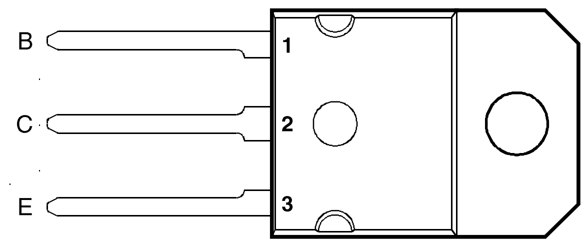
TIPL765, TIPL765A
NPN SILICON POWER TRANSISTORS

- **Rugged Triple-Diffused Planar Construction**
- **10 A Continuous Collector Current**
- **Operating Characteristics Fully Guaranteed at 100˚C**
- **1000 Volt Blocking Capability**
- **125 W at 25˚C Case Temperature**

SOT-93 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage (I_E = 0)	TIPL765 TIPL765A	V_{CBO}	850 1000	V
Collector-emitter voltage (V_{BE} = 0)	TIPL765 TIPL765A	V_{CES}	850 1000	V
Collector-emitter voltage (I_B = 0)	TIPL765 TIPL765A	V_{CEO}	400 450	V
Emitter-base voltage		V_{EBO}	10	V
Continuous collector current		I_C	10	A
Peak collector current (see Note 1)		I_{CM}	15	A
Continuous device dissipation at (or below) 25˚C case temperature		P_{tot}	125	W
Operating junction temperature range		T_j	-65 to +150	˚C
Storage temperature range		T_{stg}	-65 to +150	˚C

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

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 mA	L = 25 mH	(see Note 2)	TIPL765 TIPL765A	400 450			V
I_{CES}	Collector-emitter cut-off current	V_{CE} = 850 V	V_{BE} = 0		TIPL765			50	μA
		V_{CE} = 1000 V	V_{BE} = 0		TIPL765A			50	
		V_{CE} = 850 V	V_{BE} = 0	T_C = 100°C	TIPL765			200	
		V_{CE} = 1000 V	V_{BE} = 0	T_C = 100°C	TIPL765A			200	
I_{CEO}	Collector cut-off current	V_{CE} = 400 V	I_B = 0		TIPL765			50	μA
		V_{CE} = 450 V	I_B = 0		TIPL765A			50	
I_{EBO}	Emitter cut-off current	V_{EB} = 10 V	I_C = 0					1	mA
h_{FE}	Forward current transfer ratio	V_{CE} = 5 V	I_C = 0.5 A	(see Notes 3 and 4)		15		60	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = 0.4 A	I_C = 2 A					0.5	V
		I_B = 1 A	I_C = 5 A	(see Notes 3 and 4)				1.0	
		I_B = 2 A	I_C = 10 A					2.5	
		I_B = 2 A	I_C = 10 A	T_C = 100°C				5.0	
$V_{BE(sat)}$	Base-emitter saturation voltage	I_B = 0.4 A	I_C = 2 A					1.1	V
		I_B = 1 A	I_C = 5 A	(see Notes 3 and 4)				1.3	
		I_B = 2 A	I_C = 10 A					1.7	
		I_B = 2 A	I_C = 10 A	T_C = 100°C				1.6	
f_t	Current gain bandwidth product	V_{CE} = 10 V	I_C = 0.5 A	f = 1 MHz			8		MHz
C_{ob}	Output capacitance	V_{CB} = 20 V	I_E = 0	f = 0.1 MHz			150		pF

NOTES: 2. Inductive loop switching measurement.
3. These parameters must be measured using pulse techniques, t_p = 300 μs, duty cycle ≤ 2%.
4. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

thermal characteristics

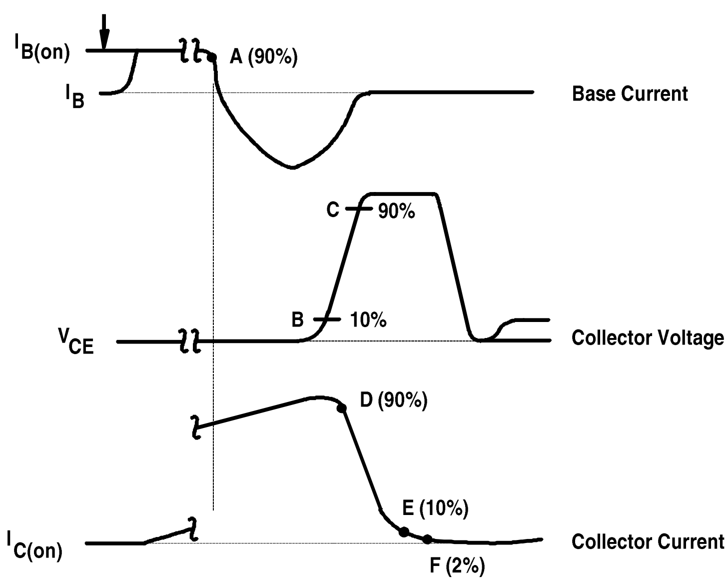
PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			1	°C/W

