FEATURES

- 26 V nominal supply voltage
- 23 W output power into a load of 50 Ω with an RF drive power of 36 mW.

APPLICATIONS

- Base station transmitting equipment operating in the 920 to 960 MHz frequency range.

DESCRIPTION

The BGY925/5 is a three-stage UHF amplifier module in a SOT365A package. The module consists of one NPN silicon planar transistor die and two silicon MOSFET dies mounted together with matching and bias circuitry on a metallized ceramic AlN substrate.

PINNING - SOT365A

PIN	DESCRIPTION
1	RF input
2	V_{S1}
3	V_{S2}
4	RF output
Flange	ground

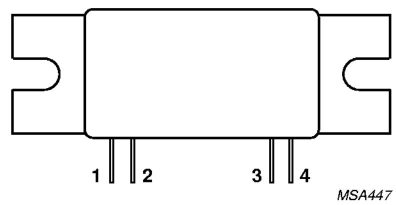


Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_{mb} = 25 °C, 100 % tested during manufacture.

MODE OF OPERATION	f (MHz)	V_{S1} (V)	V_{S2} (V)	P_L (W)	G_p (dB)	η (%) (note 1)	Z_S, Z_L (Ω)
CW	920 to 960	5	26	23	≥28	≥30	50

Note

1. At P_L = 16 W.

LIMITING VALUES

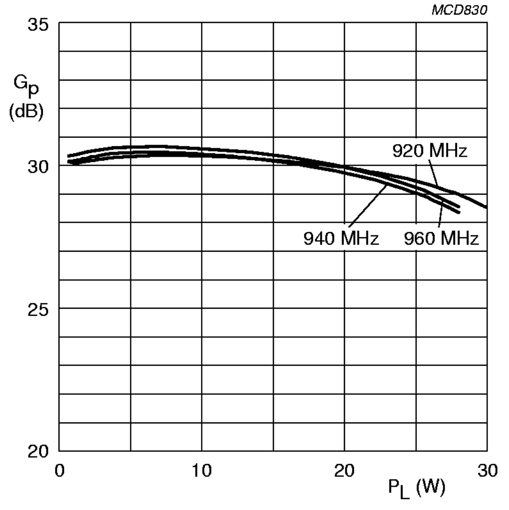
In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_{S1}	DC supply voltage	–	5.5	V
V_{S2}	DC supply voltage	–	28	V
P_D	input drive power	–	80	mW
P_L	load power	–	32	W
T_{stg}	storage temperature	–30	+100	°C
T_{mb}	operating mounting-base temperature	–10	+90	°C

CHARACTERISTICS

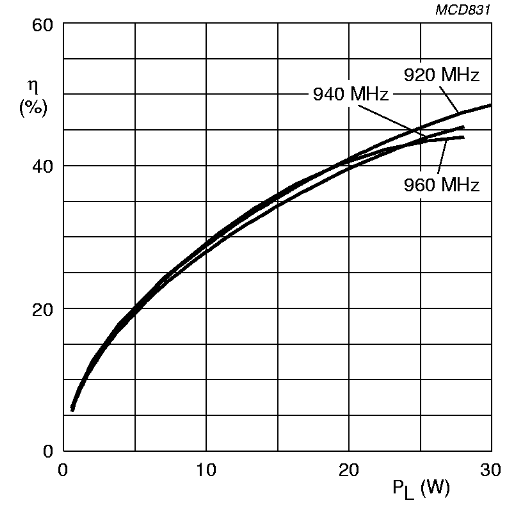
$Z_S = Z_L = 50\ \Omega$; $P_L = 23$ W; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $T_{mb} = 25$ °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency range		920	–	960	MHz
I_{S1}	supply current		–	50	–	mA
I_{S2}	supply current	$P_D < -60$ dBm	–	500	–	mA
P_L	load power		23	–	–	W
G_p	power gain	160 mW $\leq P_L \leq$ 23 W	28	30	34	dB
		2 W $\leq P_L \leq$ 23 W	28	30	32	dB
η	efficiency	$P_L = 16$ W	30	–	–	%
H_2	second harmonic	$P_L = 16$ W	–	–	–35	dBc
H_3	third harmonic	$P_L = 16$ W	–	–	–40	dBc
$VSWR_{in}$	input VSWR		–	–	2:1	
	stability	VSWR $\leq$ 3 : 1 through all phases; $V_{S2} = 26$ to 27 V; $P_L = 23$ W	–	–	–60	dBc
	reverse intermodulation	$P_{carrier} = 16$ W; $P_{interference} = 1.6\ \mu$W; $f_i = f_c \pm 600$ kHz	–	–80	–	dBc
	direct intermodulation	$P_{carrier} = 16$ W; $P_{interference} = 1.6$ mW; $f_i = f_c + 270$ kHz	–	–55	–	dBc
NF	noise figure		–	–	8	dBc
B	AM bandwidth	corner frequency = 3 dB; $P_{carrier} = 16$ W; modulation = 20%	2	–	–	MHz
	ruggedness	VSWR $\leq$ 5 : 1 through all phases; $V_{S2} = 26$ V; $P_L = 23$ W	no degradation			



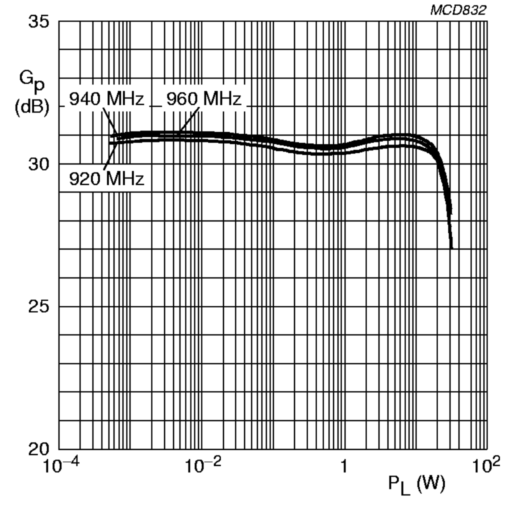
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $T_{mb} = 25$ °C.

