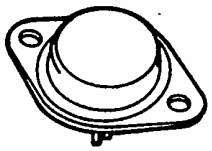
HIGH SPEED
NPN POWER DARLINGTON TRANSISTORS

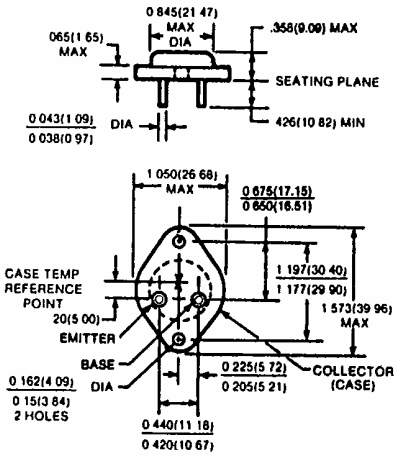
GE5060,1,2

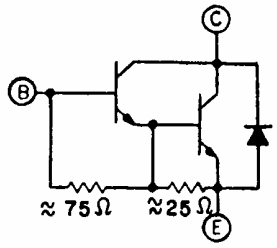
400-500 VOLTS
20 AMP, 125 WATTS

These devices are designed for use in high speed switching applications, such as off-line switching power supplies, AC & DC motor control, UPS systems, ultrasonic equipment and other high frequency power conversion equipment.



CASE STYLE TO-204AA (TO-3)
DIMENSIONS ARE IN INCHES AND (MILLIMETERS)





DEVICE CIRCUIT

maximum ratings (T_C = 25°C) (unless otherwise noted)

RATING	SYMBOL	GE5060	GE5061	GE5062	UNITS
Collector-Base Voltage	V_{CBO}	400	450	500	Volts
Collector-Emitter Voltage	V_{CEO}	350	400	450	Volts
Emitter Base Voltage	V_{EBO}	8	8	8	Volts
Collector Current — Continuous Peak (Repetitive) Peak (Non-Repetitive)	I_C I_{CM} I_{CSM}	20 25 42.5	20 25 42.5	20 25 42.5	A
Base Current — Continuous Peak (Non-Repetitive)	I_B I_{BM}	4 6	4 6	4 6	A
Total Power Dissipation @ T_C = 25°C	P_D	125	125	125	Watts
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	-65 to +150	-65 to +150	°C

thermal characteristics

Thermal Resistance, Junction to Case	$R_{\theta JC}$	1	1	1	°C/W
Maximum Lead Temperature for Soldering Purposes: ⅛" from Case for 5 Seconds	T_L	300	300	300	°C

electrical characteristics (T_C = 25° C) (unless otherwise specified)

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
off characteristics[1]						
Collector-Emitter Sustaining Voltage (I_C = .5mA) (V_{clamp} = V_{CEO} Rated)	GE5060 GE5061 GE5062	$V_{CEO(sus)}$	350 400 450	— — —	— — —	Volts
Collector-Base Voltage (I_C = 0.25mA)	GE5060 GE5061 GE5062	V_{CBO}	400 450 500	— — —	— — —	Volts
Collector Cutoff Current (V_{CB} = V_{CBO} Rated)		I_{CBO}	—	—	.25	mA
Emitter Cutoff Current (V_{EB} = 4.5V, I_C = 0)		I_{EBO}	—	—	200	mA
second breakdown						
Second Breakdown with Base Forward Biased		FBSOA	SEE FIGURE 16			
Clamped Inductive soa with Base Reversed Bias		RBSOA	SEE FIGURE 17			
on characteristics						
DC Current Gain (I_C = 10A, V_{CE} = 5V) (I_C = 15A, V_{CE} = 5V) (I_C = 20A, V_{CE} = 5V)		h_{FE}	100 40 15	160 115 65	— — —	—
Collector-Emitter Saturation Voltage (I_C = 10A, I_B = 1A) (I_C = 10A, I_B = 2A) (I_C = 20A, I_B = 2.0A)		$V_{CE(sat)}$	— — —	1.20 1.15 1.6	1.5 1.4 2.0	V
Base-Emitter Voltage (I_C = 10A, I_B = 1A) (I_C = 20A, I_B = 2A)		$V_{BE(sat)}$	— —	1.95 2.3	2.5 3.5	V
switching characteristics						
Resistive Load						
Rise Time	I_C = 15A, I_{B1} = .75A, I_{B2} = 1.5A	t_r	—	0.3	—	μs
Storage Time	V_{CC} = 300V, t_p = 50 μsec	t_s	—	2.7	—	
Fall Time		t_f	—	1.15	—	
Inductive Load, Clamped						
Storage Time	V_{CC} = 300V, L = 100 μH	t_s	—	3.3	—	μs
Crossover Time	I_C = 15A, I_{B1} = .75A, I_{B2} = 1.5A	t_c	—	1.7	—	
Fall Time		t_f	—	0.4	—	
emitter-collector diode characteristics						
Forward Voltage I_F = 10A I_F = 25A		V_F	— —	1.9 2.8	— —	Volts

