HIGH SPEED
NPN POWER DARLINGTON TRANSISTORS

D67FP5,6,7

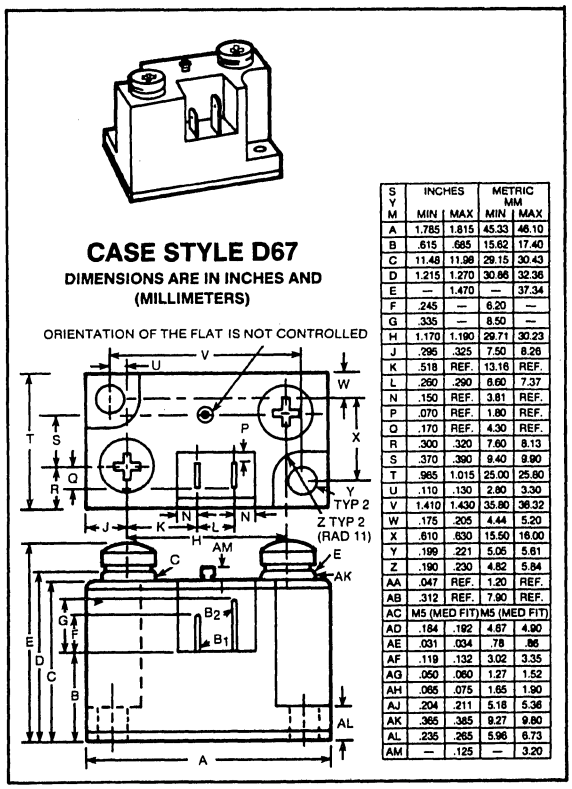
500-700 VOLTS
100 AMP, 312.5 WATTS

The D67FP is a high voltage NPN high current power darlington especially designed for use in PWM applications where fast and efficient switching is required. This device utilizes GE's latest advances in bipolar technology and features the D67 Package offering: collector isolation from heat sink, heft screw terminals for the emitter and collector and quick-connect terminals for Base 1 and Base 2.

The D67FP also features a discrete fast recovery antiparallel high power diode which eliminates the need for an external flyback diode in motor control and other inverter applications such as power supplies and UPS systems.

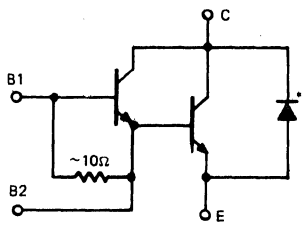
Features:

- Fast switching — $t_{f(TYP)}$ 0.6 μs
- High blocking voltage — V_{CEV} 500 to 700 Volts
- High current — $I_{C(Peak)}$ 150 Amps
- High gain — $h_{FE(MIN)}$ 50 @ 100 Amps
- Discrete high power fast recovery diode
- Both Base 1 and Base 2 connections are available
- UL recognized industrial package



SYM	INCHES MIN	INCHES MAX	METRIC MM MIN	METRIC MM MAX
A	1.785	1.815	45.33	46.10
B	.615	.685	15.62	17.40
C	11.48	11.98	29.15	30.43
D	1.215	1.270	30.86	32.36
E	—	1.470	—	37.34
F	.245	—	6.20	—
G	.335	—	8.50	—
H	1.170	1.190	29.71	30.23
J	.295	.325	7.50	8.26
K	.518	REF.	13.16	REF.
L	.260	.290	6.60	7.37
N	.150	REF.	3.81	REF.
P	.070	REF.	1.80	REF.
Q	.170	REF.	4.30	REF.
R	.300	.320	7.60	8.13
S	.370	.390	9.40	9.90
T	.965	1.015	25.00	25.80
U	.110	.130	2.80	3.30
V	1.410	1.430	35.80	36.32
W	.175	.205	4.44	5.20
X	.610	.630	15.50	16.00
Y	.199	.221	5.06	5.61
Z	.190	.230	4.82	5.84
AA	.047	REF.	1.20	REF.
AB	.312	REF.	7.90	REF.
AC	M5 (MED FIT)	M5 (MED FIT)		
AD	.184	.192	4.67	4.90
AE	.031	.034	.78	.86
AF	.119	.132	3.02	3.35
AG	.060	.080	1.27	1.52
AH	.065	.075	1.65	1.90
AJ	.204	.211	5.18	5.36
AK	.365	.385	9.27	9.80
AL	.235	.265	5.96	6.73
AM	—	.125	—	3.20

DEVICE CIRCUIT



*NOTE: The collector-emitter diode is a discrete fast-recovery high power diode.

