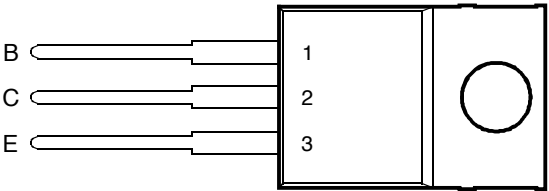




- Designed Specifically for High Frequency Electronic Ballasts up to 50 W
- h_{FE} 7 to 21 at $V_{CE} = 1\text{ V}$, $I_C = 800\text{ mA}$
- Low Power Losses (On-state and Switching)
- Key Parameters Characterised at High Temperature
- Tight and Reproducible Parametric Distributions

TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA

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

RATING	SYMBOL	VALUE	UNIT
Collector-emitter voltage ($V_{BE} = 0$)	V_{CES}	700	V
Collector-base voltage ($I_E = 0$)	V_{CBO}	700	V
Collector-emitter voltage ($I_B = 0$)	V_{CEO}	400	V
Emitter-base voltage	V_{EBO}	9	V
Continuous collector current	I_C	2.5	A
Peak collector current (see Note 1)	I_{CM}	6	A
Peak collector current (see Note 2)	I_{CM}	8	A
Continuous base current	I_B	1.5	A
Peak base current (see Note 2)	I_{BM}	2.5	A
Continuous device dissipation at (or below) 25°C case temperature	P_{tot}	50	W
Operating junction temperature range	T_j	-65 to +150	°C
Storage temperature range	T_{stg}	-65 to +150	°C

NOTES: 1. This value applies for $t_p = 10\text{ ms}$, duty cycle $\leq 2\%$.
2. This value applies for $t_p = 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

This series is currently available,
but not recommended for new
designs.



PRODUCT INFORMATION

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

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{CEO(sus)}$ Collector-emitter sustaining voltage	$I_C = 100 \text{ mA}$	$L = 25 \text{ mH}$	(see Note 3)	400			V
I_{CES} Collector-emitter cut-off current	$V_{CE} = 700 \text{ V}$ $V_{CE} = 700 \text{ V}$	$V_{BE} = 0$ $V_{BE} = 0$	$T_C = 90^\circ\text{C}$			10 200	μA
I_{EBO} Emitter cut-off current	$V_{EB} = 9 \text{ V}$	$I_C = 0$				1	mA
$V_{BE(sat)}$ Base-emitter saturation voltage	$I_B = 160 \text{ mA}$ $I_B = 160 \text{ mA}$	$I_C = 800 \text{ mA}$ $I_C = 800 \text{ mA}$	(see Notes 4 and 5) $T_C = 90^\circ\text{C}$		0.83 0.75	0.9	V
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 160 \text{ mA}$ $I_B = 160 \text{ mA}$	$I_C = 800 \text{ mA}$ $I_C = 800 \text{ mA}$	(see Notes 4 and 5) $T_C = 90^\circ\text{C}$		0.18 0.22	0.25	V
h_{FE} Forward current transfer ratio	$V_{CE} = 1 \text{ V}$ $V_{CE} = 1 \text{ V}$ $V_{CE} = 5 \text{ V}$	$I_C = 10 \text{ mA}$ $I_C = 800 \text{ mA}$ $I_C = 3.2 \text{ A}$		10 7 2	18.5 14.5 7.5	21 14	
V_{FCB} Collector-base forward bias diode voltage	$I_{CB} = 60 \text{ mA}$				870		mV

NOTES: 3. Inductive loop switching measurement.

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

5. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts, and located within 3.2 mm from the device body.

thermal characteristics

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

inductive-load switching characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
t_{sv} Storage time	$I_C = 800 \text{ mA}$ $L = 1 \text{ mH}$	$I_{B(on)} = 160 \text{ mA}$	$V_{CC} = 40 \text{ V}$		2.5	3	μs
t_{fi} Current fall time		$I_{B(off)} = 320 \text{ mA}$	$V_{CLAMP} = 300 \text{ V}$		150	190	ns
t_{xo} Cross over time					300	400	ns
t_{sv} Storage time	$I_C = 800 \text{ mA}$ $L = 1 \text{ mH}$	$I_{B(on)} = 160 \text{ mA}$	$V_{CC} = 40 \text{ V}$		4.3	5	μs
t_{fi} Current fall time		$I_{B(off)} = 100 \text{ mA}$	$V_{CLAMP} = 300 \text{ V}$		140	200	ns

resistive-load switching characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{sv} Storage time	$I_C = 800 \text{ mA}$	$I_{B(on)} = 160 \text{ mA}$		2.5	3.4	μs
t_{fi} Current fall time	$V_{CC} = 300 \text{ V}$	$I_{B(off)} = 160 \text{ mA}$		150	250	ns

