NPN POWER TRANSISTORS

COMPLEMENTARY TO THE D43C SERIES

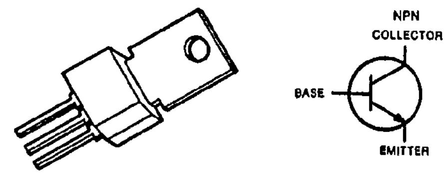
D42C Series

30-80 VOLTS
3 AMP, 12.5 WATTS

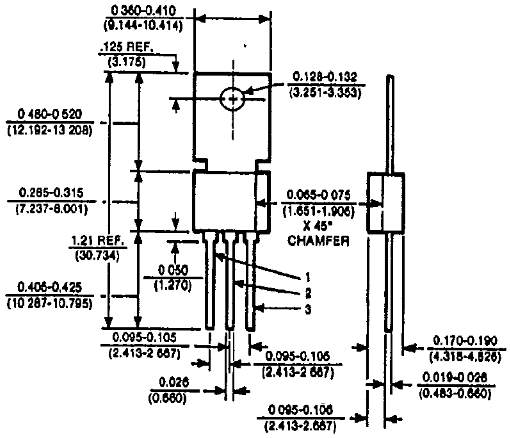
The General Electric D42C is a power transistor designed for various specific and general purpose applications, such as: output and driver stages of amplifiers operating at frequencies from DC to greater than 1.0 MHz; series, shunt and switching regulators; low and high frequency inverters/converters; and many others.

Features:

- High free-air power dissipation
- NPN complement to D43C PNP
- Low collector saturation voltage (0.5V typ. @ 3.0A I_C)
- Excellent linearity
- Fast Switching



CASE STYLE TO-202
DIMENSIONS ARE IN INCHES AND (MILLIMETERS)



TYPE	TERM. 1	TERM. 2	TERM. 3	TAB
TO-202	EMITTER	COLLECTOR	BASE	COLLECTOR

maximum ratings (T_A = 25° C) (unless otherwise specified)

RATING	SYMBOL	D42C1, 2, 3	D42C4, 5, 6	D42C7, 8, 9	D42C10, 11, 12	UNITS
Collector-Emitter Voltage	V_{CEO}	30	45	60	80	Volts
Collector-Emitter Voltage	V_{CES}	40	55	70	90	Volts
Emitter Base Voltage	V_{EBO}	5	5	5	5	Volts
Collector Current — Continuous Peak(1)	I_C I_{CM}	3 5	3 5	3. 5	3 5	A
Base Current — Continuous	I_B	2	2	2	2	A
Total Power Dissipation @ T_A = 25°C @ T_C = 25°C	P_D	2.1 12.5	2.1 12.5	2.1 12.5	2.1 12.5	Watts
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	-55 to +150	-55 to +150	-55 to +150	°C

thermal characteristics

Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	60	60	60	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	10	10	10	10	°C/W
Maximum Lead Temperature for Soldering Purposes: ⅛" from Case for 5 Seconds	T_L	+260	+260	+260	+260	°C

(1) Pulse Test Pulse Width = 300ms Duty Cycle ≤ 2%.

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

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT

off characteristics[1]

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
Collector-Emitter Sustaining Voltage (I_C = 100mA)	D42C1, 2, 3	$V_{CEO(sus)}$	30	—	—	Volts
	D42C4, 5, 6		45	—	—	
	D42C7, 8, 9		60	—	—	
	D42C10, 11, 12		80	—	—	
Collector Cutoff Current (V_{CE} = Rated V_{CES})		I_{CES}	—	—	10	μA
Emitter Cutoff Current (V_{EB} = 5V)		I_{EBO}	—	—	100	μA

second breakdown

CHARACTERISTIC	SYMBOL	
Second Breakdown with Base Forward Biased	FBSOA	SEE FIGURES 3 & 4

on characteristics[1]