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

RATING	SYMBOL	D67FP5	D67FP6	D67FP7	UNITS
Collector-Emitter Voltage	V_{CEV}	500	600	700	Volts
Collector-Emitter Voltage	V_{CER}	400	450	500	Volts
Emitter Base Voltage	V_{EBO}	7	7	7	Volts
Collector Current — Continuous Peak (Repetitive) Peak (Non-Repetitive)	I_C I_{CM} I_{CSM}	100 150 250	100 150 250	100 150 250	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 Derate above 25° C	P_D	312.5 2.5	312.5 2.5	312.5 2.5	Watts W/° C
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, (transistor) (diode)	$R_{\theta JC}$	.40 1.5	.40 1.5	.40 1.5	°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 (I_C = 1.0A, R_{BE} = 10Ω)	D67FP5	$V_{CEO(sus)}$	400	—	—	Volts
	D67FP6		450	—	—	
	D67FP7		500	—	—	
Collector Cutoff Current (V_{CE} = Rated V_{CEV}, $V_{BE(off)}$ = 1.5V)	T_J = 25°C	I_{CEV}	—	—	1.0	mA
	T_J = 150°C		—	—	2.5	
Emitter Cutoff Current (V_{EB} = 5V, I_C = 0)		I_{EBO}	—	—	10	mA
second breakdown						
Second Breakdown with Base Forward Biased		FBSOA	SEE FIGURE 5			
on characteristics						
DC Current Gain		h_{FE}				
(I_C = 150A, V_{CE} = 5V)			25	150	—	—
(I_C = 100A, V_{CE} = 5V)			50	300	—	
(I_C = 40A, V_{CE} = 5V)			100	350	—	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$				
(I_C = 150A, I_B = 10A)			—	1.9	3.0	V
(I_C = 100A, I_B = 8A)			—	1.3	2.0	
(I_C = 40A, I_B = 4A)			—	0.8	1.5	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$				
(I_C = 150A, I_B = 10A)			—	2.75	3.5	V
(I_C = 100A, I_B = 8A)			—	2.3	3.0	
switching characteristics						
Resistive Load						
Delay Time	V_{CE} = 250V	t_d	—	0.1	0.5	μs
Rise Time	I_C = 100A	t_r	—	0.45	1.0	
Storage Time	I_{B1} = 5A, $-I_{B2}$ = 10A	t_s	—	3.2	5.0	
Fall Time	t_p = 50 μsec	t_f	—	1.0	3.0	
e-c diode characteristics						
Forward Voltage	(I_F = 100A)					
@ T_J = 25°C		V_P	—	1.3	2.0	Volts
@ T_J = 150°C		V_P	—	1.3	2.5	Volts
Reverse Recovery Time (I_F = 100A, $di/_{dt}$ = 100A/μsec, $V_{BE(off)}$ = 1.5V)		T_{rr}	—	0.5	1.0	μsec

