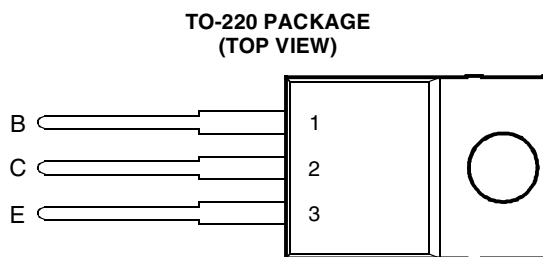


**BOURNS®**

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



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  $t_p = 10$  ms, duty cycle  $\leq 2\%$ .2. This value applies for  $t_p = 300$   $\mu$ s, duty cycle  $\leq 2\%$ .**PRODUCT INFORMATION**

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Specifications are subject to change without notice.

**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	$\mu\text{A}$
$I_{EBO}$ 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**

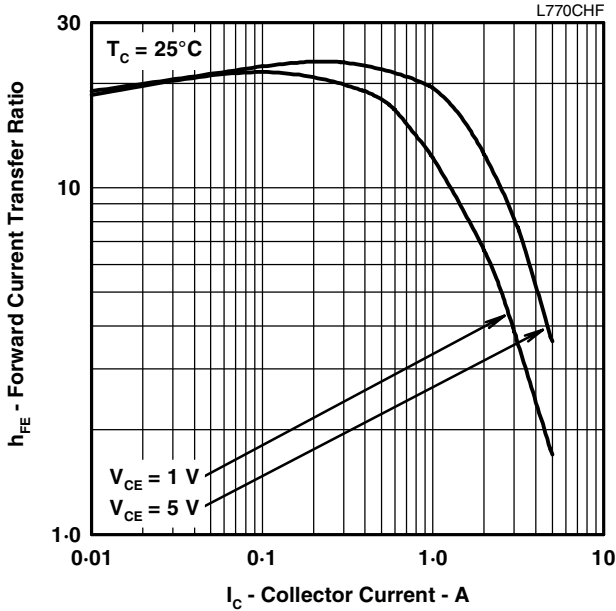
PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$t_{sv}$ Storage time	$I_C = 800\text{ mA}$ $L = 1\text{ mH}$	$I_{B(on)} = 160\text{ mA}$	$V_{CC} = 40\text{ V}$		2.5	3	$\mu\text{s}$
$t_{fi}$ Current fall time		$I_{B(off)} = 320\text{ mA}$	$V_{CLAMP} = 300\text{ V}$		150	190	ns
$t_{xo}$ Cross over time						300	400
$t_{sv}$ 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	$\mu\text{s}$
$t_{fi}$ 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	$\mu\text{s}$
$t_{fi}$ Current fall time	$V_{CC} = 300\text{ V}$	$I_{B(off)} = 160\text{ mA}$		150	250	ns

