

V.H.F. POWER TRANSISTORS

Silicon planar n-p-n high frequency medium power transistors primarily intended for class-B operation in v.h.f. amplifiers. The collector is electrically connected to the case.

QUICK REFERENCE DATA

	BLY33	BLY34	
Collector-emitter voltage (peak r.f. ≥ 1 MHz); $V_{BE} = 0$ open base	V_{CESM} max. 66	40	V
	V_{CEO} max. 33	20	V
Collector current (peak r.f. ≥ 1 MHz)	I_{CM} max. 1,5	1,5	A
Total power dissipation up to $T_{case} = 100$ °C	P_{tot} max. 2,0	2,0	W
Junction temperature	T_j max. 150	150	°C
Transition frequency at $f = 100$ MHz	$f_T >$ 250	250	MHz

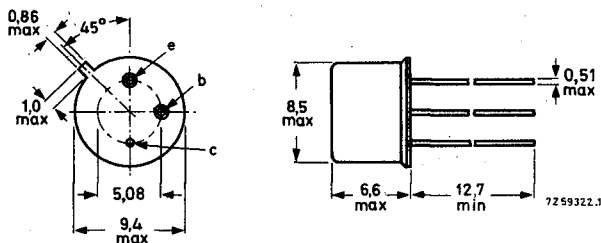
R.F. performance in a 175 MHz common-emitter amplifier

type number	mode of operation	V_{CC} V	P_o W	G_p dB	η %
BLY33	a.m.	13,8	2,0	typ. 8,0	typ. 80
BLY34	f.m.	13,8	3,0	typ. 8,0	typ. 80

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-39; collector connected to case.



Maximum lead diameter is guaranteed only for 12,7 mm.

Accessories: 56245 (distance disc).

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

		BLY33	BLY34	
Collector-emitter voltage (peak r.f. ≥ 1 MHz); $V_{BE} = 0$ open base	V_{CESM}	max. 66	40	V
	V_{CEO}	max. 33	20	V
Emitter-base voltage (open collector)	V_{EBO}	max. 4,0		V
Collector current d.c. (peak value); $f < 1$ MHz (peak value); $f \geq 1$ MHz	I_C	max. 0,5		A
	I_{CM}	max. 0,5		A
	I_{CM}	max. 1,5		A
Total power dissipation (see also Figs 4, 5 and 6) $f < 1$ MHz; $T_{case} = 25$ °C $f \geq 1$ MHz; $T_{case} = 25$ °C	P_{tot}	max. 4,0		W
	P_{tot}	max. 5,0		W
Storage temperature	T_{stg}	-65 to +150		°C
Junction temperature continuous operation intermittent operation, total duration 200 hours	T_j	max. 150		°C
	T_j	max. 200		°C

THERMAL RESISTANCE

From junction to case	$R_{th\ j-c}$	=	25	K/W*
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CHARACTERISTICS

$T_j = 25$ °C unless otherwise specified

Collector cut-off current

$V_{BE} = 0$; $V_{CE} = V_{CEOmax}$	I_{CES}	typ. 0,02 < 0,5	mA
$V_{BE} = 0$; $V_{CE} = V_{CESMmax}$	I_{CES}	typ. 0,10 < 5,0	mA

Emitter cut-off current

$I_C = 0$; $V_{EB} = 4,0$ V	I_{EBO}	typ. 0,2 < 0,5	μ A mA
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D.C. current gain

$I_C = 0,2$ A; $V_{CE} = 5,0$ V	h_{FE}	> 10 typ. 60	
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Transition frequency at $f = 100$ MHz

$I_C = 0,2$ A; $V_{CE} = 5,0$ V; $T_{amb} = 25$ °C	f_T	> 250 typ. 450	MHz MHz
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Collector capacitance at $f = 0,5$ MHz

$I_E = I_e = 0$; $V_{CB} = 10$ V	C_c	typ. 11 < 15	pF pF
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Emitter capacitance at $f = 0,5$ MHz

$I_C = I_c = 0$; $V_{EB} = 0$	C_e	typ. 65 45 to 90	pF pF
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* K/W is SI unit for °C/W.

RECOMMENDED OPERATING CONDITIONS

As a medium power amplifier for the output stage of a small transmitter, or as a driver for larger output stages.