TYPICAL CHARACTERISTICS

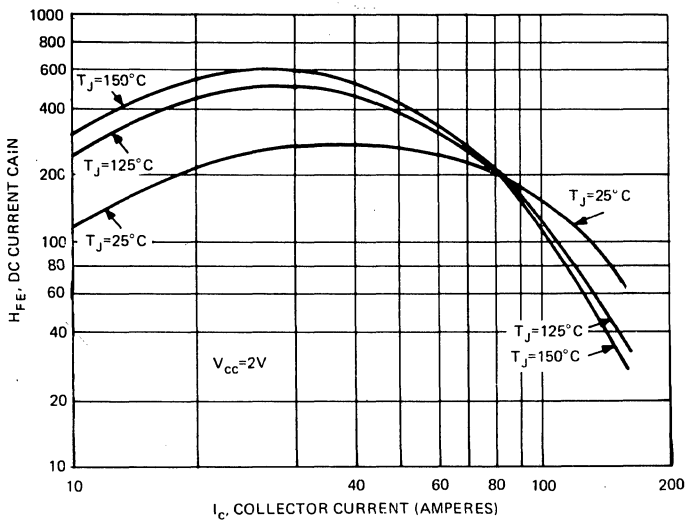


FIGURE 1. DC CURRENT GAIN (V_{CE} = 2V), TYPICAL

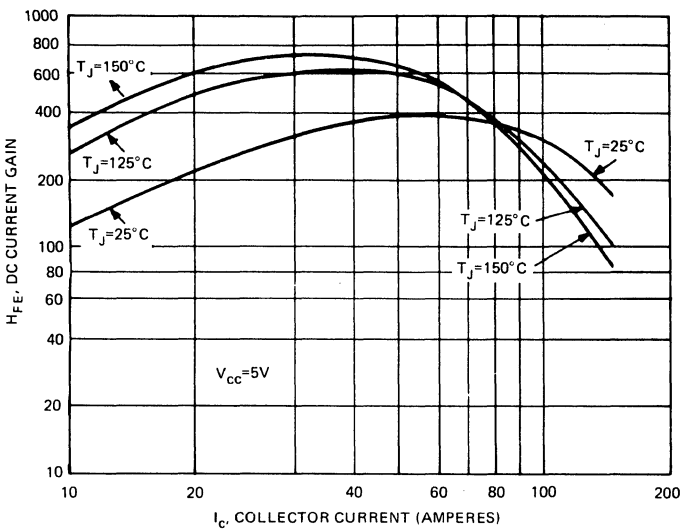


FIGURE 2. DC CURRENT GAIN (V_{CE} = 5V), TYPICAL

TYPICAL CHARACTERISTICS

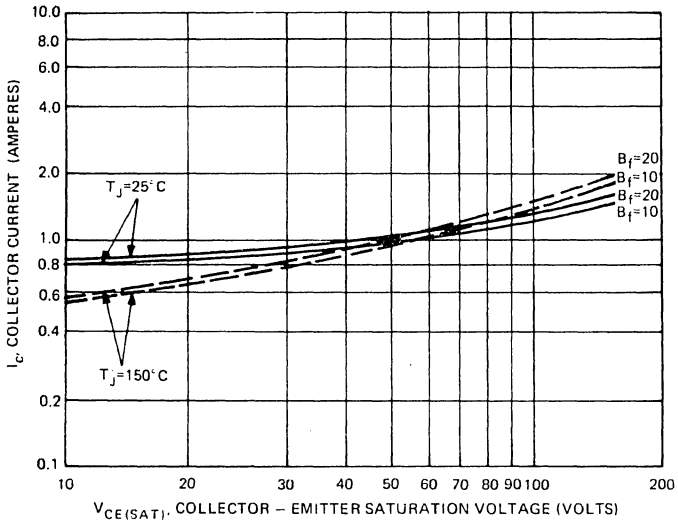


FIGURE 3. $V_{CE(SAT)}$ vs. I_C, TYPICAL

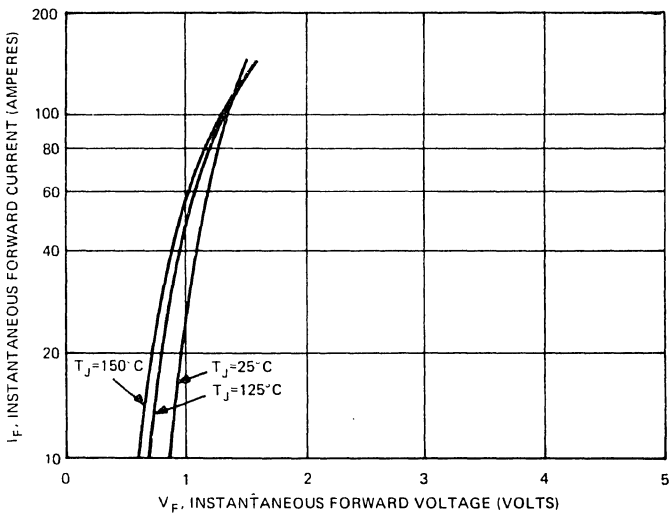


FIGURE 4. DIODE FORWARD CHARACTERISTICS

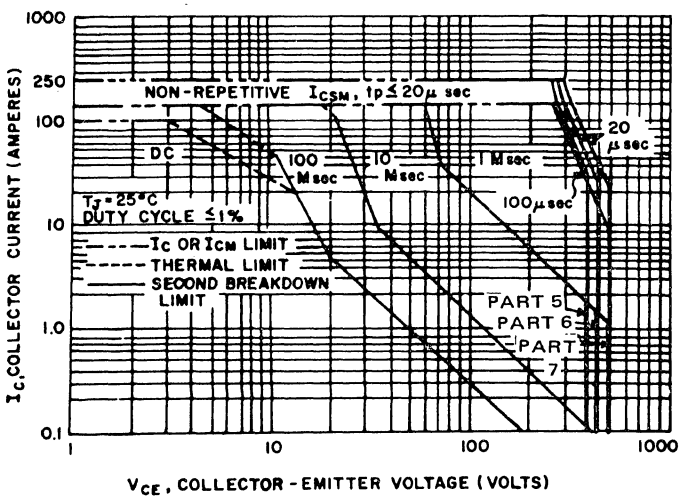


