

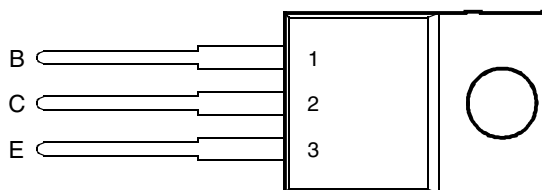


THE DATASHEET OF BDT61A-S



- Designed for Complementary Use with BDT60, BDT60A, BDT60B and BDT60C
- 50 W at 25°C Case Temperature
- 4 A Continuous Collector Current
- Minimum h_{FE} of 750 at 1.5V, 3 A

TO-220 PACKAGE
(TOP VIEW)



This series is obsolete and not recommended for new designs.

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 ($I_E = 0$)	BDT61	V_{CBO}	60	V
	BDT61A		80	
	BDT61B		100	
	BDT61C		120	
Collector-emitter voltage ($I_B = 0$)	BDT61	V_{CEO}	60	V
	BDT61A		80	
	BDT61B		100	
	BDT61C		120	
Emitter-base voltage		V_{EBO}	5	V
Continuous collector current		I_C	4	A
Continuous base current		I_B	0.1	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 1)		P_{tot}	50	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 2)		P_{tot}	2	W
Operating junction temperature range		T_j	-65 to +150	°C
Storage temperature range		T_{stg}	-65 to +150	°C
Operating free-air temperature range		T_A	-65 to +150	°C

NOTES: 1. Derate linearly to 150°C case temperature at the rate of 0.4 W/°C.
2. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

PRODUCT INFORMATION

BDT61, BDT61A, BDT61B, BDT61C NPN SILICON POWER DARLINGTONS

BOURNS®

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

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$ Collector-emitter breakdown voltage	$I_C = 30 \text{ mA}$	$I_B = 0$	(see Note 3)	BDT61 BDT61A BDT61B BDT61C	60 80 100 120		V
I_{CEO} Collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$ $V_{CE} = 40 \text{ V}$ $V_{CE} = 50 \text{ V}$ $V_{CE} = 60 \text{ V}$	$I_B = 0$ $I_B = 0$ $I_B = 0$ $I_B = 0$		BDT61 BDT61A BDT61B BDT61C		0.5 0.5 0.5 0.5	mA
I_{CBO} Collector cut-off current	$V_{CB} = 60 \text{ V}$ $V_{CB} = 80 \text{ V}$ $V_{CB} = 100 \text{ V}$ $V_{CB} = 120 \text{ V}$ $V_{CB} = 30 \text{ V}$ $V_{CB} = 40 \text{ V}$ $V_{CB} = 50 \text{ V}$ $V_{CB} = 60 \text{ V}$	$I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$ $I_E = 0$	$T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$ $T_C = 150^\circ\text{C}$	BDT61 BDT61A BDT61B BDT61C BDT61 BDT61A BDT61B BDT61C		0.2 0.2 0.2 0.2 2.0 2.0 2.0 2.0	mA
I_{EBO} Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$				5	mA
h_{FE} Forward current transfer ratio	$V_{CE} = 3 \text{ V}$	$I_C = 1.5 \text{ A}$	(see Notes 3 and 4)		750		
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 6 \text{ mA}$	$I_C = 1.5 \text{ A}$	(see Notes 3 and 4)			2.5	V
$V_{BE(on)}$ Base-emitter voltage	$V_{CE} = 3 \text{ V}$	$I_C = 1.5 \text{ A}$	(see Notes 3 and 4)			2.5	V
V_{EC} Parallel diode forward voltage	$I_E = 1.5 \text{ A}$	$I_B = 0$				2	V

NOTES: 3. These parameters must be measured using pulse techniques, $t_p = 300 \mu\text{s}$, duty cycle $\leq 2\%$.

4. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

thermal characteristics

PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$ Junction to case thermal resistance			2.5	°C/W
$R_{\theta JA}$ Junction to free air thermal resistance			62.5	°C/W

resistive-load-switching characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_{on} Turn-on time	$I_C = 2 \text{ A}$	$I_{B(on)} = 8 \text{ mA}$	$I_{B(off)} = -8 \text{ mA}$		1		μs
t_{off} Turn-off time	$V_{BE(off)} = -5 \text{ V}$	$R_L = 20 \Omega$	$t_p = 20 \mu\text{s}$, dc $\leq 2\%$		4.5		μs

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

PRODUCT INFORMATION

TYPICAL CHARACTERISTICS

**TYPICAL DC CURRENT GAIN
vs
COLLECTOR CURRENT**

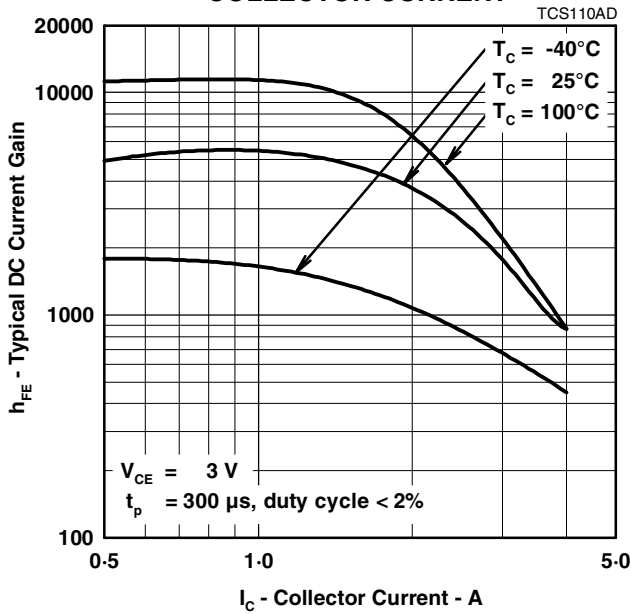


Figure 1.

**COLLECTOR-EMITTER SATURATION VOLTAGE
vs
COLLECTOR CURRENT**

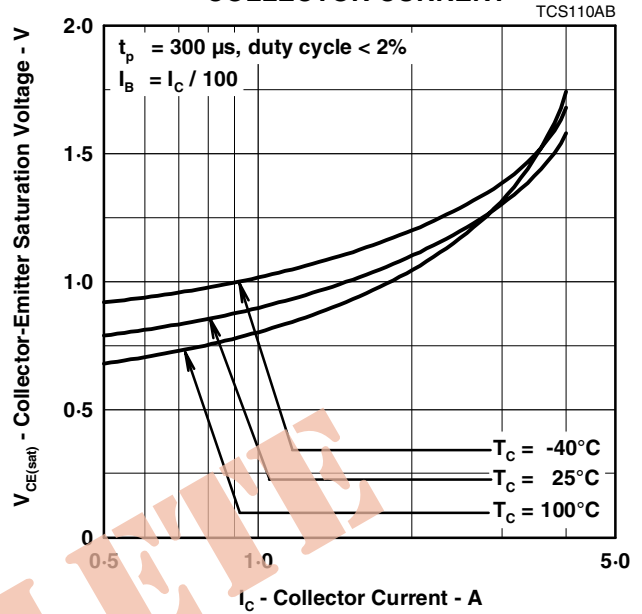


Figure 2.

