HIGH POWER
NPN POWER DARLINGTON TRANSISTORS

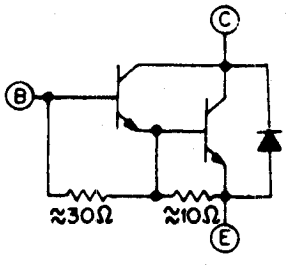
D66DV5,6,7
D66EV5,6,7

500-700 VOLTS
50 AMP, 125 WATTS

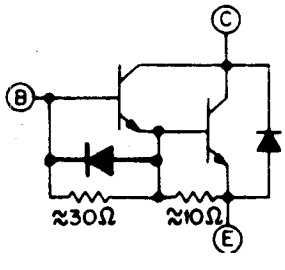
The General Electric D66DV and EV are high current power Darlingtons. They feature collector isolation from the heat sink, and internal construction designed for stress-free operation at temperature extremes and quick connect electrical terminals. They are designed to meet UL creep, strike and isolation voltage. Major applications are for motor controls, switching power supplies, and UPS systems.

Features:

- High Voltage: 400-500 $V_{CEO(SUS)}$; 500-700 V_{CEV}
- High Current: 75 Amperes, I_C (Peak)
- High Gain: h_{FE} 50 Minimum @ 50 Amperes, I_C (h_{FE} = 135, typical)

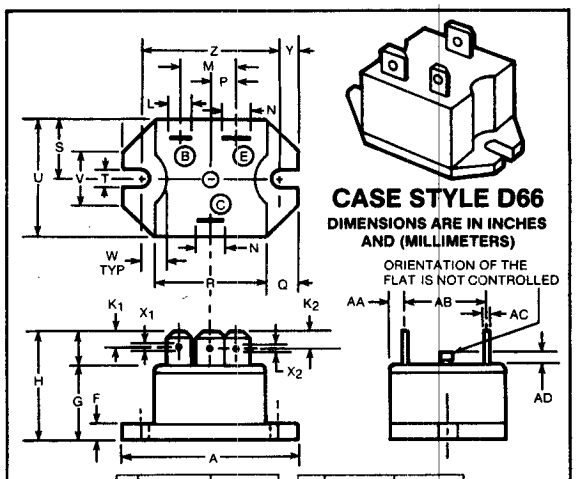


D66DV



D66EV

DEVICE CIRCUIT



CASE STYLE D66
DIMENSIONS ARE IN INCHES AND (MILLIMETERS)

ORIENTATION OF THE FLAT IS NOT CONTROLLED

SYM	INCHES MIN	INCHES MAX	METRIC MM MIN	METRIC MM MAX
A	1.505	1.540	38.22	39.12
F	.120	.132	3.04	3.35
G	.605	.645	15.36	16.40
H	.940	.980	23.87	24.19
J	.307	—	7.80	—
K_1	.120	.132	3.04	3.35
K_2	.171	.184	4.34	4.64
L	.184	.192	4.57	4.88
M	.464	.484	11.78	12.30
N	.247	.255	6.27	6.48
P	.210	.230	5.33	5.84
Q	.275	REF.	7.00	REF.
R	.970	REF.	24.64	REF.

SYM	INCHES MIN	INCHES MAX	METRIC MM MIN	METRIC MM MAX
S	.495	.510	12.57	12.95
T	.150	.170	3.81	4.32
U	.985	1.015	25.01	25.80
V	.450	REF.	11.43	REF.
W	.180	—	4.57	—
X_1	.050	.058	1.27	1.47
X_2	.066	.073	1.65	1.85
Y	.157	.177	3.98	4.50
Z	1.180	1.192	29.97	30.30
AA	.130	.165	3.30	4.30
AB	.684	.704	17.37	17.90
AC	.031	.035	.78	.90
AD	.100	REF.	2.54	REF.

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

RATING	SYMBOL	D66DV5/EV5	D66DV6/EV6	D66DV7/EV7	UNITS
Collector-Emitter Voltage	V_{CEV}	500	600	700	Volts
Collector-Emitter Voltage	V_{CEO}	400	450	500	Volts
Emitter Base Voltage D66DV D66EV	V_{EBO}	8 5	8 5	8 5	Volts
Collector Current — Continuous Peak (Repetitive) Peak (Non-Repetitive)	I_C I_{CM} I_{CSM}	50 75 125	50 75 125	50 75 125	A
Base Current — Continuous Peak (Non-Repetitive)	I_B I_{BM}	10 20	10 20	10 20	A
Total Power Dissipation @ T_C = 25°C	P_D	125	125	125	Watts
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-40 to +150	-40 to +150	-40 to +150	°C
Isolation Voltage	V_{ISOL}	2500	2500	2500	$V_{(rms)}$

thermal characteristics

Thermal Resistance, Junction to Case	$R_{\theta JC}$	4	4	4	°C/W

See page 845 for mounting and handling considerations.