FIGURE 5. FORWARD BIAS SAFE OPERATING AREA

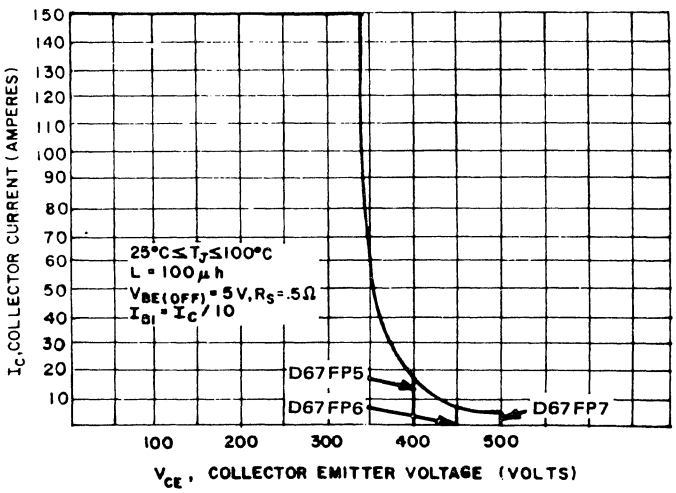
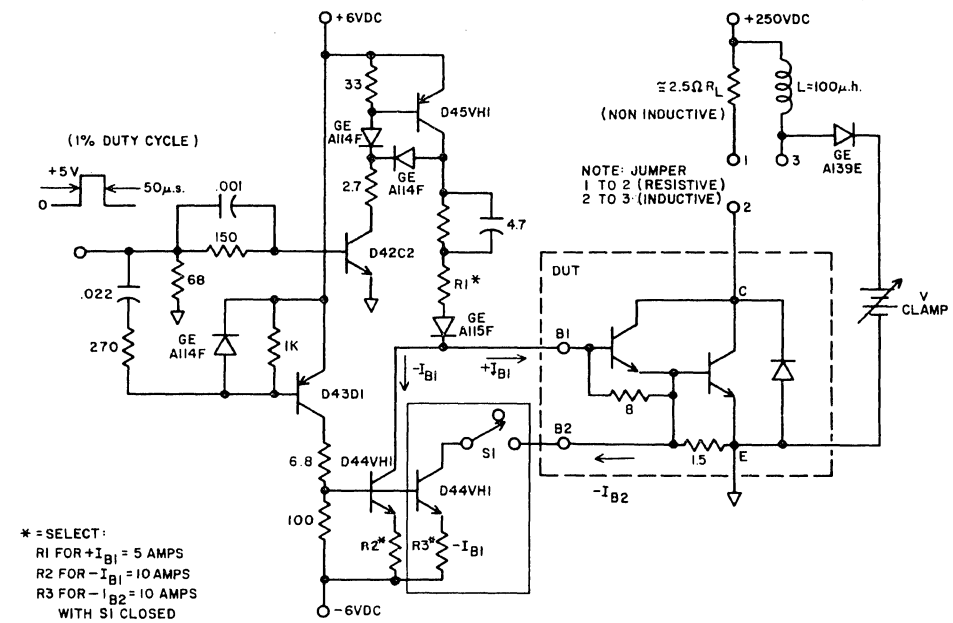


FIGURE 6. REVERSE BIAS SAFE OPERATING AREA (CLAMPED)



NOTE: UTILIZING SECOND BASE CONNECTION DURING TURN-OFF (SI CLOSED), TYPICAL REDUCTIONS IN TURN-OFF TIMES (t_s, t_f, t_c) RANGE FROM 2:1 TO 10:1. REDUCTION IS PROPORTIONAL TO $-I_{B2}$.

FIGURE 7. SWITCHING TIME TEST CIRCUIT