



# HIGH VOLTAGE NPN POWER DARLINGTON TRANSISTORS

**D66DW1,2,3  
D66EW1,2,3**

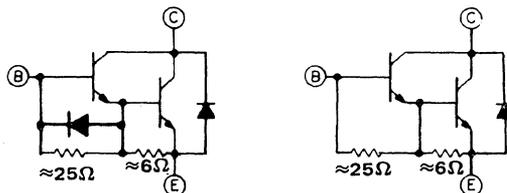
**V<sub>CEV</sub> = 600-700 VOLTS  
V<sub>CEV</sub> = 800-900 VOLTS  
50 AMP, 167 WATTS**

The D66DW/EW is a high voltage NPN high current power Darlington especially designed for applications requiring high blocking voltage capability such as: 460VAC line motor controls, power supplies and UPS systems as well as European 380 VAC line operated systems. This device utilizes GE's latest advances in bipolar technology and features the D66 package offering: collector isolation from heat sink, TO-3 mounting compatibility and quick-connect terminals.

The D66DW/EW also features a discrete fast recovery anti-parallel high power diode which eliminates the need for an external flyback diode in most inverter applications.

### Features:

- Very high blocking voltage — V<sub>CEV</sub> 800 to 900 Volts
- High current — I<sub>C(Peak)</sub> 75 Amps
- Discrete high power flyback diode
- UL recognized industrial package
- Two versions — with or without speedup diode

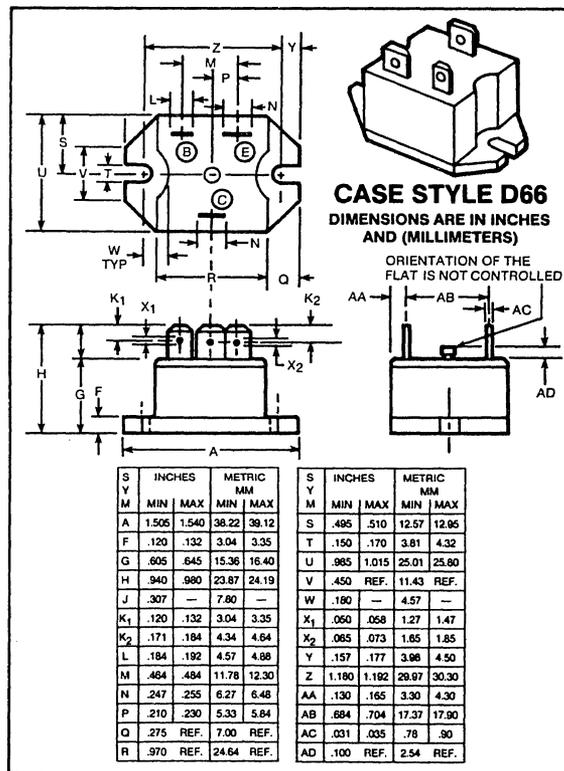


D66EW

D66DW

The collector-emitter diode is a discrete high power diode.

### DEVICE CIRCUIT



maximum ratings (T<sub>C</sub> = 25° C) (unless otherwise noted)

RATING	SYMBOL	D66DW1/EW1	D66DW2/EW2	D66DW3/EW3	UNITS
Collector-Emitter Voltage	V <sub>CEV</sub>	800	850	900	Volts
Collector-Emitter Voltage	V <sub>CER</sub>	600	650	700	Volts
Emitter Base Voltage	V <sub>EBO</sub>	8	8	8	Volts
		5	5	5	
Collector Current — Continuous	I <sub>C</sub>	50	50	50	A
Peak (Repetitive)	I <sub>CM</sub>	75	75	75	
Peak (Non-Repetitive)	I <sub>CSM</sub>	125	125	125	
Base Current — Continuous	I <sub>B</sub>	10	10	10	A
Peak (Non-Repetitive)	I <sub>BM</sub>	20	20	20	
Total Power Dissipation @ T <sub>C</sub> = 25° C	P <sub>D</sub>	167	167	167	Watts
Derate above 25° C		1.33	1.33	1.33	W/°C
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-40 to +150	-40 to +150	-40 to +150	°C
Isolation Voltage	V <sub>ISOL</sub>	2500	2500	2500	V <sub>(rms)</sub>