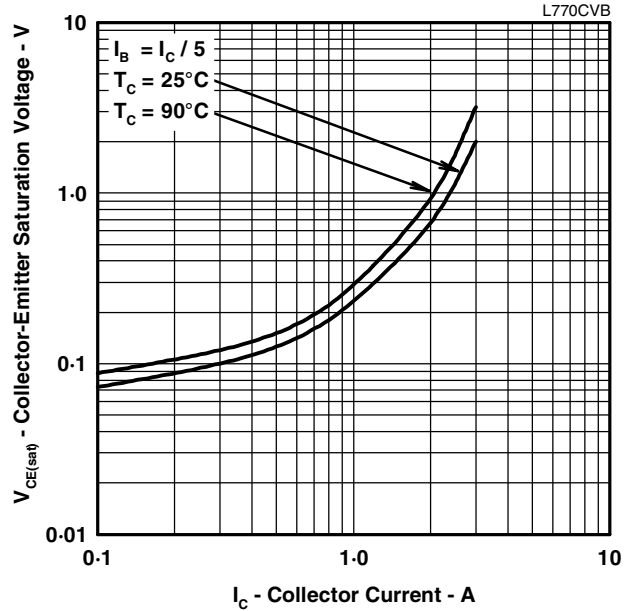
**TYPICAL CHARACTERISTICS**

**FORWARD CURRENT TRANSFER RATIO  
vs  
COLLECTOR CURRENT**



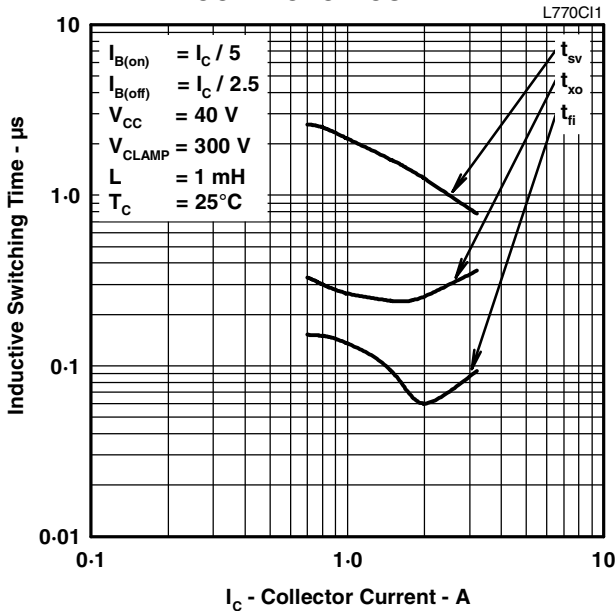
**Figure 1.**

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



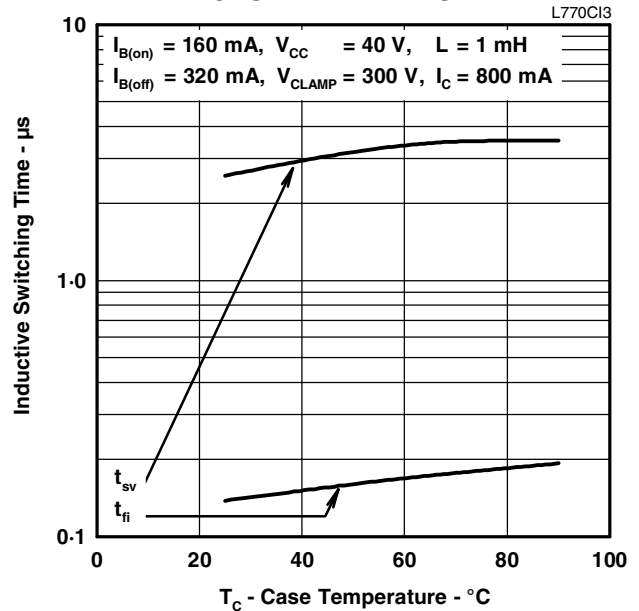
**Figure 2.**

**INDUCTIVE SWITCHING TIMES  
vs  