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

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
off characteristics						
Collector-Emitter Sustaining Voltage	D66DV5/EV5	$V_{CEO(sus)}$	400	—	—	Volts
(I_C = 1A)	D66DV6/EV6		450	—	—	
(V_{clamp} = V_{CEO} Rated)	D66DV7/EV7		500	—	—	
Collector Cutoff Current	T_J = 25°C	I_{CEV}	—	—	10	mA
(V_{CE} = Rated Value, V_{BE} = -1.5V)	T_J = 150°C		—	—	2.5	
Emitter Cutoff Current		I_{EBO}				
(V_{EB} = 4.5V, I_C = 0)	D66DV		—	—	350	mA
(V_{EB} = 1.5V, I_C = 0)	D66EV		—	—	350	
second breakdown						
Second Breakdown with Base Forward Biased		FBSOA	SEE FIGURE 23			
on characteristics						
DC Current Gain		h_{FE}				
(I_C = 75A, V_{CE} = 5V)			25	60	—	—
(I_C = 50A, V_{CE} = 5V)			50	135	—	
(I_C = 20A, V_{CE} = 5V)			100	250	—	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$				
(I_C = 75A, I_B = 5A)			—	2.2	3.0	V
(I_C = 50A, I_B = 4A)			—	1.7	2.0	
(I_C = 20A, I_B = 2A)			—	1.15	1.5	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$				
(I_C = 75A, I_B = 5A)			—	2.8	3.5	V
(I_C = 50A, I_B = 4A)			—	2.45	3.0	
(I_C = 20A, I_B = 2A)			—	1.95	2.5	

switching characteristics

Resistive Load				TYP. DV	TYP. EV	MAX. DV	MAX. EV	
Delay Time	V_{CC} = 250V	t_d	—	.09	.09	.5	.5	μs
Rise Time	I_C = 50A	t_r	—	.5	.5	1	1	
Storage Time	I_{B1} = 2.5A, I_{B2} = 5A	t_s	—	2.55	2	5	3	
Fall Time	t_p = 50 μsec	t_f	—	1.4	.64	3	1	

emitter-collector diode characteristics

Power Dissipation	(I_{B1} = 0)	P_D	—	—	125	Watts
Forward Voltage	(I_F = 25A)	V_F	—	1.95	3.20	Volts
	(I_F = 50A)	V_F	—	2.60	3.80	Volts
	(I_F = 50A, T_J = 150°C)	V_F	—	2.30	3.50	Volts
Reverse Recovery Time (I_F = 50A, $di/_{dt}$ = 25A/μsec, R_{B1E} = .25Ω)		T_{rr}	—	3.85	10.0	μsec
Forward Turn-On Time (I_F = 50A, $di/_{dt}$ = 100A/μsec)		T_{ON}	—	0.75	1.5	μsec
Single Cycle Surge Current (60Hz)		I_{FSM}	—	—	150	Amps
Thermal Resistance		$R_{\theta JC}$	—	—	1.0	°C/Watt

TYPICAL CHARACTERISTICS

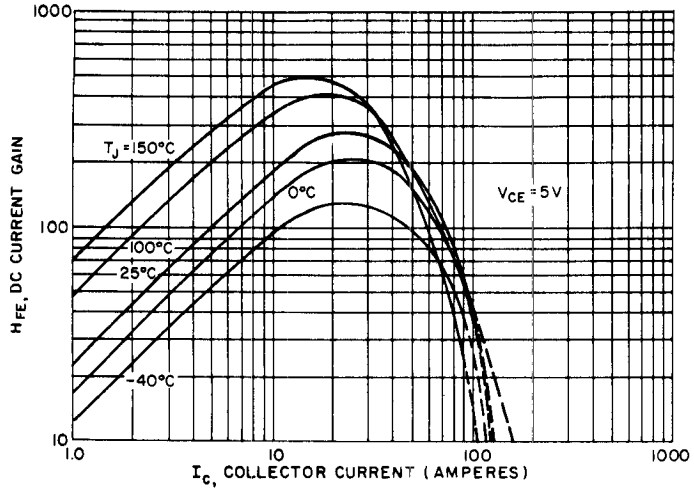


FIGURE 1. DC CURRENT GAIN (V_{CE} = 5V)

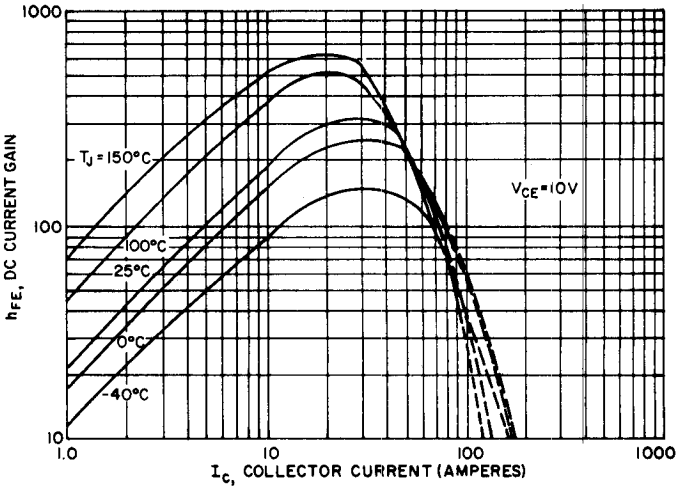


FIGURE 2. DC CURRENT GAIN (V_{CE} = 10V)

