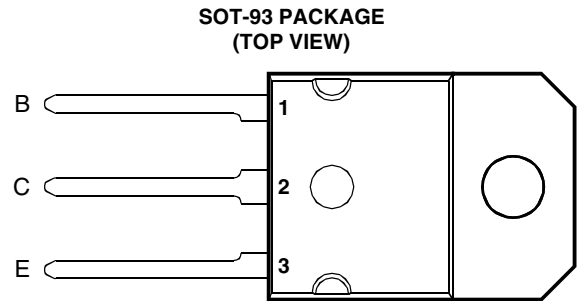


- 50 W at 25°C Case Temperature
- 10 A Continuous Collector Current
- 15 A Peak Collector Current
- Maximum $V_{CE(sat)}$ of 2.8 V at $I_C = 6.5$ A
- $I_{CEX(sus)}$ 7 A at rated $V_{(BR)CEO}$



MDTRAAA

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage ($I_E = 0$)	TIP160	V_{CBO}	320	V
	TIP161		350	
	TIP162		380	
Collector-emitter voltage ($I_B = 0$)	TIP160	V_{CEO}	320	V
	TIP161		350	
	TIP162		380	
Emitter-base voltage		V_{EBO}	5	V
Continuous collector current		I_C	10	A
Peak collector current (see Note 1)		I_{CM}	15	A
Peak commutating anti-parallel diode current ($I_B = 0$) (see Note 2)		I_{EM}	10	A
Continuous base current		I_B	1	A
Continuous device dissipation at (or below) 100°C case temperature (see Note 3)		P_{tot}	50	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 4)		P_{tot}	3	W
Operating junction temperature range		T_j	-65 to +150	°C
Storage temperature range		T_{stg}	-65 to +150	°C
Lead temperature 3.2 mm from case for 10 seconds		T_L	260	°C

- NOTES: 1. This value applies for $t_p \leq 10$ ms, duty cycle $\leq 10\%$.
 2. This value applies to the total collector-terminal current when the collector is at negative potential with respect to the emitter.
 3. Derate linearly to 150°C case temperature at the rate of 0.4 W/°C.
 4. Derate linearly to 150°C free air temperature at the rate of 24 mW/°C.

PRODUCT INFORMATION

electrical characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
I_{CEO}	Collector-emitter cut-off current	$V_{CE} = 320\text{ V}$	$I_B = 0$	TIP160				
		$V_{CE} = 350\text{ V}$	$I_B = 0$	TIP161			1	mA
		$V_{CE} = 380\text{ V}$	$I_B = 0$	TIP162				
$I_{CEX(sus)}$	Collector-emitter sustaining current	$V_{CLAMP} = V_{(BR)CEO}$			7			A
I_{EBO}	Emitter cut-off current	$V_{EB} = 5\text{ V}$	$I_C = 0$				100	mA
h_{FE}	Forward current transfer ratio	$V_{CE} = 2.2\text{ V}$	$I_C = 4\text{ A}$	(see Notes 5 and 6)	200			
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_B = 0.1\text{ A}$	$I_C = 6.5\text{ A}$				2.8	V
		$I_B = 1\text{ A}$	$I_C = 10\text{ A}$				2.9	
$V_{BE(sat)}$	Base-emitter saturation voltage	$I_B = 0.1\text{ A}$	$I_C = 6.5\text{ A}$		(see Notes 5 and 6)		2.2	V
V_{EC}	Parallel diode forward voltage	$I_E = 10\text{ A}$	$I_B = 0$		(see Notes 5 and 6)		3.5	V

NOTES: 5. These parameters must be measured using pulse techniques, $t_p = 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

6. 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
$R_{\theta JA}$	Junction to free air thermal resistance			41.7	°C/W
$C_{\theta C}$	Thermal capacitance of case		1.4		J/°C

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

PARAMETER		TEST CONDITIONS †			MIN	TYP	MAX	UNIT		
t_d	Delay time	$I_C = 6.5\text{ A}$	$I_{B(on)} = 100\text{ mA}$	$I_{B(off)} = -100\text{ mA}$		40		ns		
t_r	Rise time					1.5		μs		
t_s	Storage time				$V_{BE(off)} = -5\text{ V}$	$R_L = 5\ \Omega$		2.2		μs
t_f	Fall time							2.6		μs