COLLECTOR CURRENT**



**Figure 3.**

**INDUCTIVE SWITCHING TIMES  
vs  
CASE TEMPERATURE**



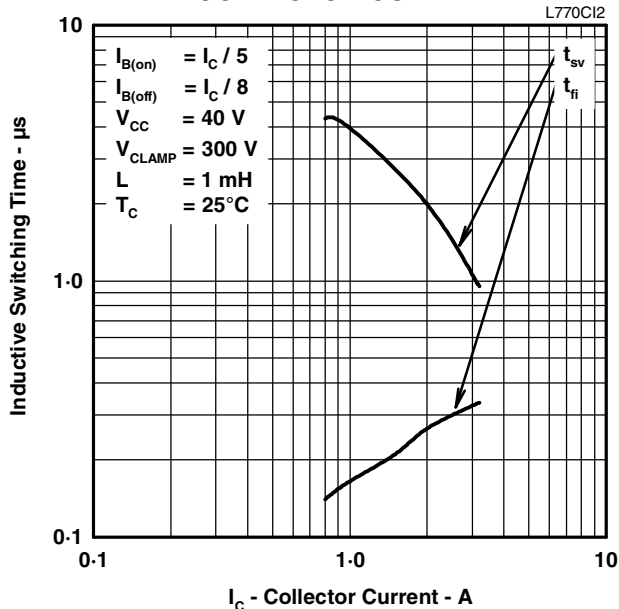
**Figure 4.**

**PRODUCT INFORMATION**

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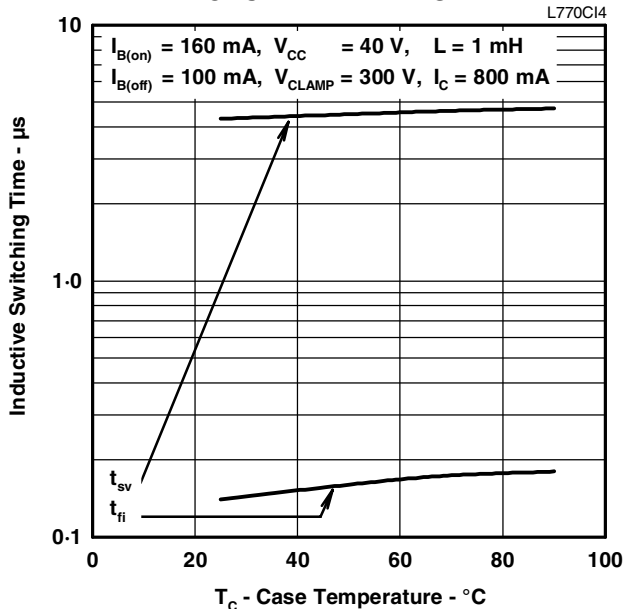
**TYPICAL CHARACTERISTICS**