TYPICAL CHARACTERISTICS

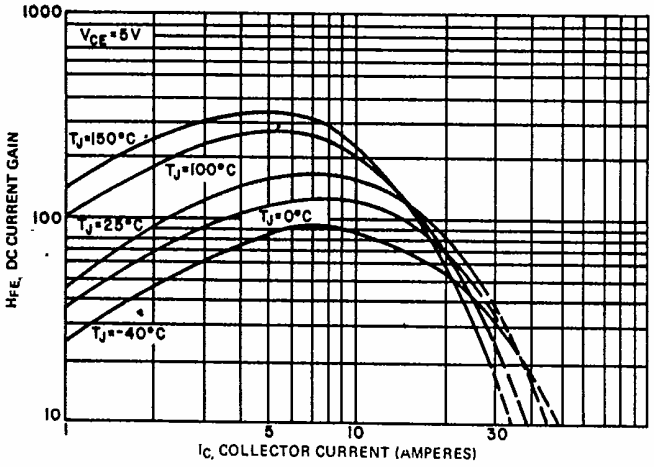


FIGURE 1. DC CURRENT GAIN (V_{CE} = 2V)

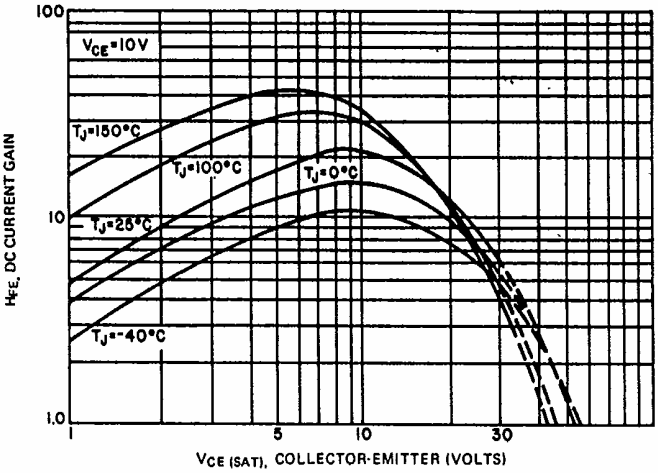


FIGURE 2. DC CURRENT GAIN (V_{CE} = 10V)