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

PARAMETER MEASUREMENT INFORMATION

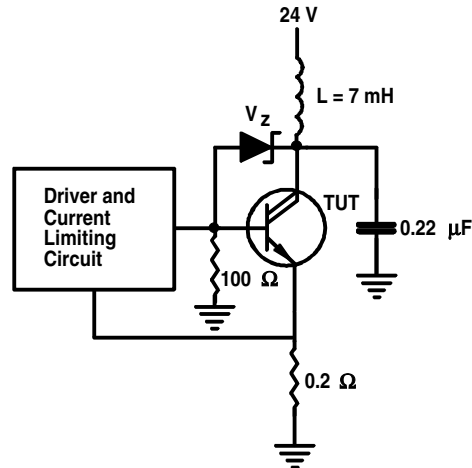


Figure 1. Functional Test Circuit

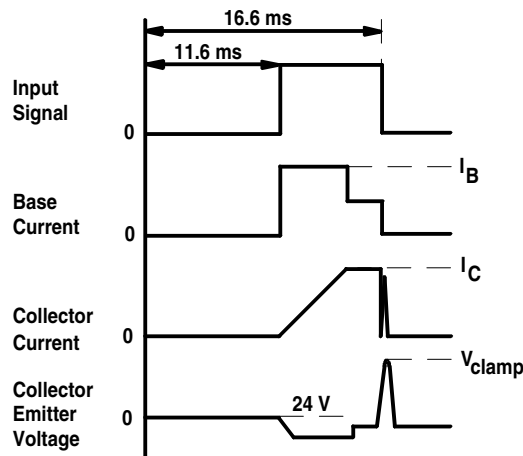


Figure 2. Functional Test Waveforms

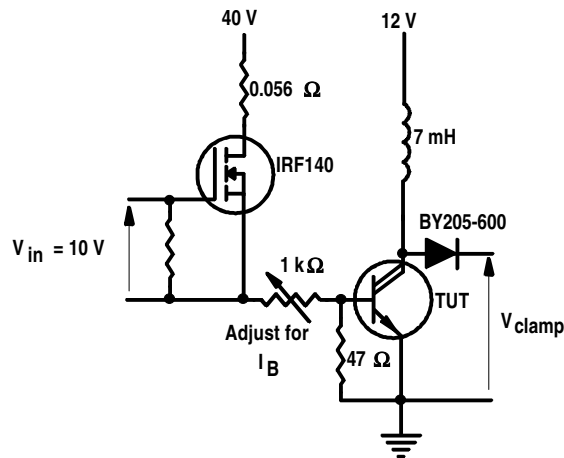


Figure 3. Switching Test Circuit

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TYPICAL CHARACTERISTICS

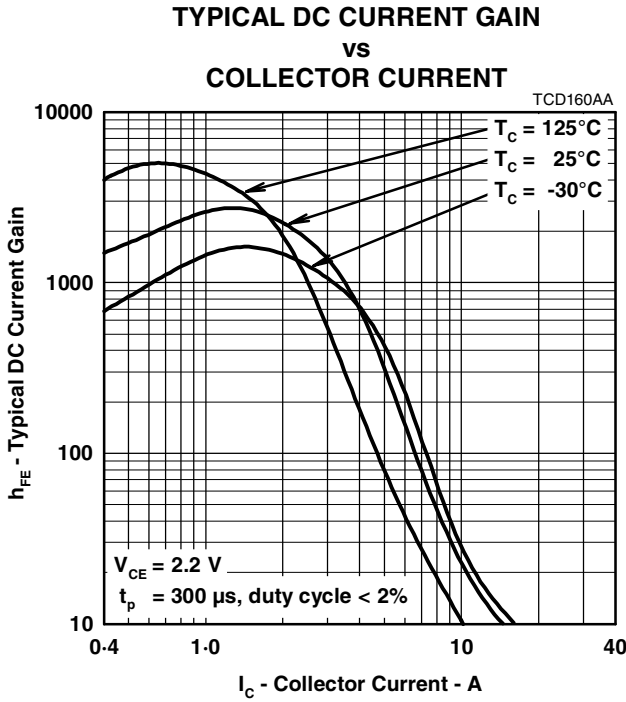


Figure 4.

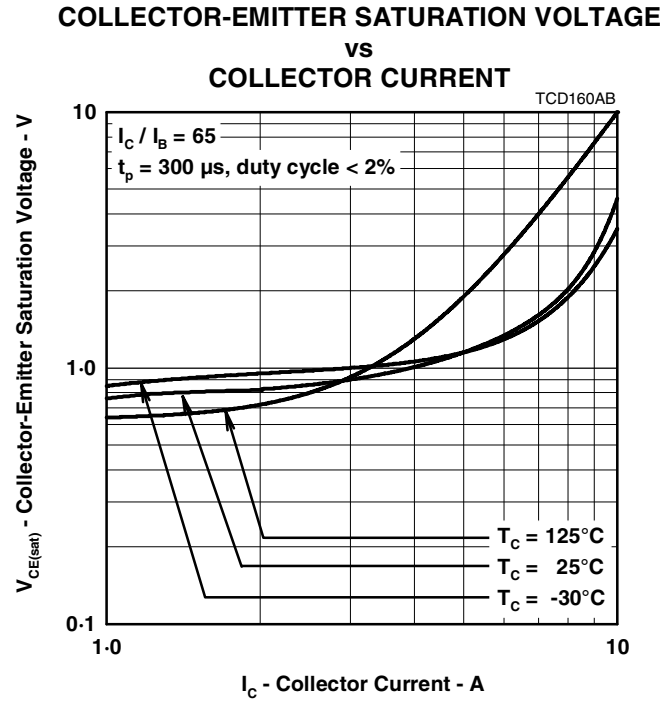


Figure 5.