**INDUCTIVE SWITCHING TIMES**  
**VS**  
**COLLECTOR CURRENT**



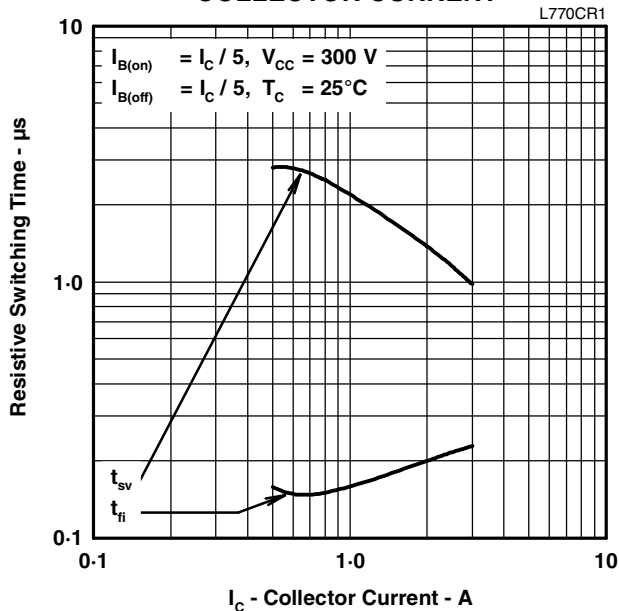
**Figure 5.**

**INDUCTIVE SWITCHING TIMES**  
**VS**  
**CASE TEMPERATURE**



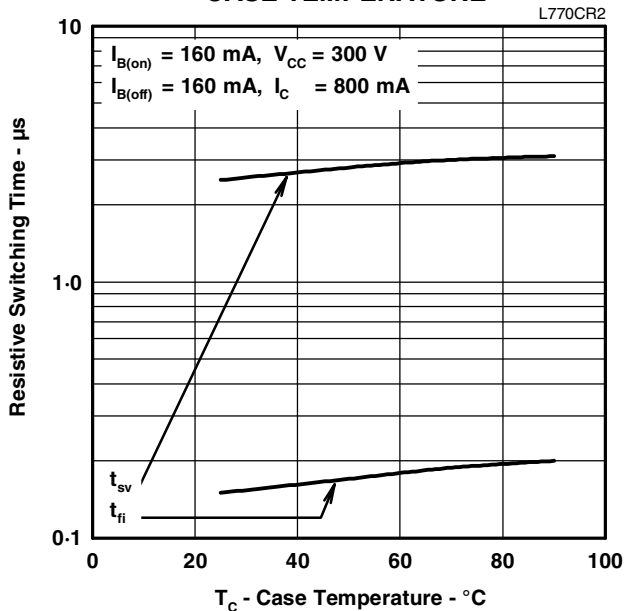
**Figure 6.**

**RESISTIVE SWITCHING TIMES**  
**VS**  
**COLLECTOR CURRENT**



**Figure 7.**

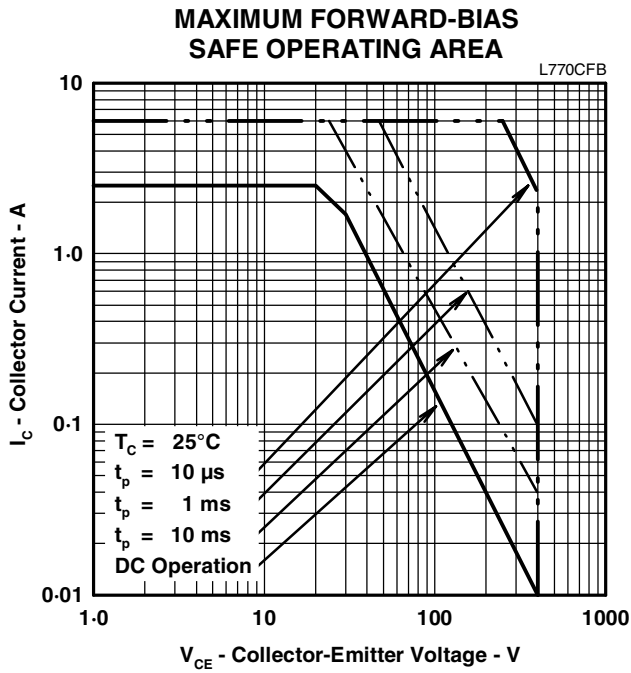
**RESISTIVE SWITCHING TIMES**  
**VS**  
**CASE TEMPERATURE**



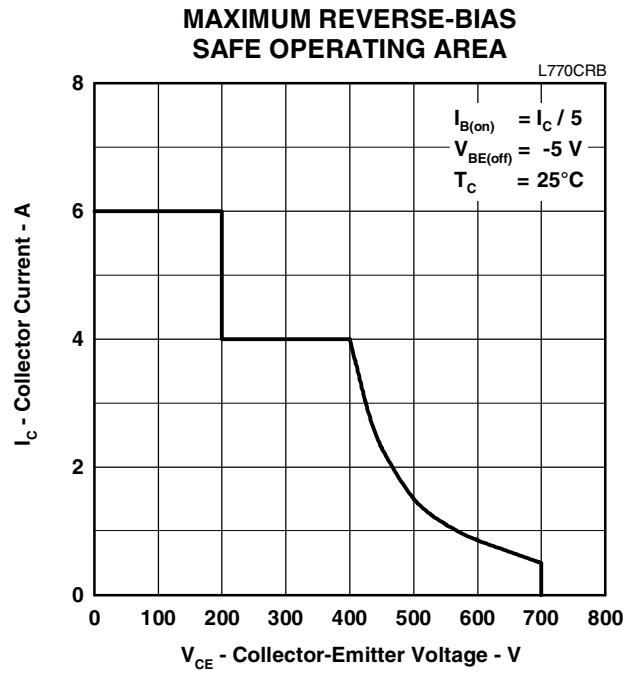