$f = 175 \text{ MHz}$

	mode of operation	BLY33		BLY34		
		a.m.	f.m.	f.m.		
Supply voltage	V_{CC}	nom.	13,8	28	13,8	V
		<	16,5	32	16,5	V
Base bias voltage	V_B		0	0	0	V
Output power	P_O		2,0	3,0	3,0	W
Input power	P_i	typ.	0,32	0,28	0,5	W
		<	0,40	0,40	0,6	W
Supply current	I_{CC}	typ.	180	160	270	mA
Efficiency	η	typ.	80	65	80	%

Notes

1. For a.m. telephony, collector modulation of the output and driver stages is recommended.
2. A heatsink of thermal resistance 20 K/W is recommended for operation in ambient temperatures up to 65 °C. At temperatures > 65 °C, derating is necessary.
3. Under the recommended a.m. operating condition and without modulation, the transistor can withstand any load mismatch. With modulation applied, operation into an extreme mismatch may adversely affect the life of the transistor and care should be exercised to keep the device within its ratings.

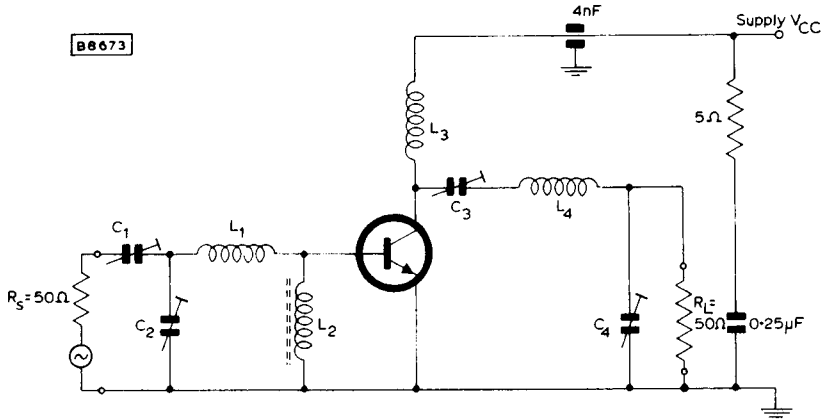


Fig. 2 Basic v.h.f. amplifier circuit.

Component values for 175 MHz amplifier circuit:

C₁ to C₄ = 30 pF concentric trimmer capacitors

L₁ = 1" of straight 18 s.w.g.

L₂ = 3 turns of 24 s.w.g. on ferrite FX1115

L₃ = 5 turns of 18 s.w.g.; internal diameter 3/8"; length 3/8"

L₄ = 3 turns of 18 s.w.g.; internal diameter 3/8"; length 3/8"

Note

To obtain optimum gain performance the emitter lead length should not exceed 1,6 mm.

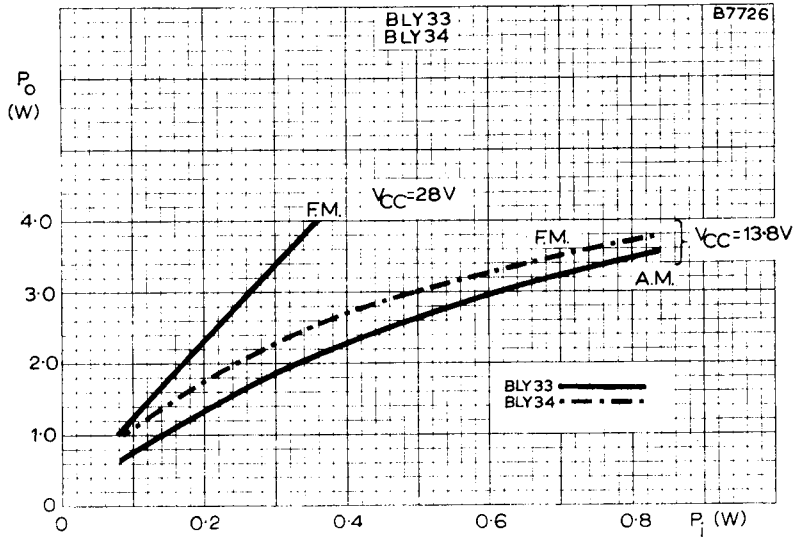


Fig. 3 Typical variation of output power with input power for v.h.f. amplifier (see recommended operating conditions on page 3).