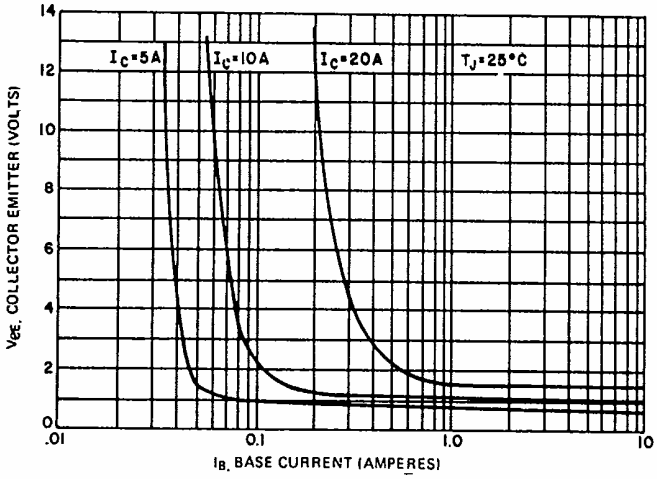


FIGURE 3. COLLECTOR SATURATION REGION

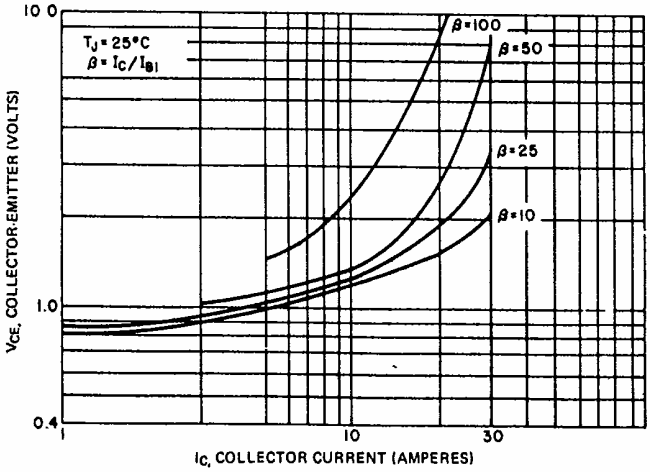


FIGURE 4. $V_{CE(SAT)}$ VS. I_C, T_J = 25°C

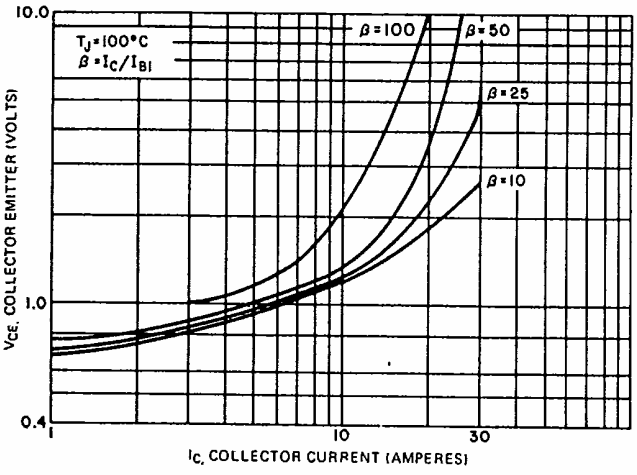


FIGURE 5. $V_{CE(SAT)}$ VS. I_C, T_J = 100°C

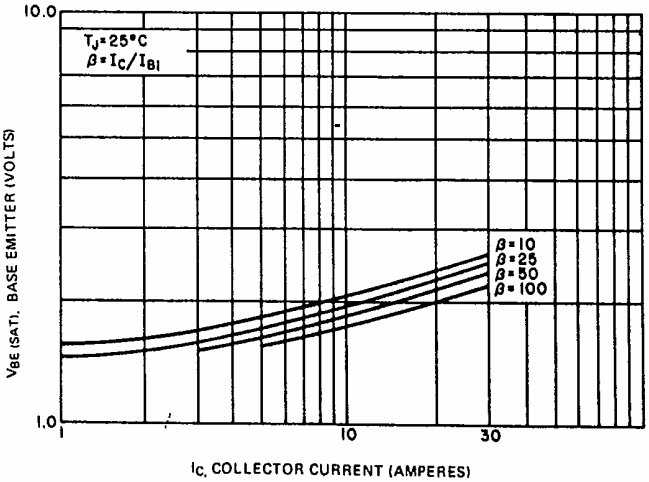


FIGURE 6. $V_{BE(SAT)}$ VS. I_C, T_J = 25°C