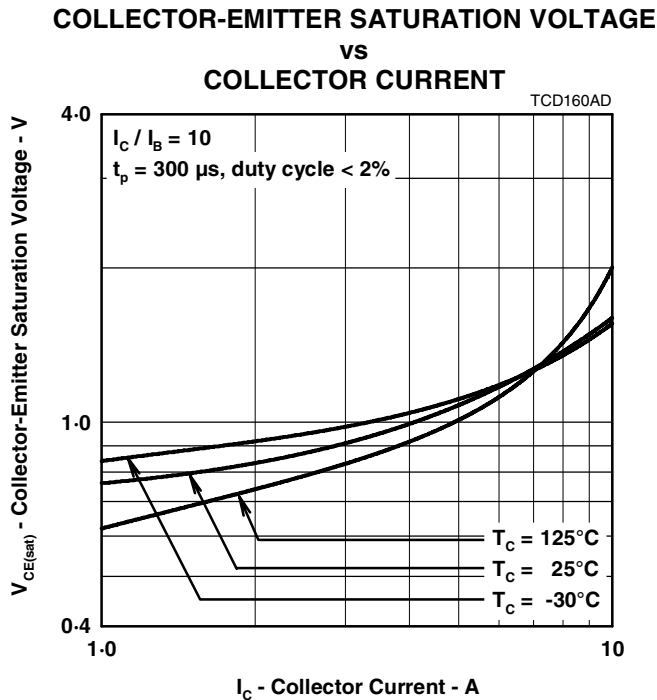


Figure 6.

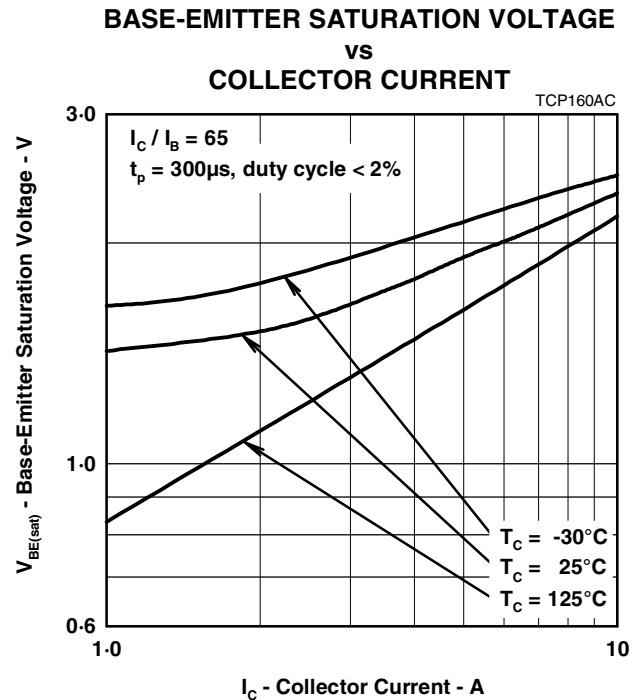


Figure 7.

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MAXIMUM SAFE OPERATING REGIONS

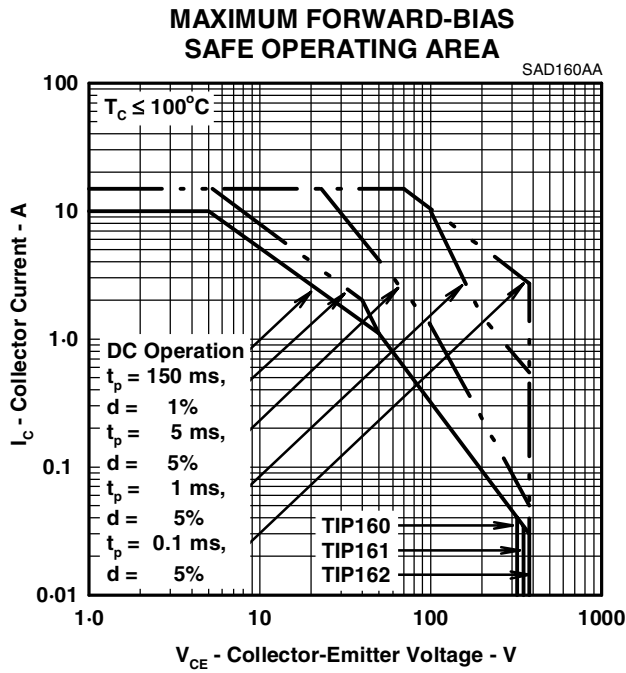


Figure 8.

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