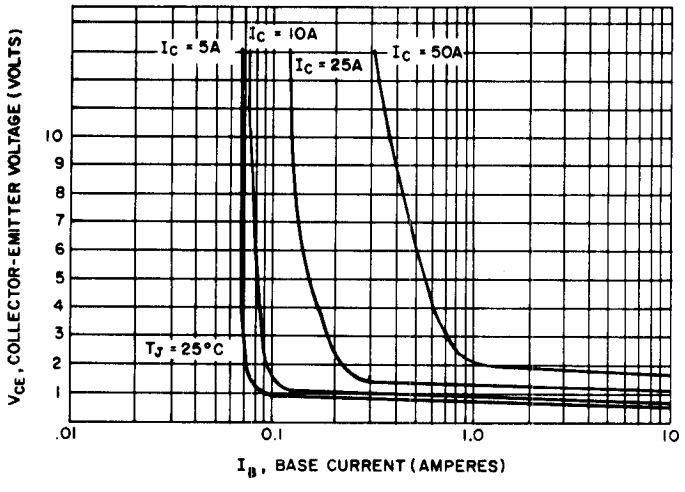


FIGURE 3. COLLECTOR SATURATION REGION

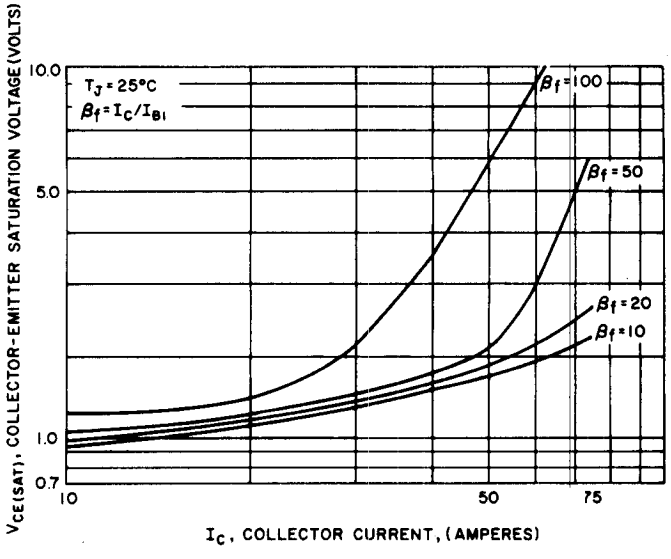


FIGURE 4. $V_{CE\ (SAT)}$ VS I_C, T_J = 25°C

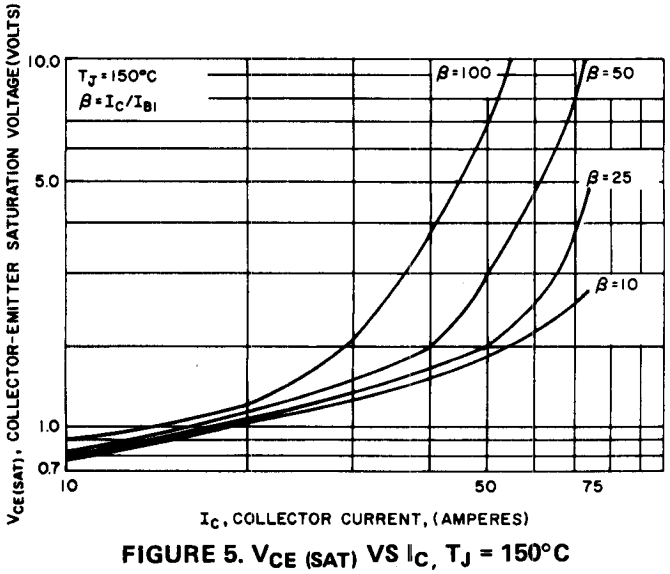


FIGURE 5. $V_{CE\ (SAT)}$ VS I_C, T_J = 150°C

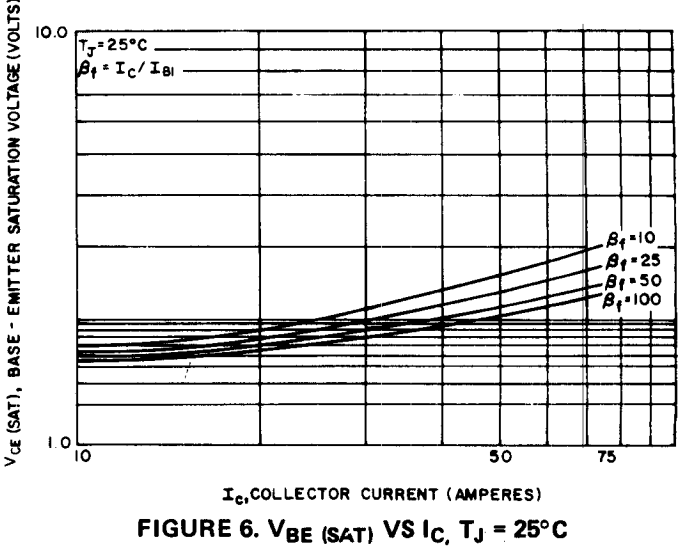


FIGURE 6. $V_{BE\ (SAT)}$ VS I_C, T_J = 25°C

TYPICAL CHARACTERISTICS

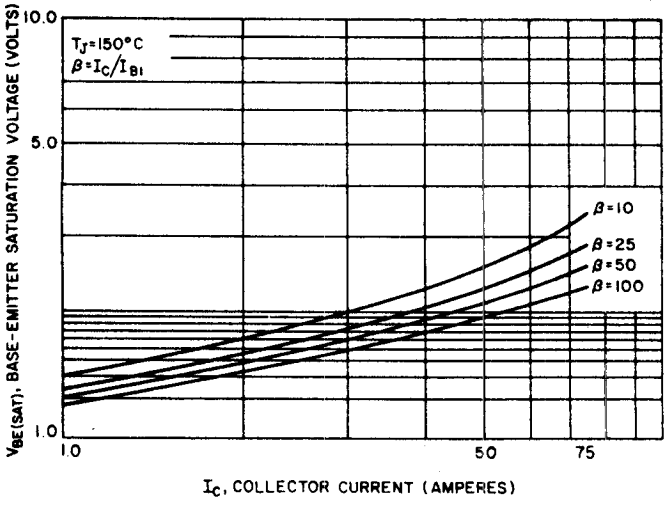