TYPICAL CHARACTERISTICS

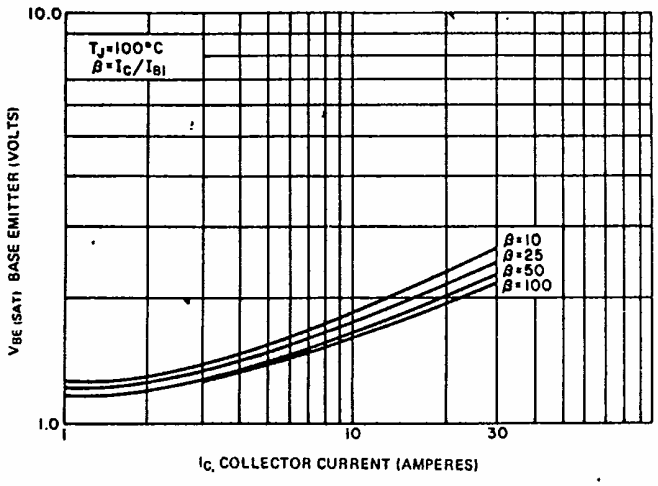


FIGURE 7. $V_{BE(SAT)}$ VS. I_C, T_J = 100°C

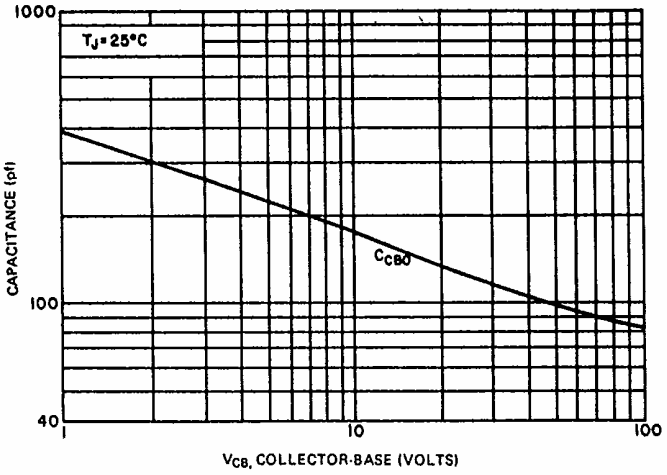


FIGURE 8. CAPACITANCE (C_{CBO})

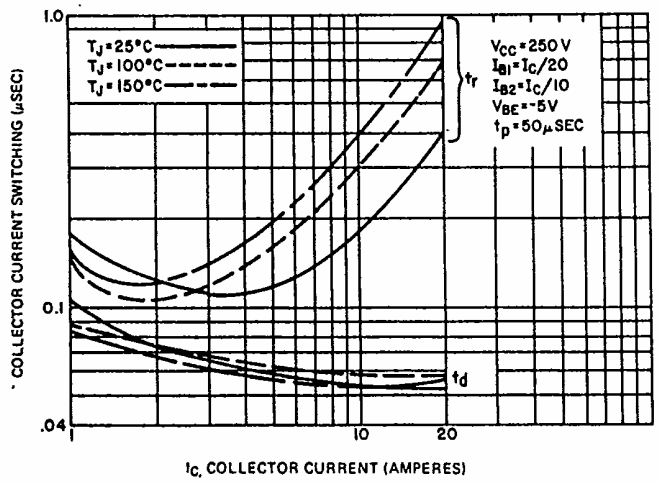


FIGURE 9. TURN-ON TIME (RESISTIVE LOAD)

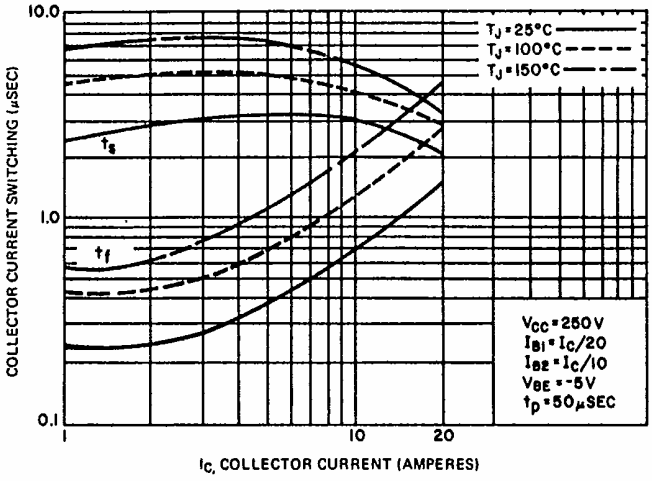


FIGURE 10. TURN-OFF TIME (RESISTIVE)