TYPICAL CHARACTERISTICS

**FORWARD CURRENT TRANSFER RATIO
vs
COLLECTOR CURRENT**

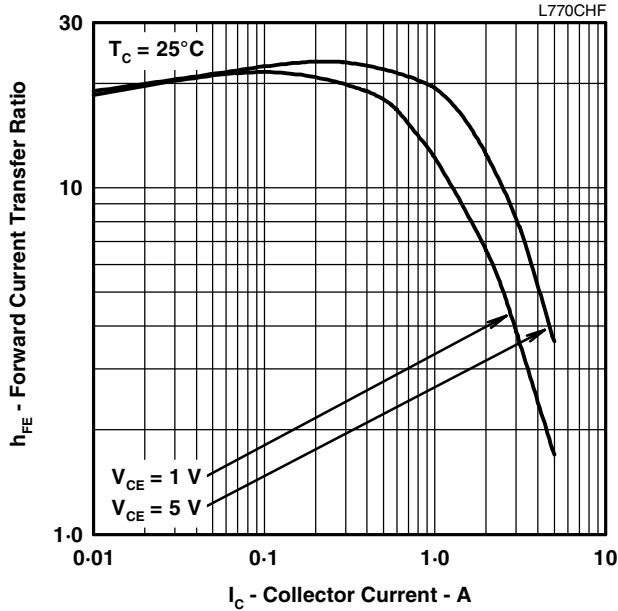


Figure 1.

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

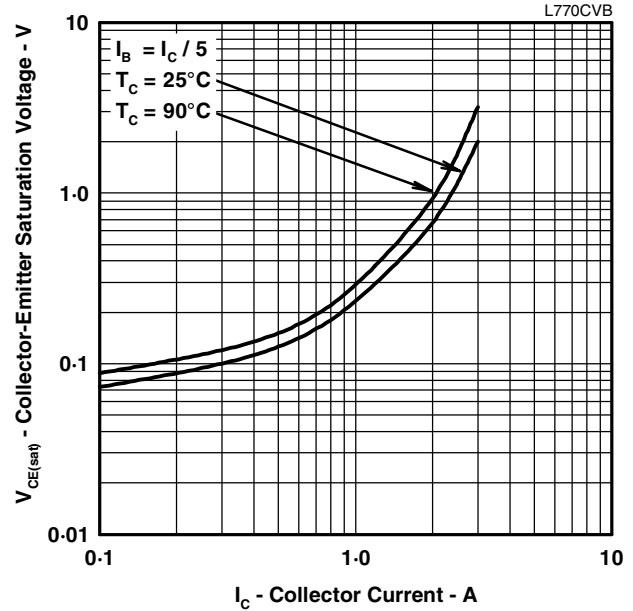


Figure 2.

**INDUCTIVE SWITCHING TIMES
vs
COLLECTOR CURRENT**

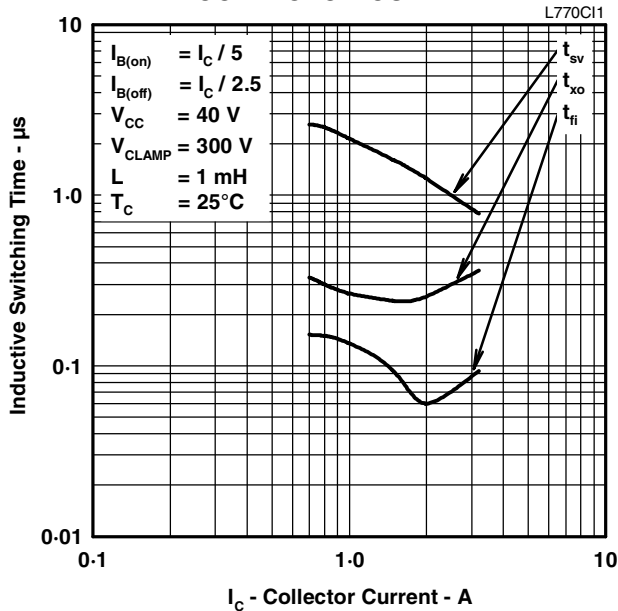


Figure 3.