### thermal characteristics

Thermal Resistance, (transistor) (diode)	R <sub>θJC</sub>	.75 4	.75 4	.75 4	°C/W
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See page 845 for mounting and handling considerations.

electrical characteristics ( $T_C = 25^\circ C$ ) (unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
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off characteristics

Collector-Emitter Sustaining Voltage ( $I_C = 5A$ , $V_{clamp} = V_{CE}$ (Rated), $R_{BE} = 10\Omega$ )	D66DW1/EW1 D66DW2/EW2 D66DW3/EW3	$V_{CER(sus)}$	600 650 700	— — —	— — —	Volts
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CEV}$ , $V_{BE(off)} = 1.5V$ )	$T_J = 25^\circ C$ $T_J = 150^\circ C$	$I_{CEV}$	— —	— —	1.0 2.5	mA
Emitter Cutoff Current ( $V_{EB} = 4.5V$ , $I_C = 0$ ) ( $V_{EB} = 1.5V$ , $I_C = 0$ )	D66DW D66EW	$I_{EBO}$	—	—	350	mA

second breakdown

Second Breakdown with Base Forward Biased	FBSOA	SEE FIGURE 3
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on characteristics

DC Current Gain ( $I_C = 50A$ , $V_{CE} = 5V$ ) ( $I_C = 75A$ , $V_{CE} = 10V$ )	$h_{FE}$	25 15	— —	— —	—
Collector-Emitter Saturation Voltage ( $I_C = 50A$ , $I_B = 4A$ ) ( $I_C = 20A$ , $I_B = 2A$ )	$V_{CE(sat)}$	— —	— —	2.5 2.0	V
Base-Emitter Saturation Voltage ( $I_C = 50A$ , $I_B = 4A$ ) ( $I_C = 20A$ , $I_B = 2A$ )	$V_{BE(sat)}$	— —	— —	3.5 3.0	V

switching characteristics

Resistive Load			TYP.		MAX.			
			DW	EW	DW	EW		
Delay Time	$V_{CE} = 500V$ $I_C = 50A$ $I_{B1} = 4A$ , $I_{B2} = 6A$ $t_p = 50 \mu\text{sec}$	$t_d$	—	—	0.75	0.5	.5	$\mu\text{s}$
Rise Time		$t_r$	—	—	.3	1.0	1	
Storage Time		$t_s$	—	—	5	10	15	
Fall Time		$t_f$	—	—	1	2	4	

emitter-collector diode characteristics

Forward Voltage	( $I_F = 25A$ ) ( $I_F = 50A$ )	$V_F$ $V_F$	— —	— —	2.0 2.5	Volts Volts
Reverse Recovery Time ( $I_F = 50A$ , $di/dt = 25A/\mu\text{sec}$ , $R_{B1E} = .25\Omega$ )		$T_{rr}$	—	2.0	—	$\mu\text{sec}$