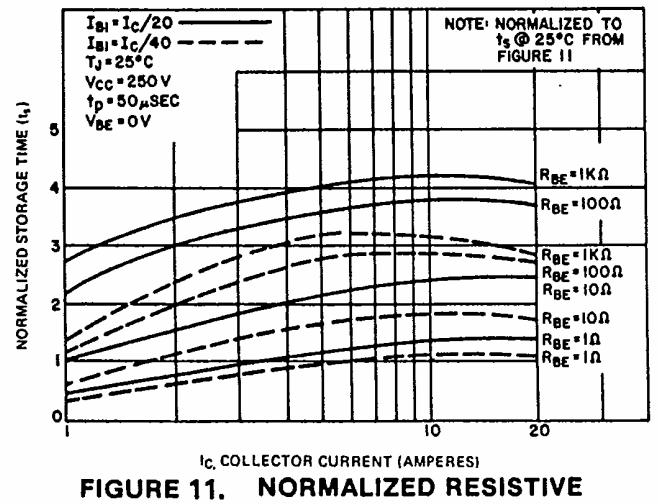


FIGURE 11. NORMALIZED RESISTIVE SWITCHING STORAGE TIME (R_{BE} VARIATIONS) VS. COLLECTOR CURRENT

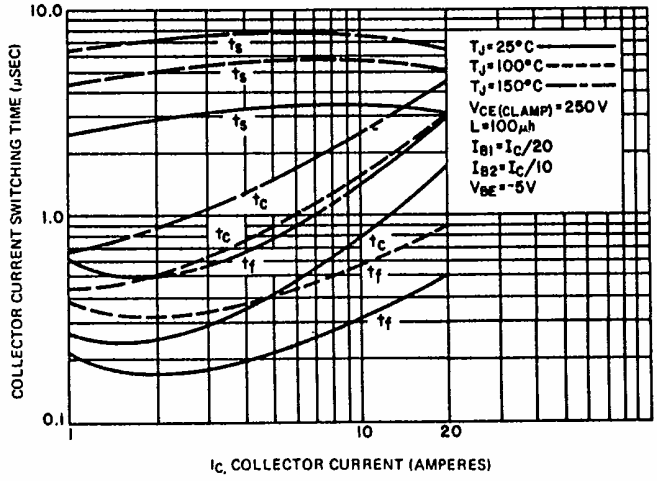


FIGURE 12. CLAMPED INDUCTIVE TURN-OFF TIME

TYPICAL CHARACTERISTICS

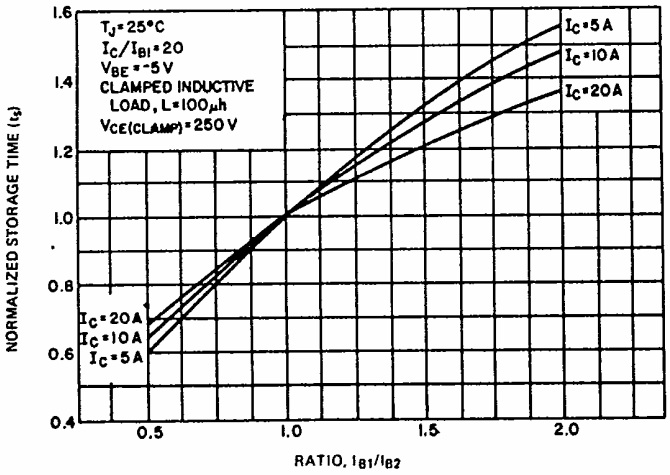


FIGURE 13. STORAGE TIME VARIATION WITH I_{B2}