FIGURE 7. $V_{BE\ (SAT)}$ VS I_C, T_J = 150°C

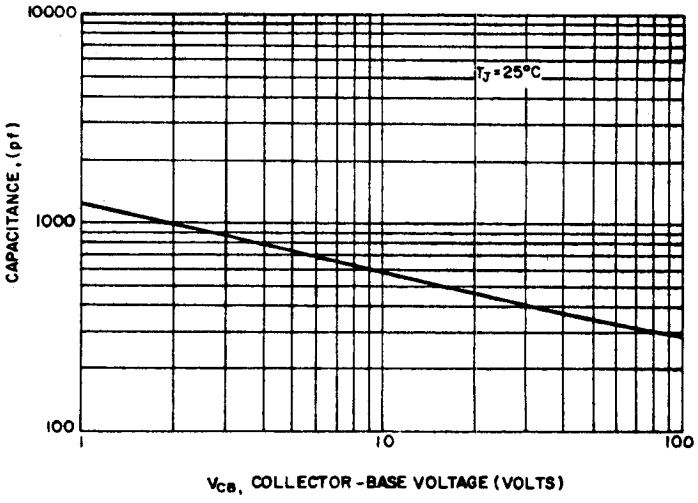


FIGURE 8. CAPACITANCE (C_{CBO})

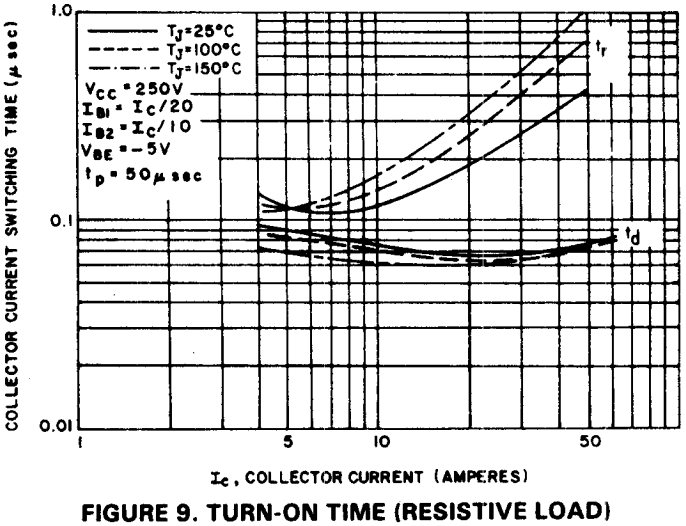


FIGURE 9. TURN-ON TIME (RESISTIVE LOAD) (D66DV ONLY)

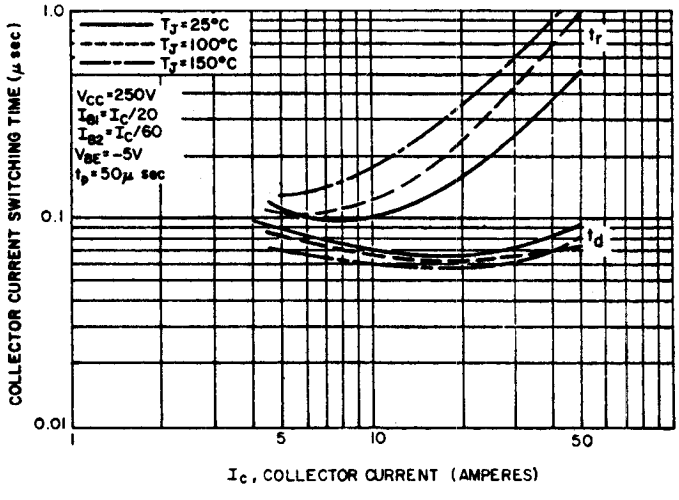


FIGURE 10. TURN-ON TIME (RESISTIVE LOAD) (D66EV ONLY)

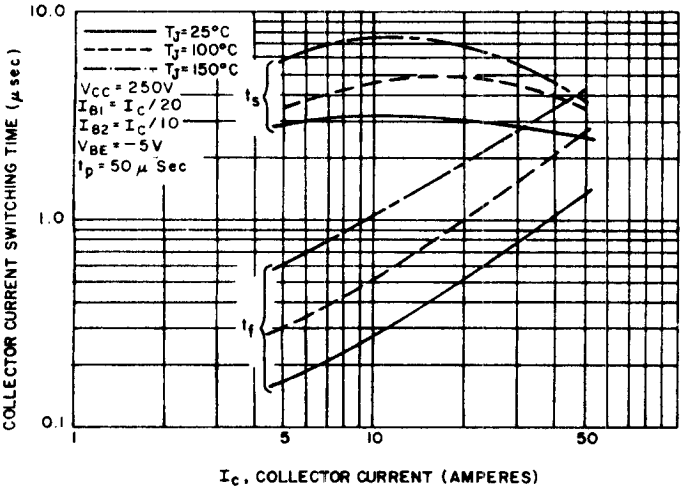


FIGURE 11. TURN-ON TIME (RESISTIVE LOAD) (D66DV ONLY)