**BASE-EMITTER SATURATION VOLTAGE
vs
COLLECTOR CURRENT**

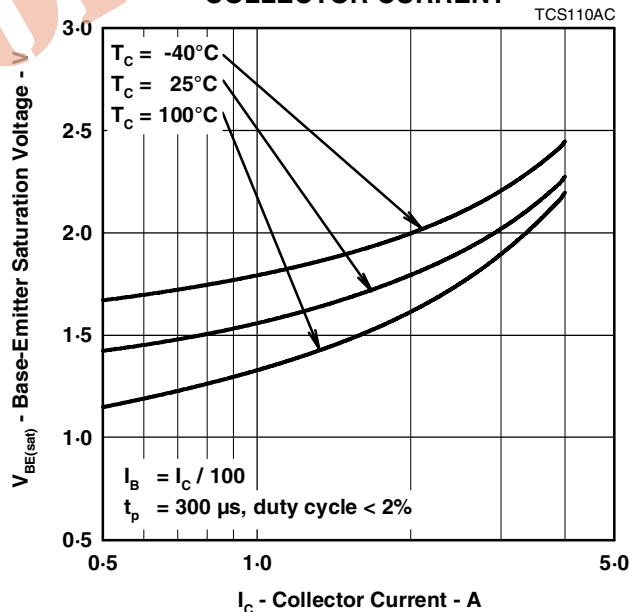


Figure 3.

PRODUCT INFORMATION

AUGUST 1993 - REVISED SEPTEMBER 2002
Specifications are subject to change without notice.

MAXIMUM SAFE OPERATING REGIONS

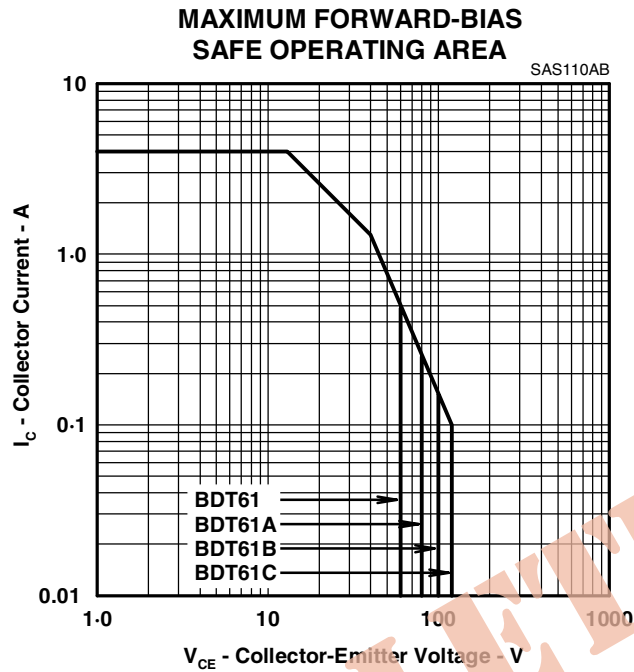


Figure 4.

THERMAL INFORMATION

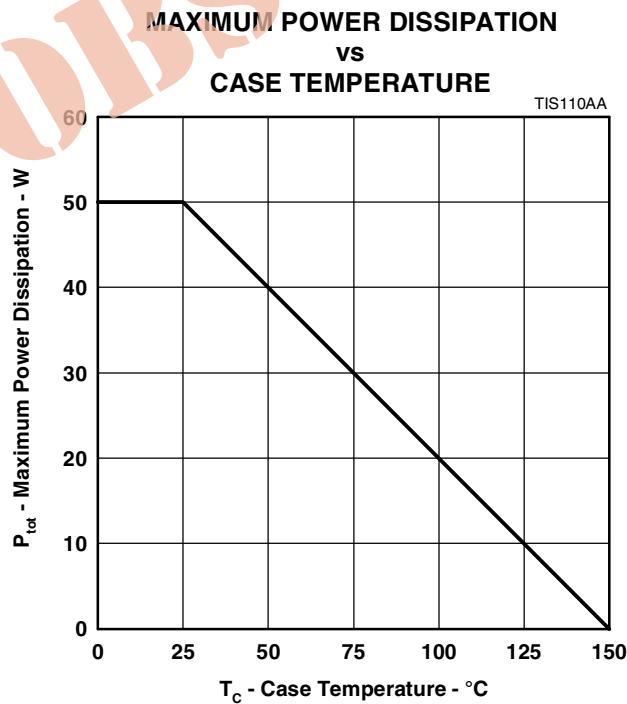


Figure 5.

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