**INDUCTIVE SWITCHING TIMES
vs
CASE TEMPERATURE**

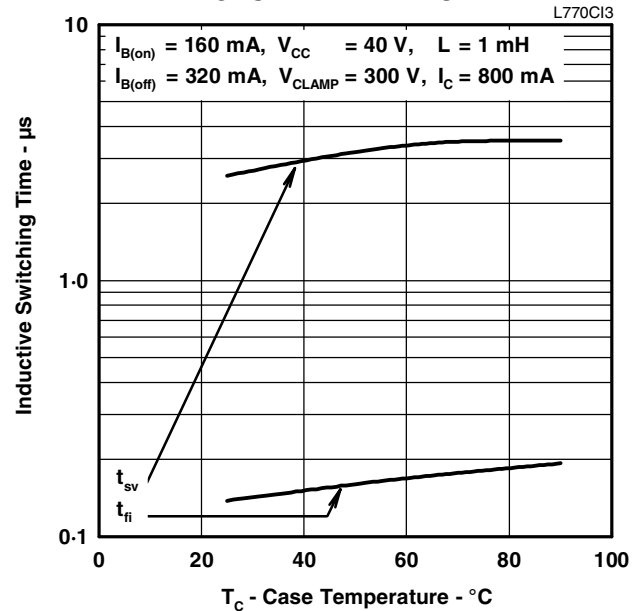


Figure 4.

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TYPICAL CHARACTERISTICS

**INDUCTIVE SWITCHING TIMES
VS
COLLECTOR CURRENT**

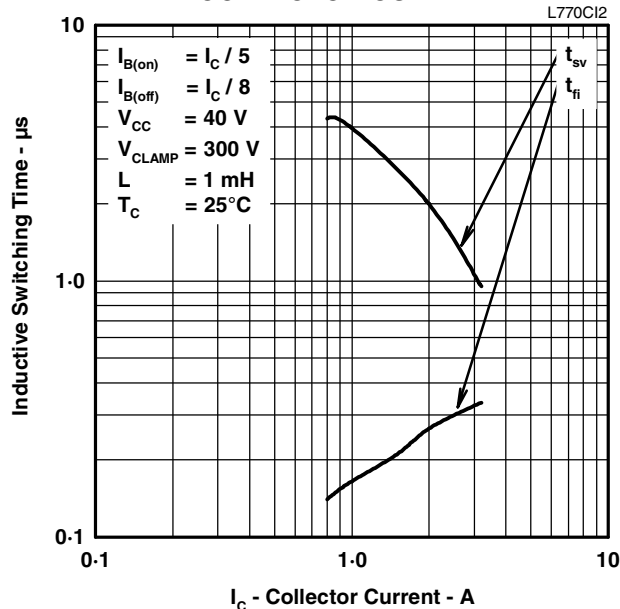


Figure 5.

**INDUCTIVE SWITCHING TIMES
VS
CASE TEMPERATURE**

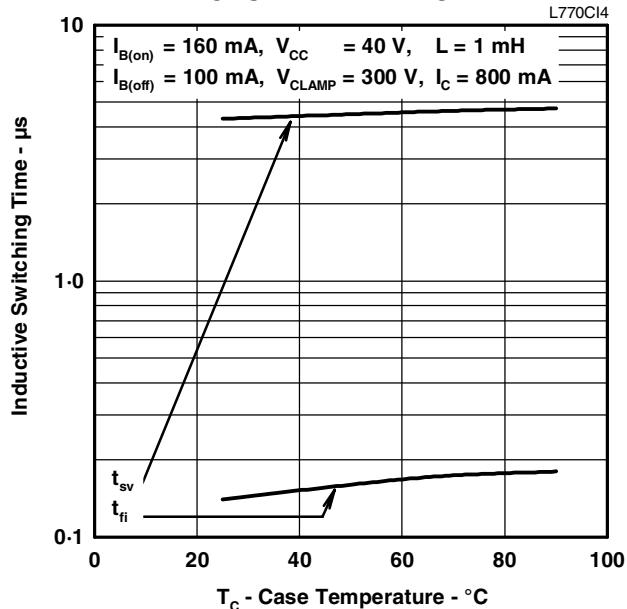


Figure 6.

**RESISTIVE SWITCHING TIMES
VS
COLLECTOR CURRENT**

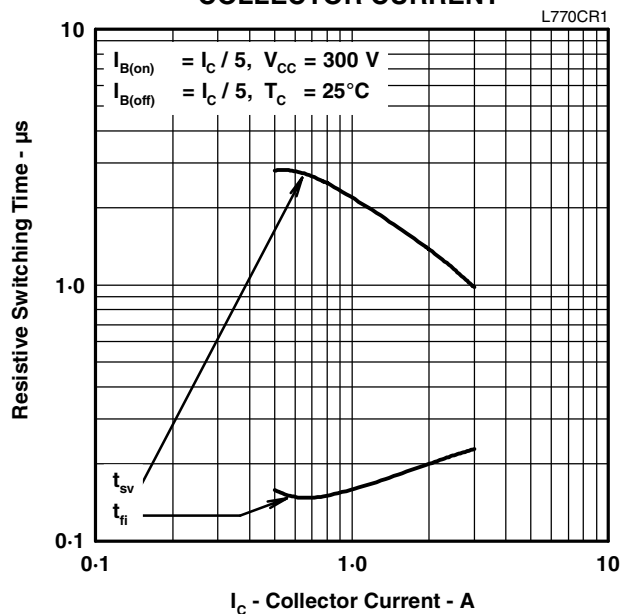


Figure 7.