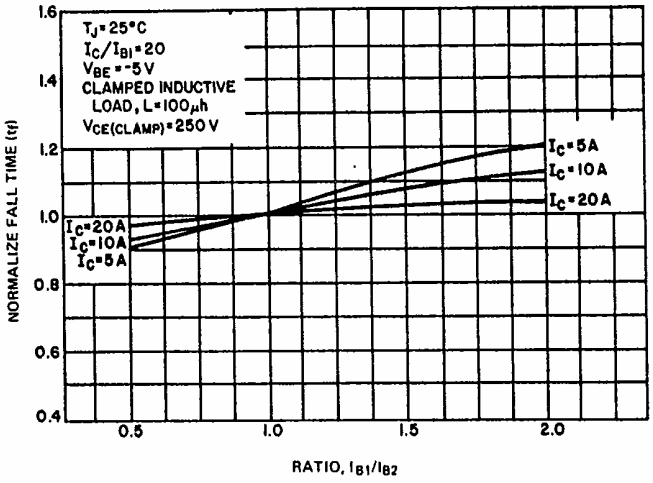


FIGURE 14. FALL TIME VARIATION WITH I_{B2}

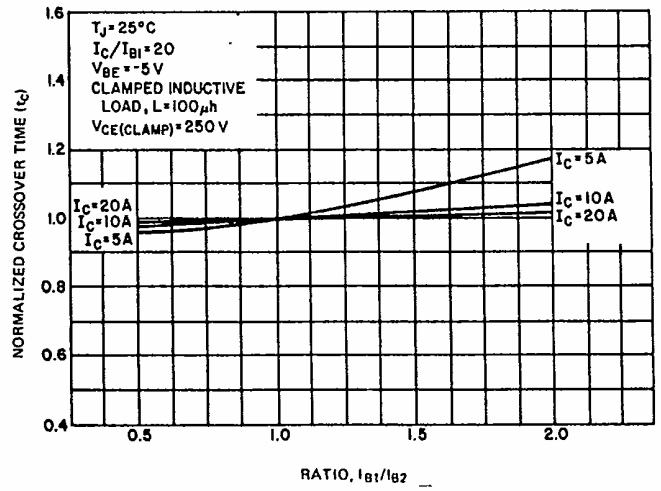


FIGURE 15. CROSS-OVER TIME VARIATION WITH I_{B2}

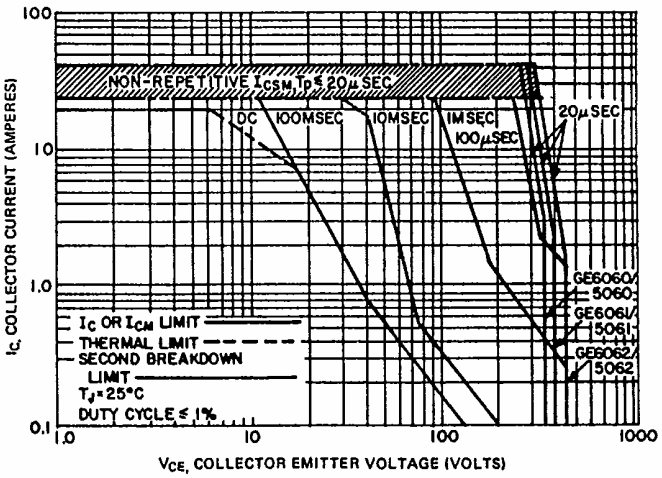


FIGURE 16. FORWARD BIAS SAFE OPERATING AREA

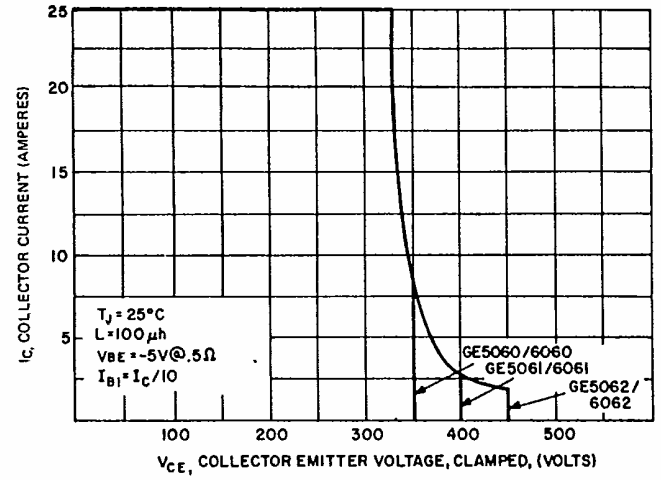


FIGURE 17. REVERSE BIAS SAFE OPERATING AREA