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

PARAMETER		TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_{sv}	Voltage storage time	I_C = 10 A $V_{BE(off)}$ = -5 V	$I_{B(on)}$ = 2 A	(see Figures 1 and 2)			2	μs
t_{rv}	Voltage rise time						300	ns
t_{fi}	Current fall time						200	ns
t_{ti}	Current tail time						50	ns
t_{xo}	Cross over time						400	ns
t_{sv}	Voltage storage time	I_C = 10 A $V_{BE(off)}$ = -5 V	$I_{B(on)}$ = 2 A T_C = 100°C	(see Figures 1 and 2)			3.5	μs
t_{rv}	Voltage rise time						400	ns
t_{fi}	Current fall time						300	ns
t_{ti}	Current tail time						80	ns
t_{xo}	Cross over time						500	ns

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

A - B = t_{sv}
B - C = t_{rv}
D - E = t_{fi}
E - F = t_{ti}
B - E = t_{xo}



NOTES: A. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r < 15$ ns, $R_{in} > 10\ \Omega$, $C_{in} < 11.5$ pF.
B. Resistors must be noninductive types.

Figure 2. Inductive-Load Switching Waveforms

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN
vs
COLLECTOR CURRENT

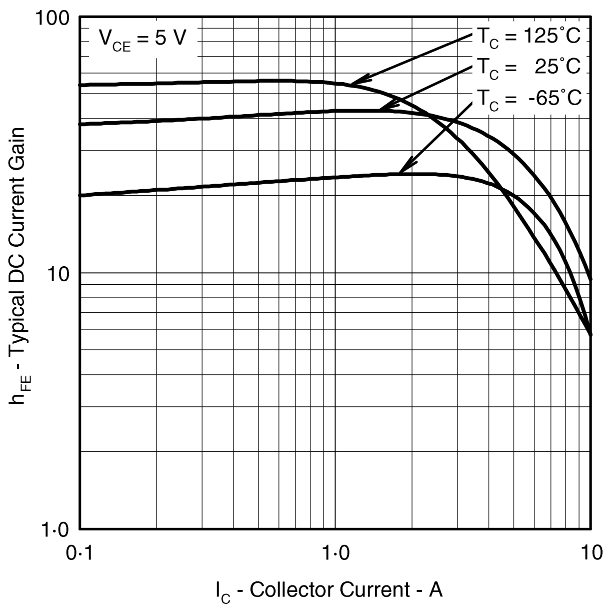


Figure 3.

COLLECTOR-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

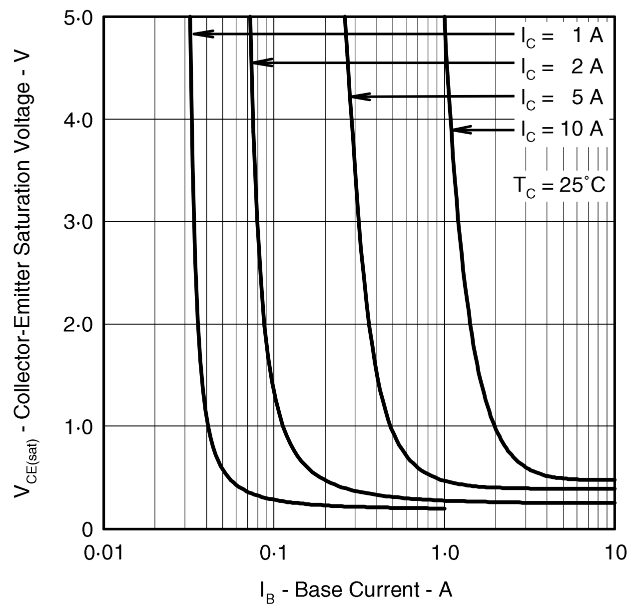


Figure 4.