**RESISTIVE SWITCHING TIMES
VS
CASE TEMPERATURE**

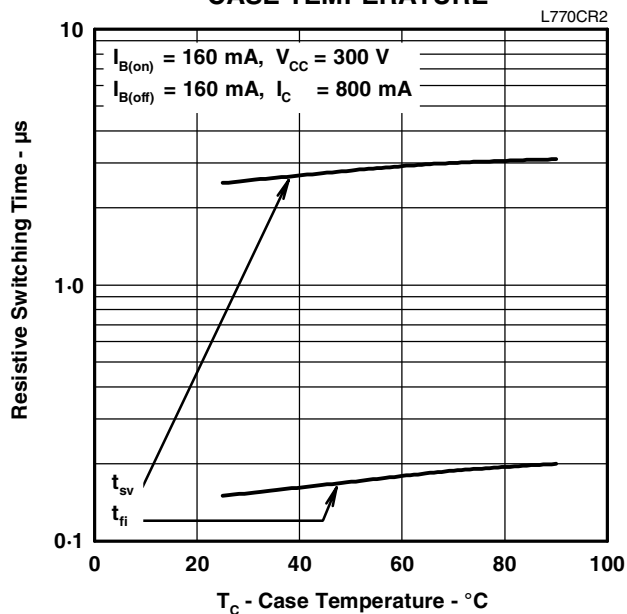


Figure 8.

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MAXIMUM SAFE OPERATING REGIONS

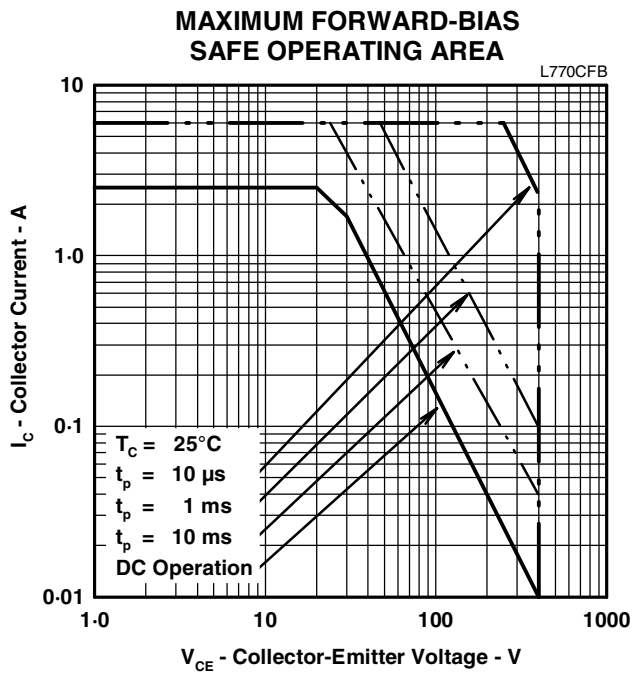


Figure 9.

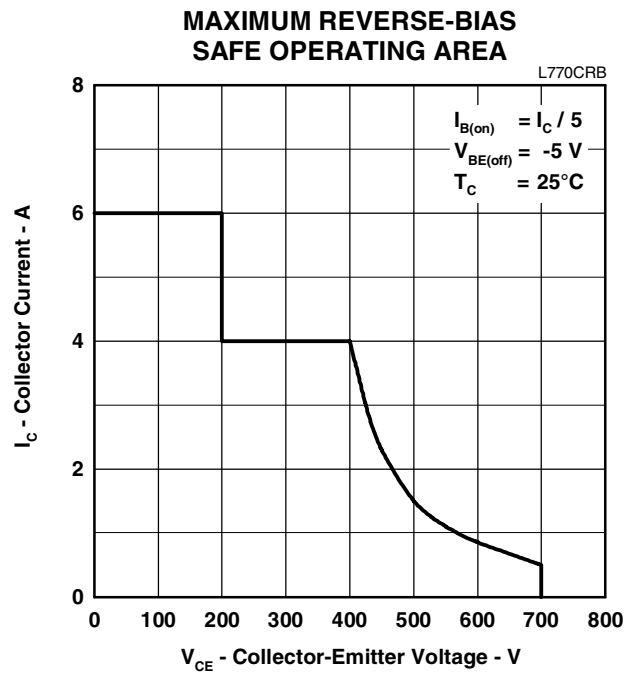


Figure 10.

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