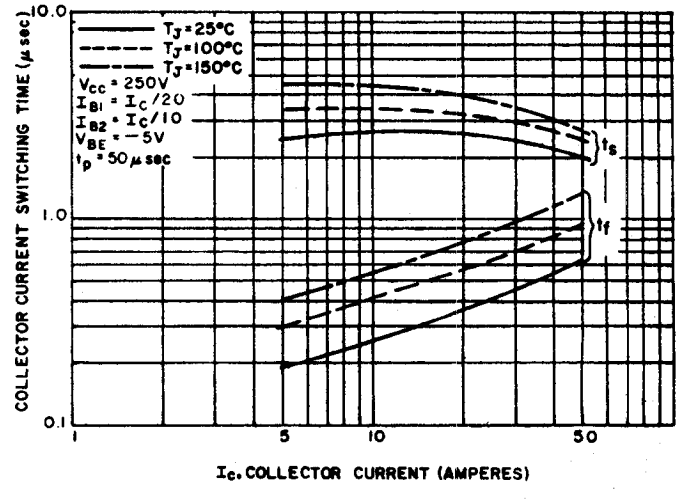


FIGURE 12. TURN-ON TIME (RESISTIVE LOAD) (D66EV ONLY)

TYPICAL CHARACTERISTICS

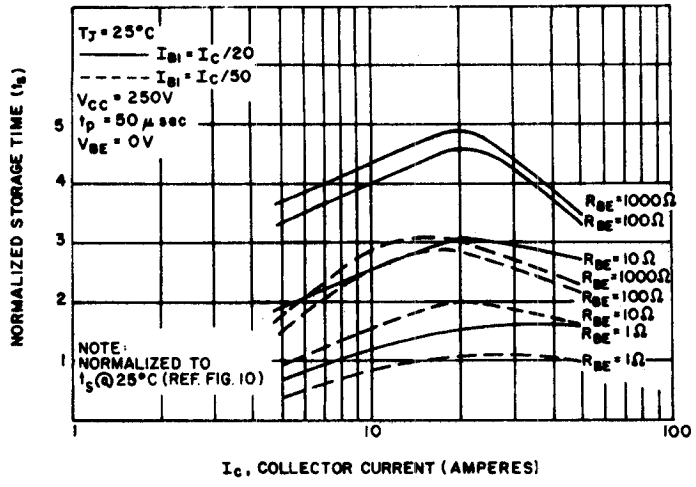


FIGURE 13. NORMALIZED RESISTIVE SWITCHING STORAGE TIME (R_{BE} VARIATIONS) VS COLLECTOR CURRENT (D66DV ONLY)

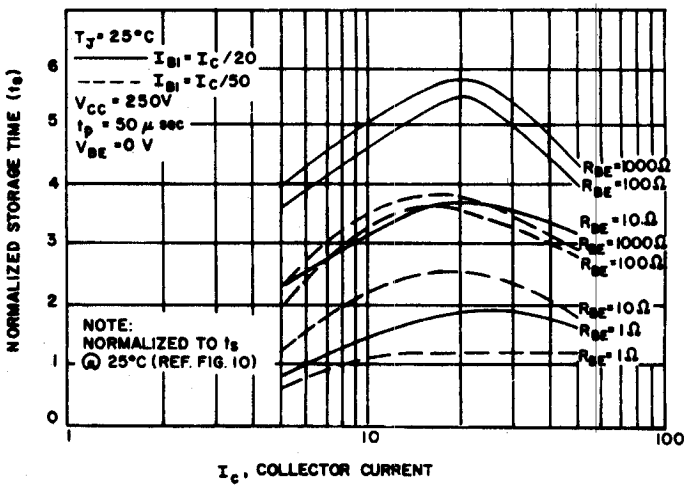


FIGURE 14. NORMALIZED RESISTIVE SWITCHING STORAGE TIME (R_{BE} VARIATIONS) VS COLLECTOR CURRENT (D66EV ONLY)

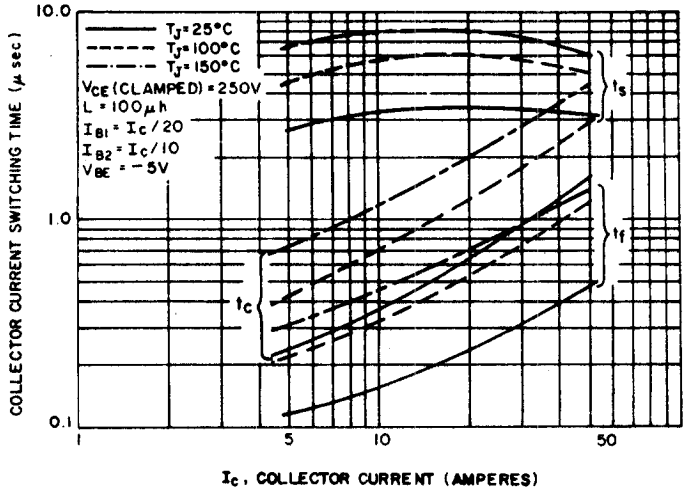


FIGURE 15. CLAMPING INDUCTIVE TURN-OFF TIME (D66DV ONLY)