COLLECTOR-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

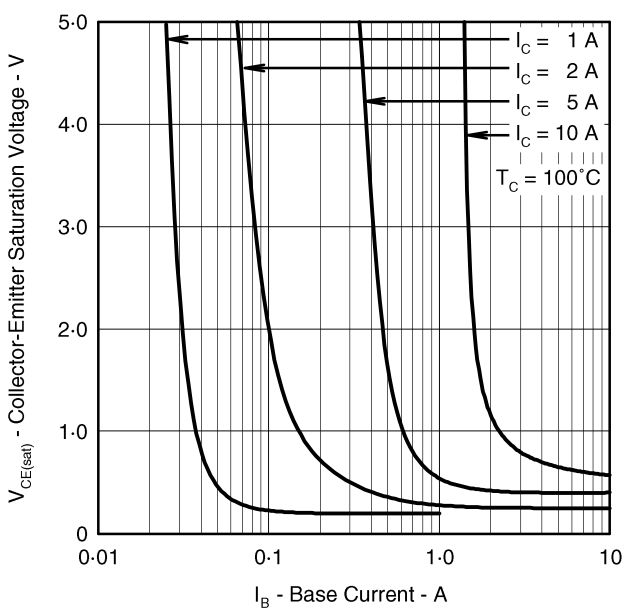


Figure 5.

BASE-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

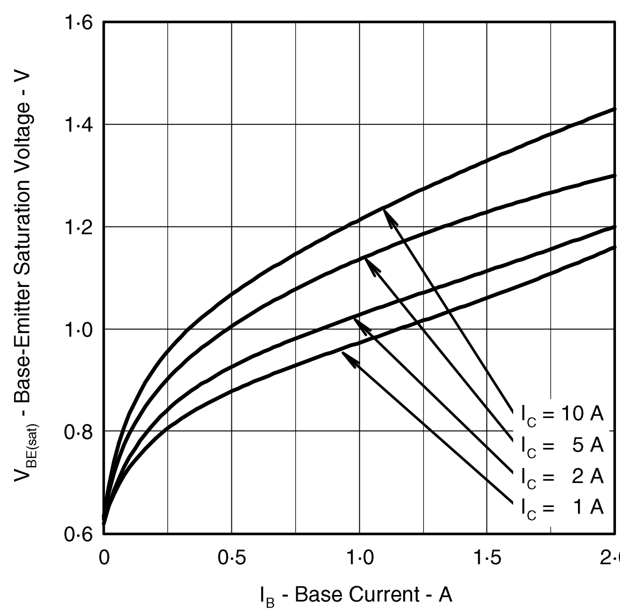


Figure 6.

TYPICAL CHARACTERISTICS

COLLECTOR CUT-OFF CURRENT
vs
CASE TEMPERATURE

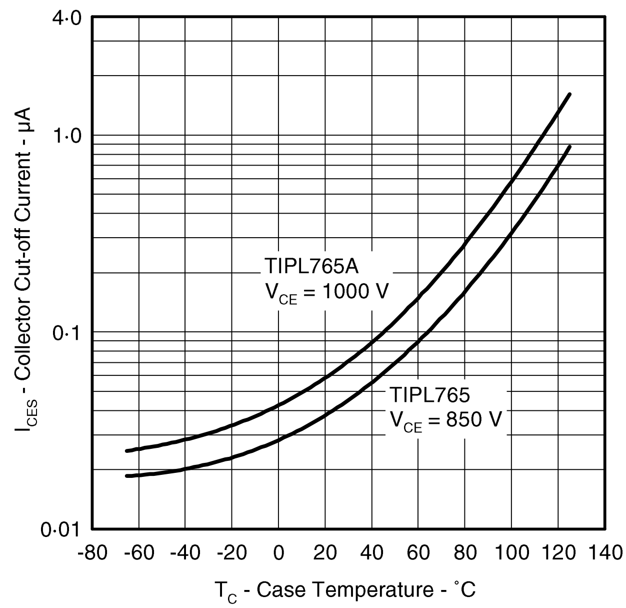


Figure 7.