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
DC Current Gain (I_C = 200mA, V_{CE} = 1V)	D42C1, 4, 7, 10	h_{FE}	25	—	—	—
	D42C2, 5, 8, 11		100	—	220	
	D42C3, 6, 9, 12		40	—	120	
(I_C = 1A, V_{CE} = 1V)	D42C1, 4, 7, 10	h_{FE}	10	—	—	—
(I_C = 2A, V_{CE} = 1V)	D42C2, 5, 8, 11		20	—	—	
	D42C3, 6, 9, 12		20	—	—	
Collector-Emitter Saturation Voltage (I_C = 1A, I_B = 50mA)	D42C2, 5, 8, 11	$V_{CE(sat)}$	—	—	0.5	Volts
	D42C3, 6, 9, 12		—	—	0.5	
(I_C = 1A, I_B = 100mA)	D42C1, 4, 7, 10	$V_{CE(sat)}$	—	—	0.5	Volts
Base-Emitter Saturation Voltage (I_C = 1A, I_B = 100mA)		$V_{BE(sat)}$	—	—	1.3	Volts

dynamic characteristics

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
Collector Capacitance (V_{CB} = 10V, f = 1MHz)	C_{CBO}	—	—	100	pF
Current-Gain — Bandwidth Product (I_C = 20mA, V_{CE} = 4V)	f_T	—	50	—	MHz

switching characteristics

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
Resistive Load						
Delay Time + Rise Time	I_C = 1A, I_{B1} = I_{B2} = 0.1A,	$t_d + t_r$	—	100	—	nS
Storage Time	V_{CC} = 30V, t_p = 25 μsec	t_s	—	500	—	
Fall Time		t_f	—	75	—	

(1) Pulse Test PW = 300ms Duty Cycle ≤ 2%.