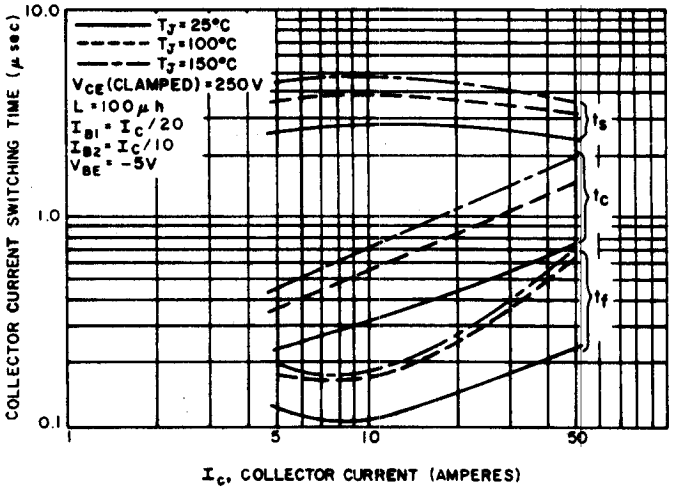


FIGURE 16. CLAMPING INDUCTIVE TURN-OFF TIME (D66EV ONLY)

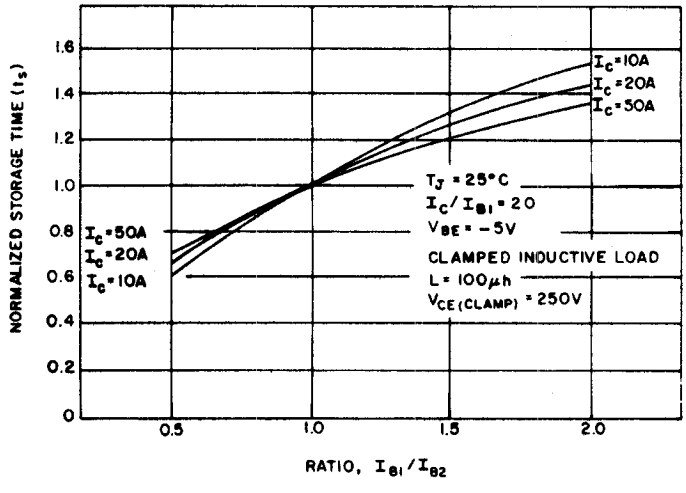


FIGURE 17. STORAGE TIME VARIATION WITH I_{B2} (D66DV ONLY)

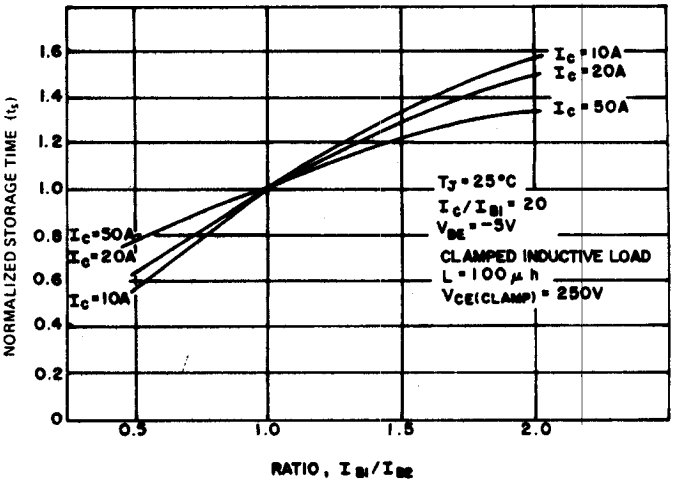


FIGURE 18. STORAGE TIME VARIATION WITH I_{B2} (D66EV ONLY)

TYPICAL CHARACTERISTICS

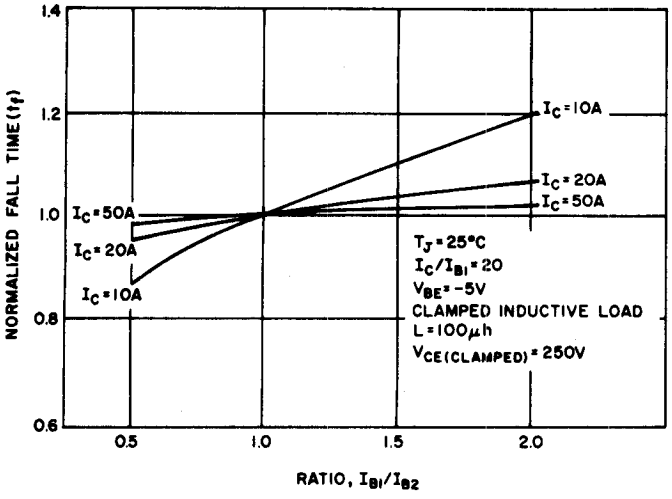


FIGURE 19. FALL TIME VARIATION WITH I_{B2} (D66DV ONLY)