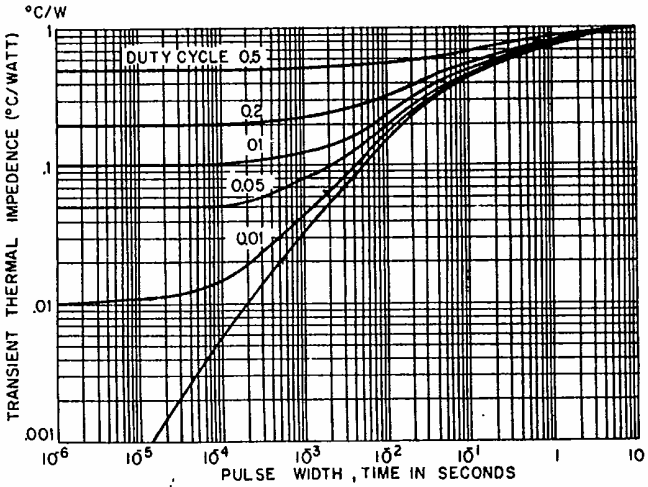


FIGURE 18. TRANSIENT THERMAL RESPONSE

TYPICAL CHARACTERISTICS

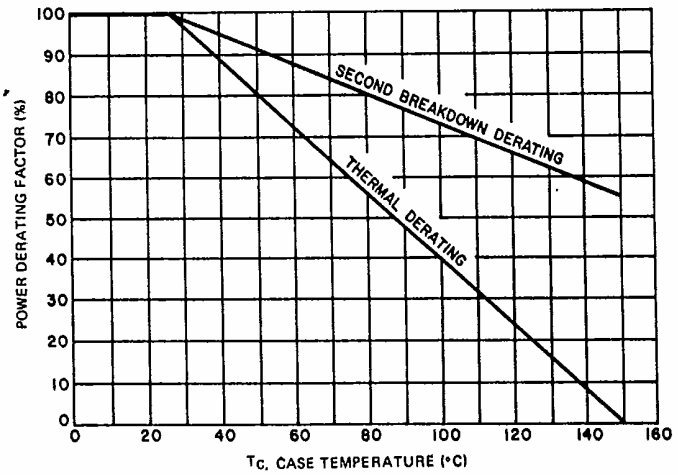


FIGURE 19. POWER DERATING

DIODE CHARACTERISTICS

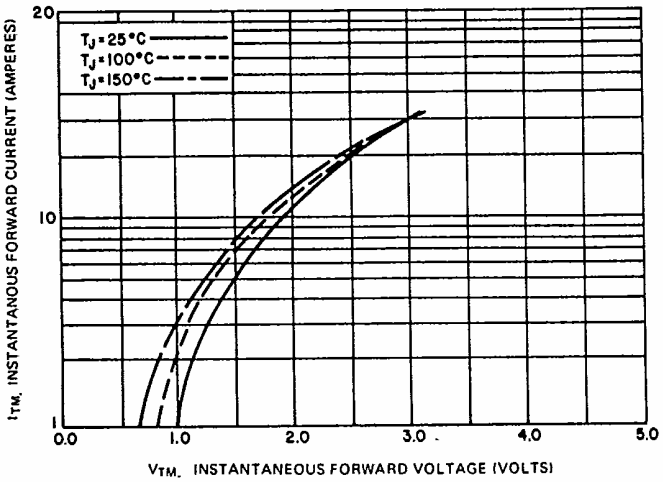


FIGURE 20. FORWARD CHARACTERISTICS

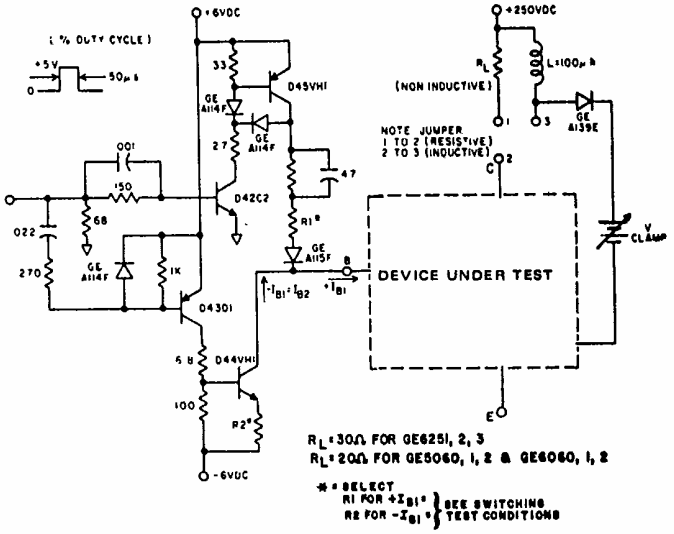


FIGURE 21. SWITCHING TIME TEST CIRCUIT