MAXIMUM SAFE OPERATING REGIONS

MAXIMUM FORWARD-BIAS
SAFE OPERATING AREA

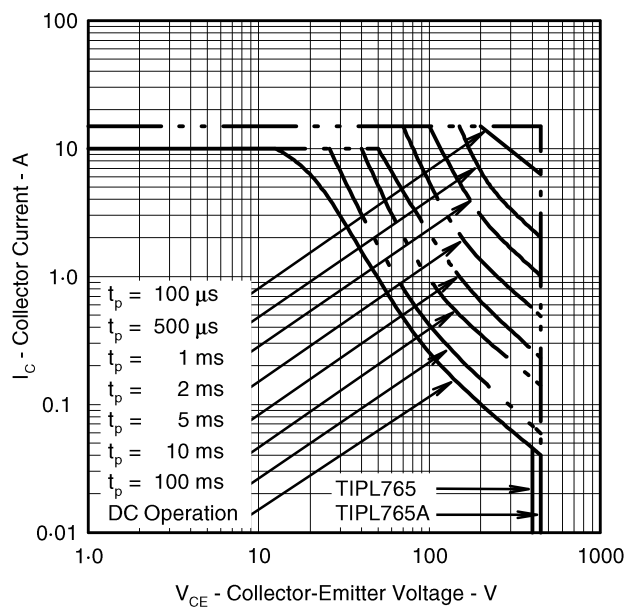


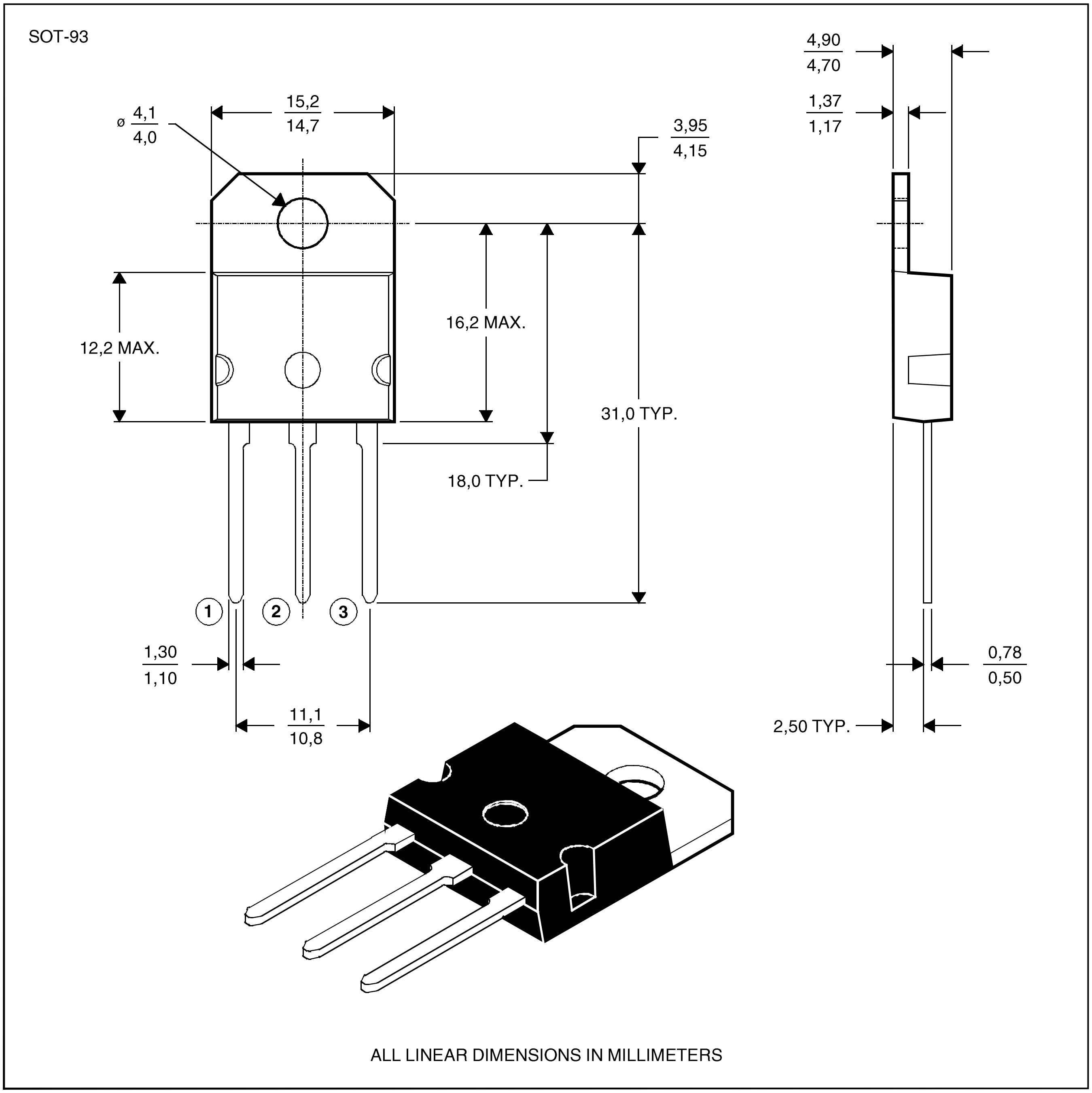
Figure 8.

MECHANICAL DATA

SOT-93

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.



NOTE A: The centre pin is in electrical contact with the mounting tab.