**Figure 8.**

**PRODUCT INFORMATION**

**MAXIMUM SAFE OPERATING REGIONS**



**Figure 9.**



**Figure 10.**

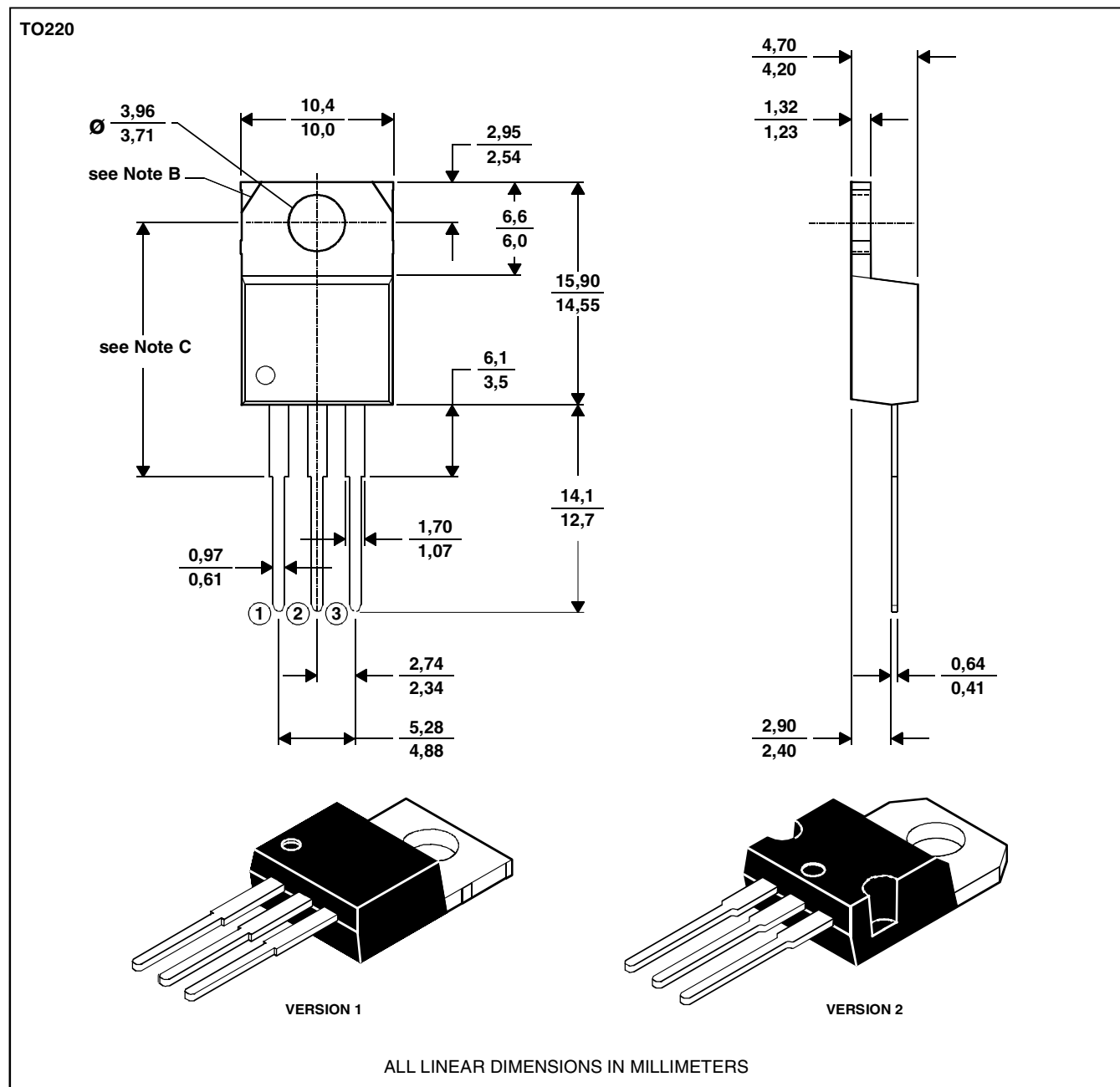
**PRODUCT INFORMATION**

**MECHANICAL DATA**

**TO-220**

**3-pin plastic flange-mount package**

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



NOTES: A. The centre pin is in electrical contact with the mounting tab.  
 B. Mounting tab corner profile according to package version.  
 C. Typical fixing hole centre stand off height according to package version.  
 Version 1, 18.0 mm. Version 2, 17.6 mm.

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