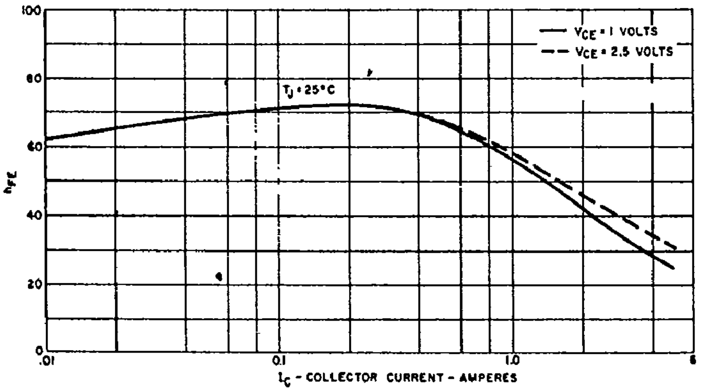


FIG. 1 TYPICAL h_{FE} VS. I_C

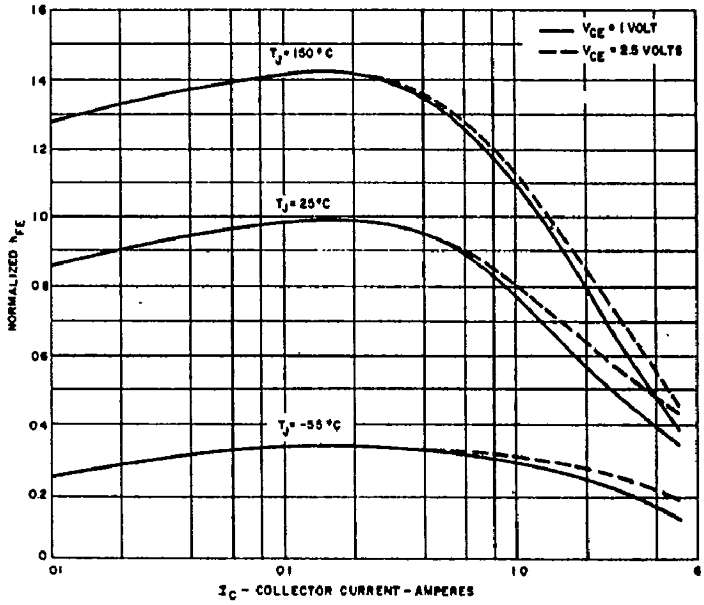


FIG. 2 TYPICAL NORMALIZED h_{FE} VS. I_C

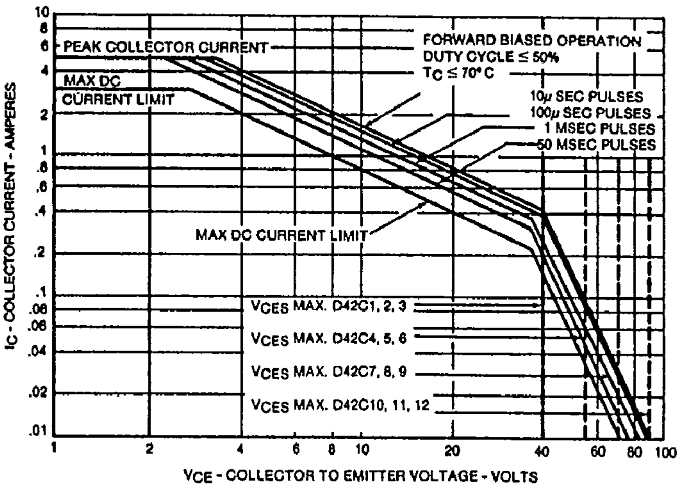


FIG. 3 SAFE REGION OF OPERATION

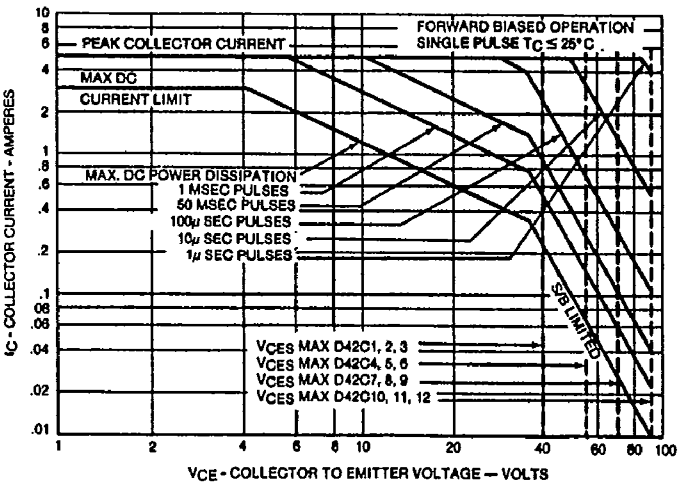


FIG. 4 SAFE REGION OF OPERATION

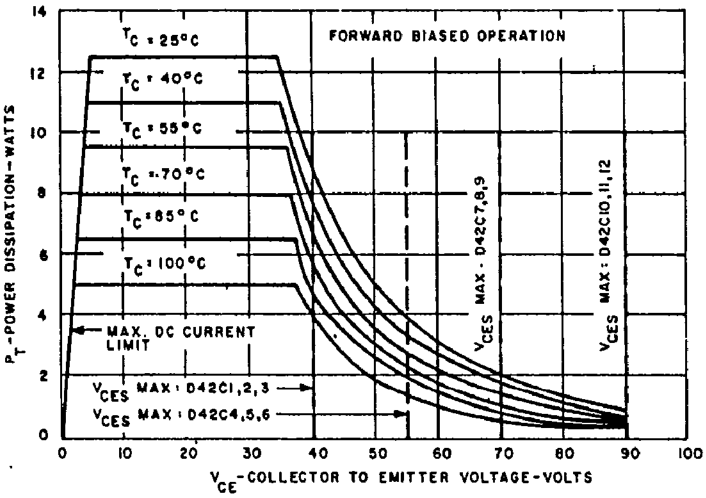


FIG. 5 MAXIMUM PERMISSIBLE DC POWER DISSIPATION

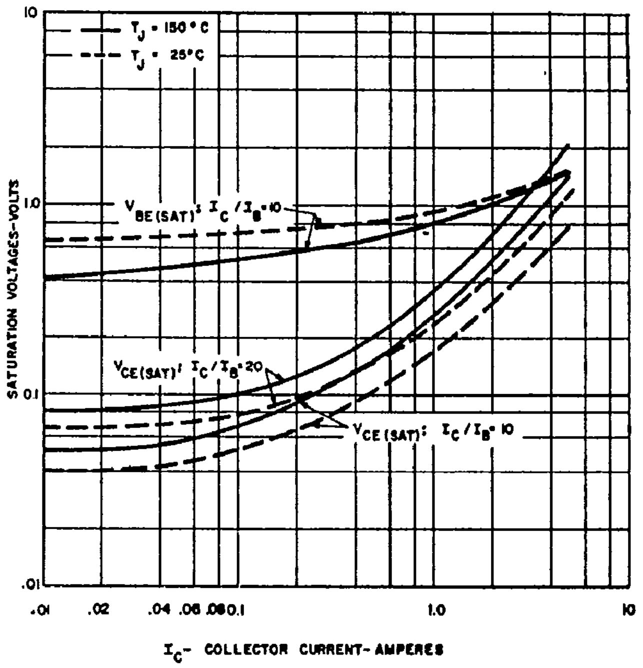