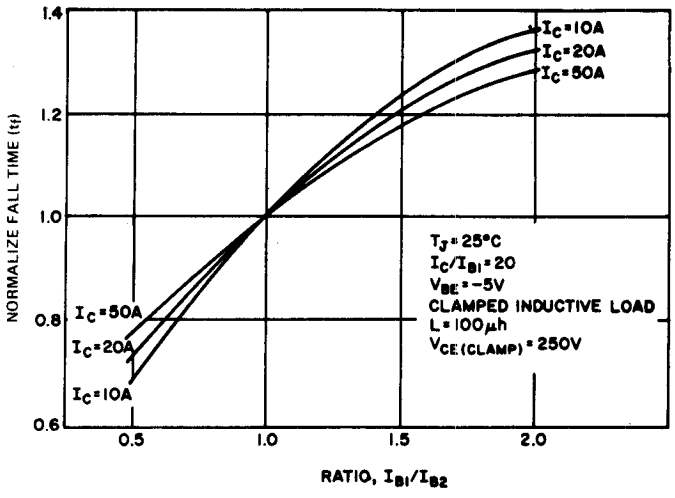


FIGURE 20. FALL TIME VARIATION WITH I_{B2} (D66EV ONLY)

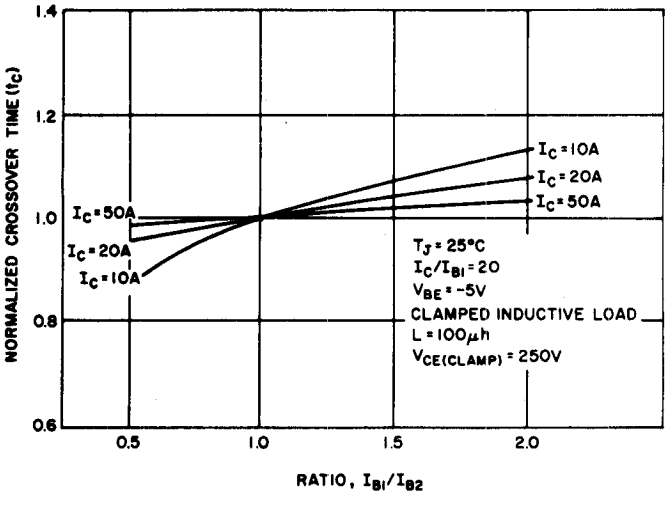


FIGURE 21. CROSSOVER TIME VARIATION WITH I_{B2} (D66DV ONLY)

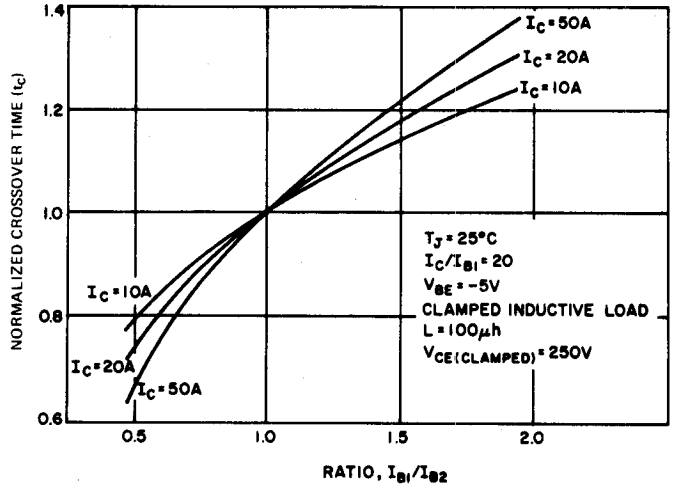


FIGURE 22. CROSSOVER TIME VARIATION WITH I_{B2} (D66EV ONLY)

