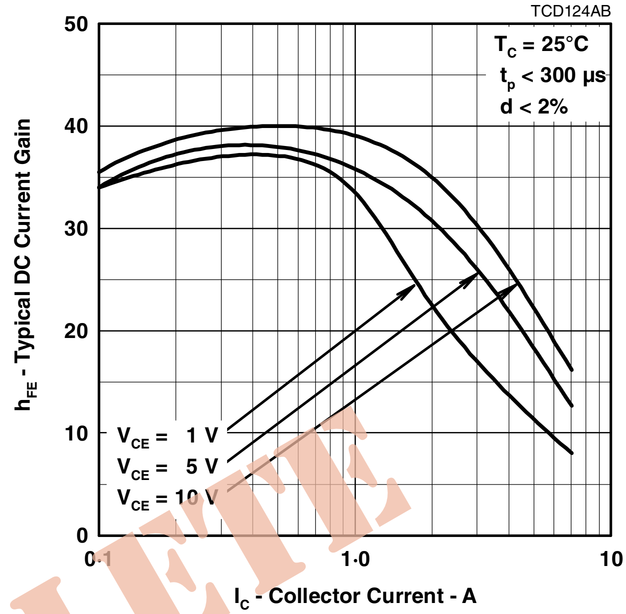


Figure 4.

COLLECTOR-EMITTER SATURATION VOLTAGE vs CASE TEMPERATURE

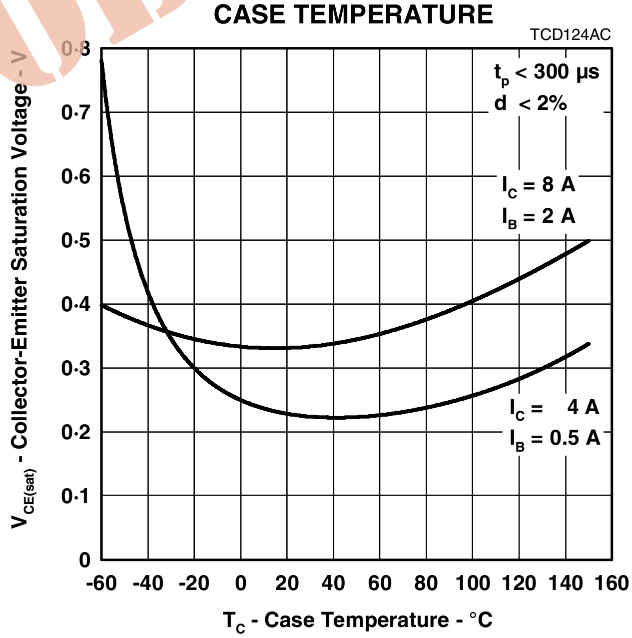


Figure 5.

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MAXIMUM SAFE OPERATING REGIONS

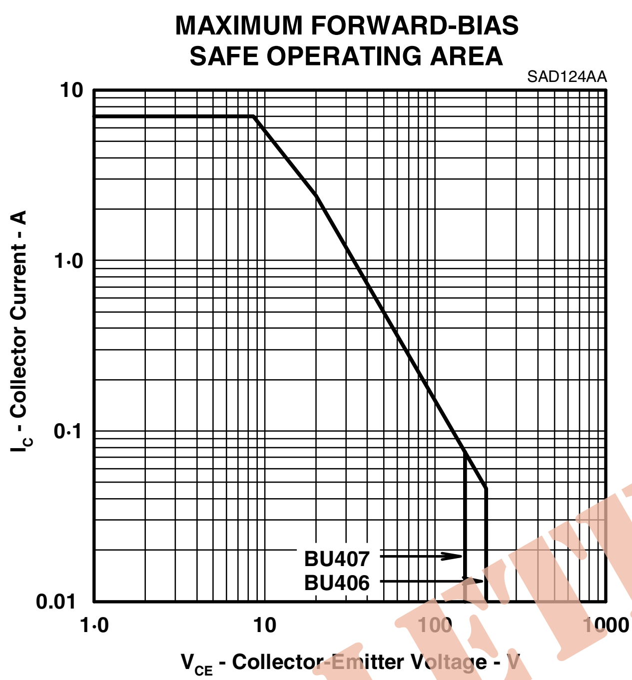

Figure 6.