FIG. 6 TYPICAL SATURATION VOLTAGE CHARACTERISTICS

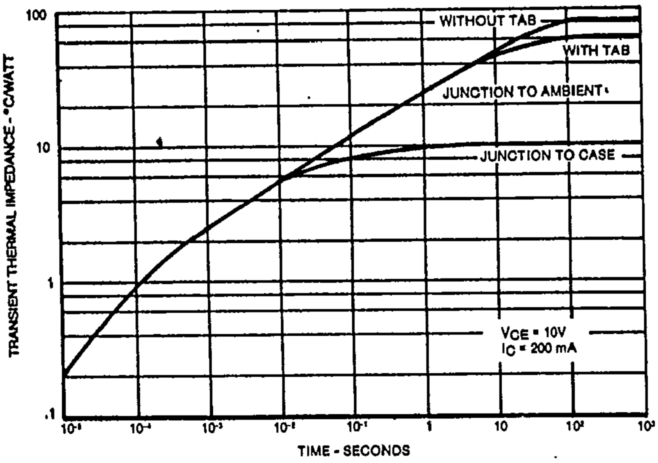


FIG. 7 MAXIMUM TRANSIENT THERMAL IMPEDANCE

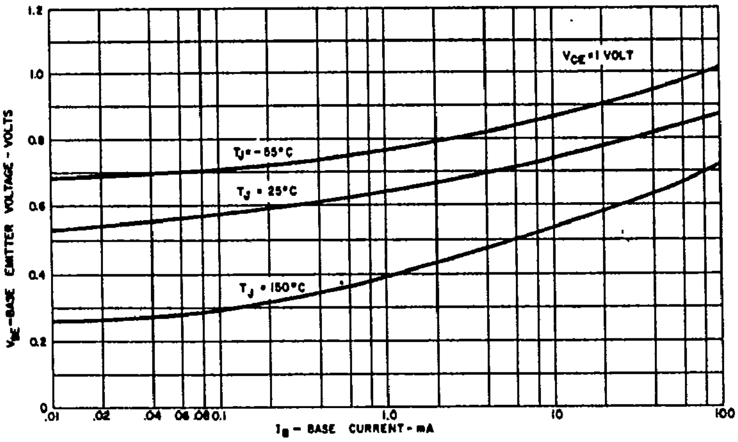


FIG. 8 TYPICAL INPUT CHARACTERISTICS

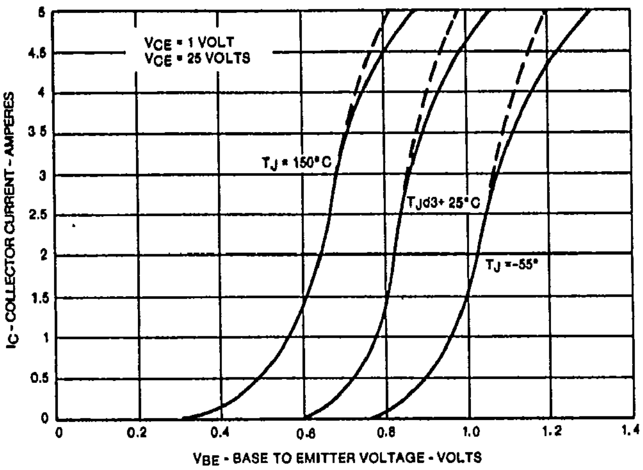


FIG. 9

TYPICAL TRANSCONDUCTANCE CHARACTERISTICS

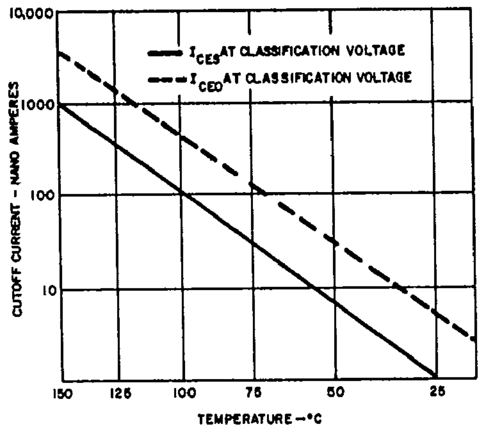


FIG. 10

TYPICAL I_{CEO}, I_{CES} VS. TEMPERATURE