TYPICAL CHARACTERISTICS

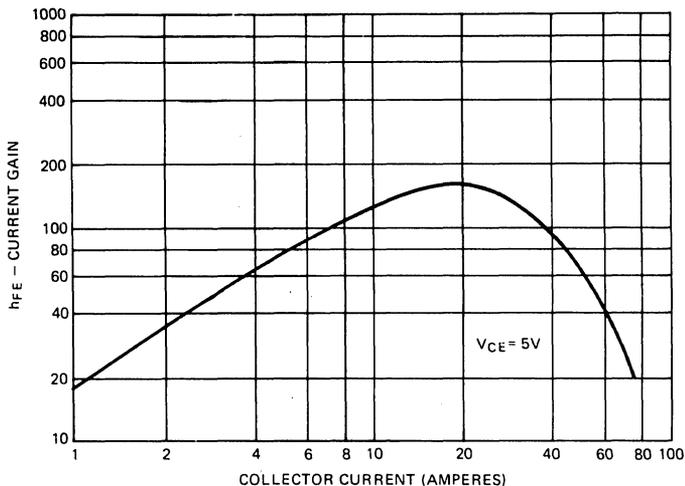


FIGURE 1. TYPICAL CURRENT GAIN

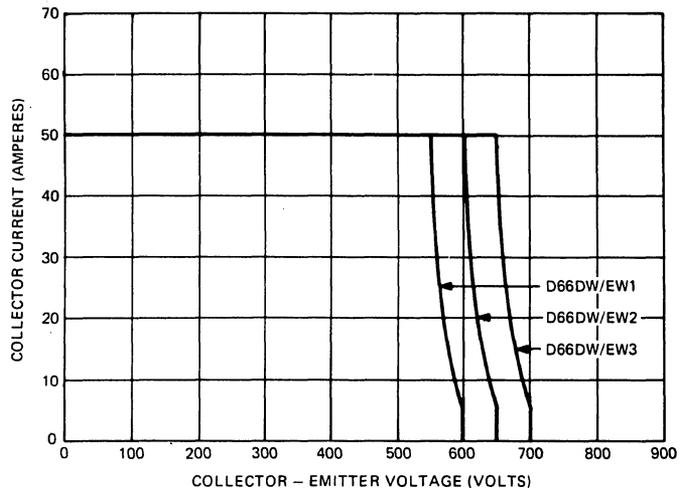


FIGURE 2. REVERSE BIAS SAFE OPERATING AREA (CLAMPED)

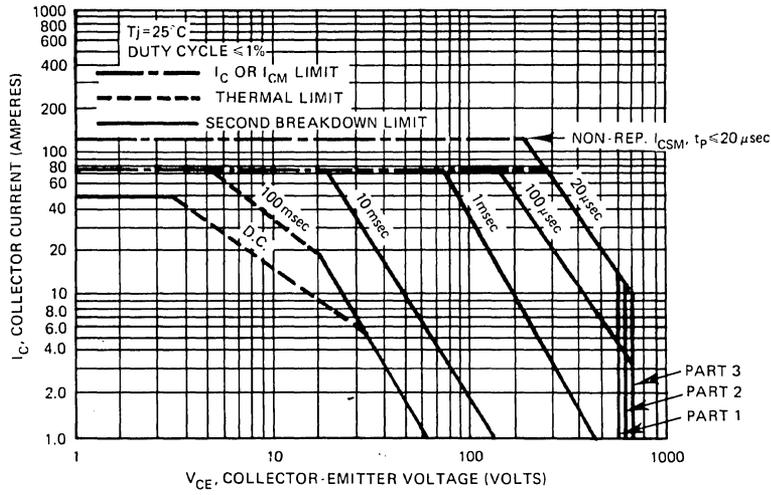


FIGURE 3. FORWARD BIAS SAFE OPERATING AREA

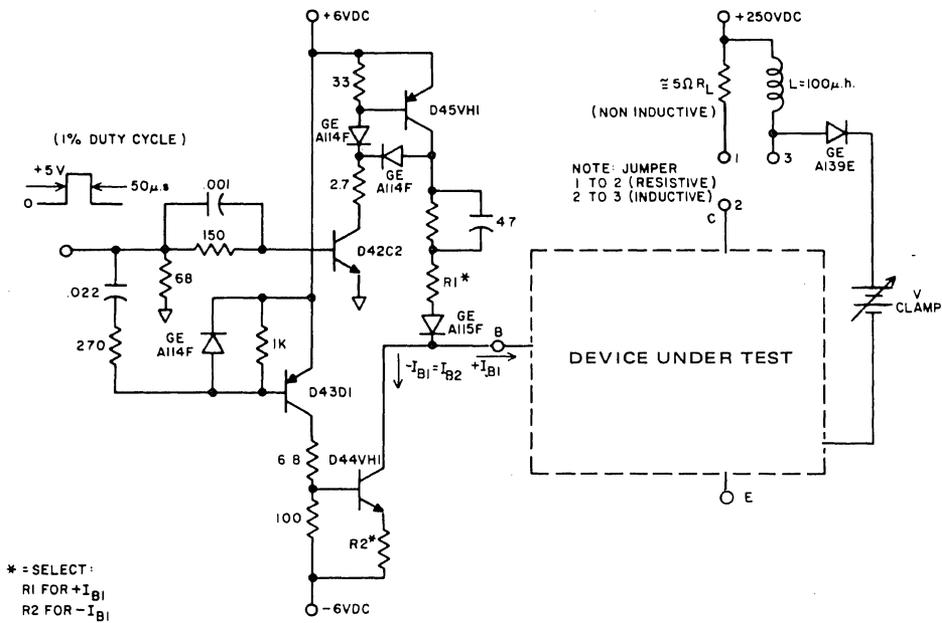


FIG. 4 SWITCHING TIME TEST CIRCUIT