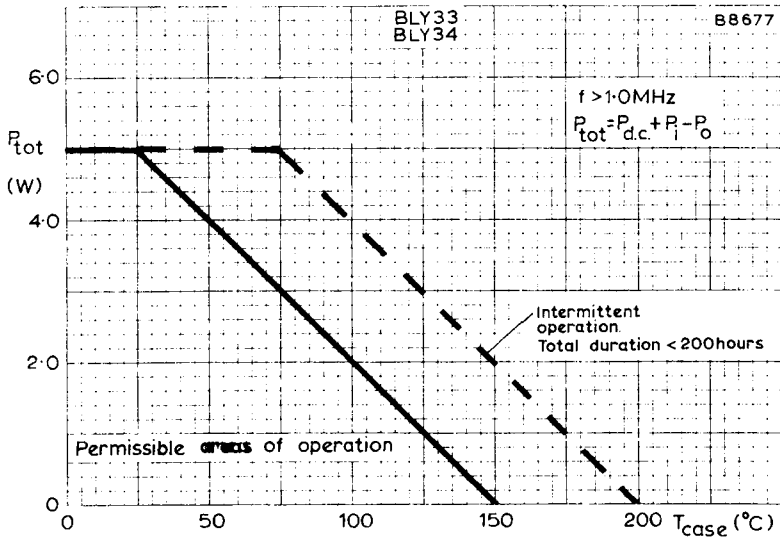


Fig. 4 Maximum permissible power dissipation plotted against case temperature for frequencies > 1,0 MHz.

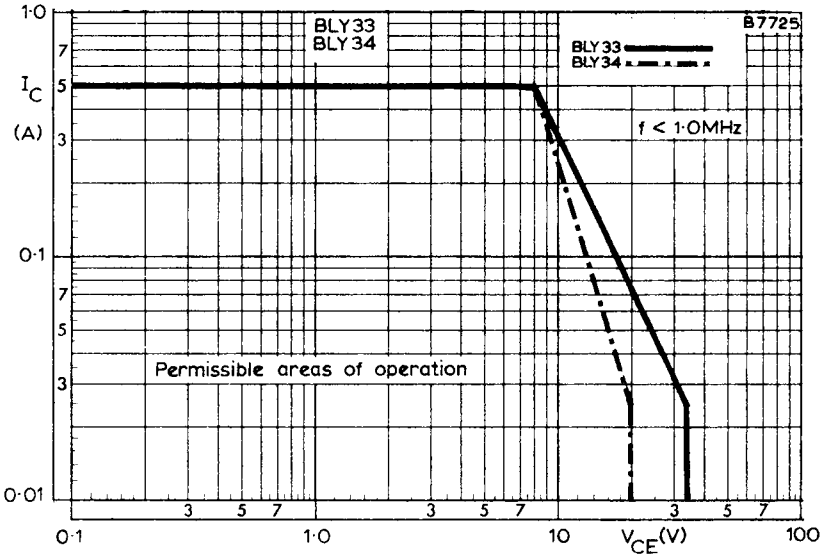


Fig. 5 Permissible areas of operation for frequencies $< 1.0\text{ MHz}$.

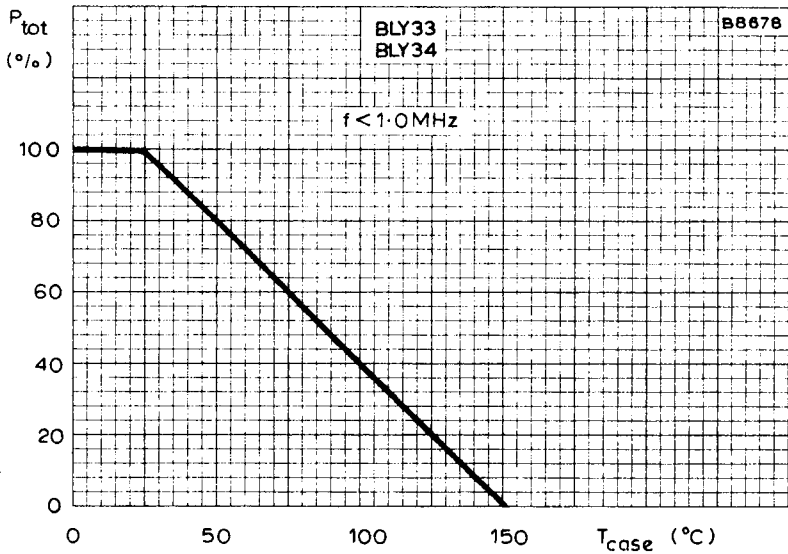


Fig. 6 Percentage power derating plotted against case temperature for frequencies $< 1.0\text{ MHz}$.