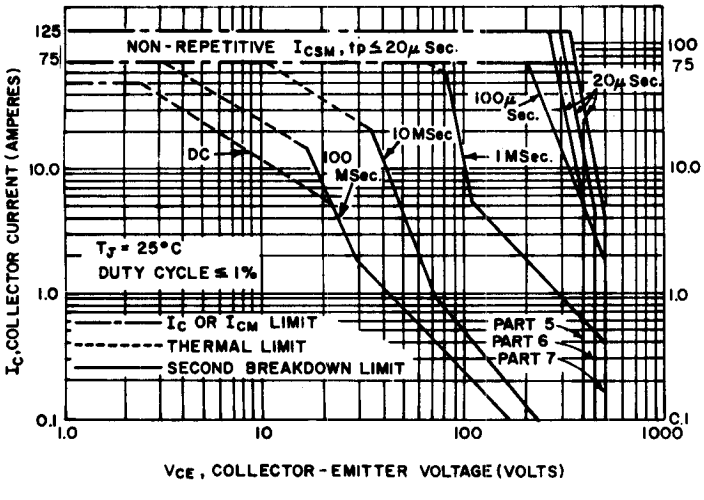


FIGURE 23. FORWARD BIAS SAFE OPERATING AREA

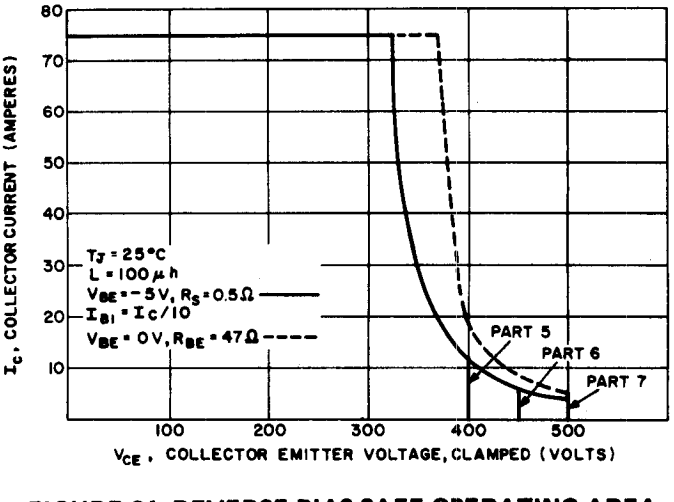


FIGURE 24. REVERSE BIAS SAFE OPERATING AREA (CLAMPED)

TYPICAL CHARACTERISTICS

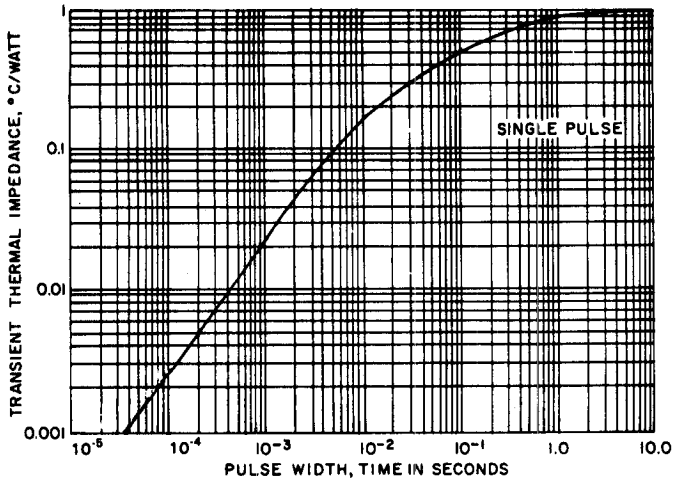


FIGURE 25. TRANSIENT THERMAL RESPONSE

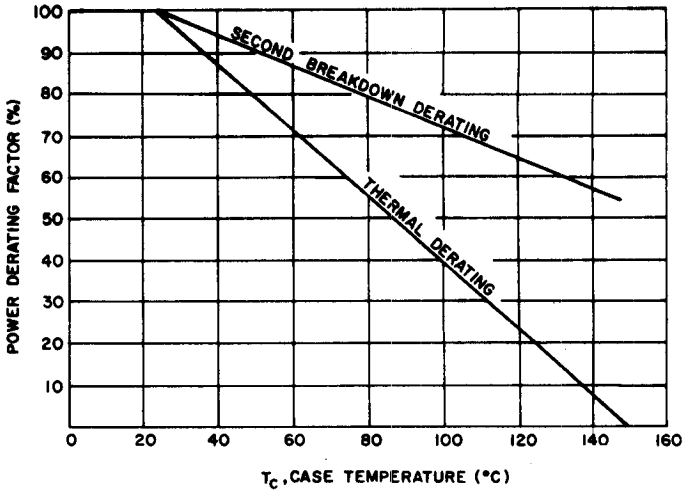


FIGURE 26. POWER DERATING

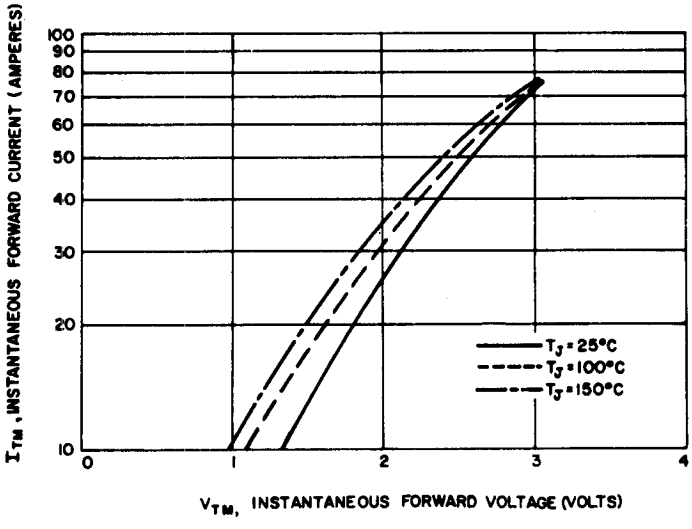


FIGURE 27. DIODE FORWARD CHARACTERISTICS

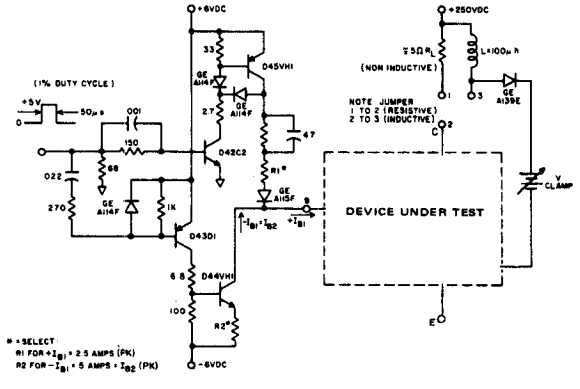


FIGURE 28. SWITCHING TIME TEST CIRCUIT