Fig.2 Power gain as a function of load power; typical values.



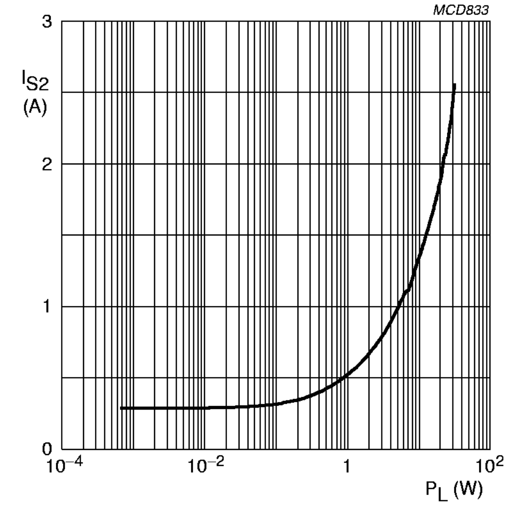
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $T_{mb} = 25$ °C.

Fig.3 Efficiency as a function of load power; typical values.



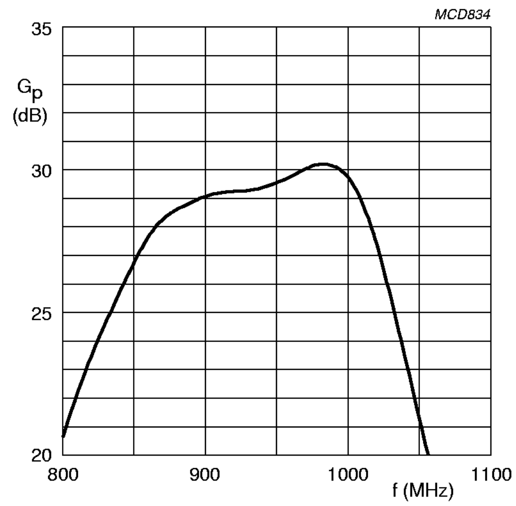
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $T_{mb} = 25$ °C.

Fig.4 Power gain as a function of load power; typical values.



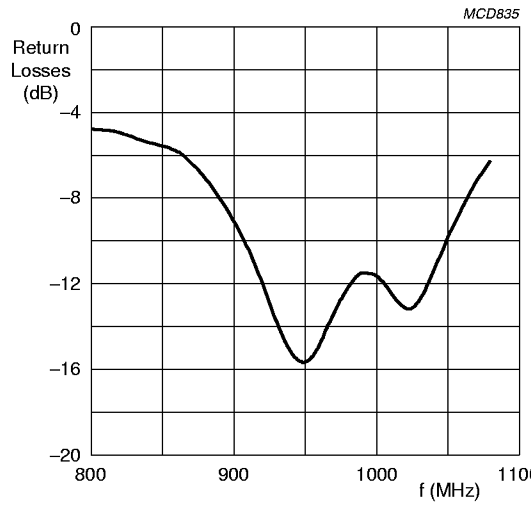
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $T_{mb} = 25$ °C;
f = 920 to 960 MHz.

Fig.5 Supply current as a function of load power; typical values.



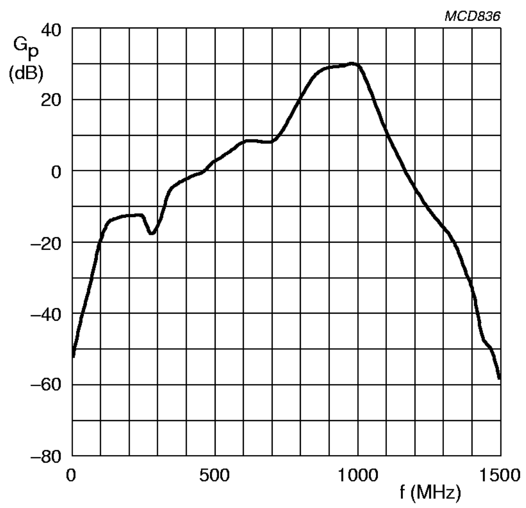
$Z_S = Z_L = 50\ \Omega$; $P_D = -30$ dBm; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $T_{mb} = 25$ °C.

Fig.6 Small signal in band power gain as a function of frequency; typical values.



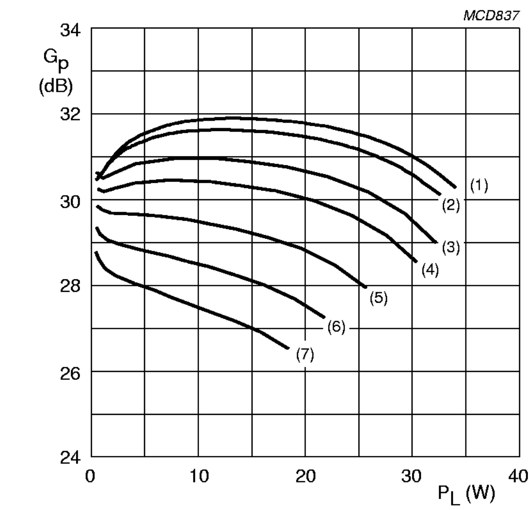
$Z_S = Z_L = 50\ \Omega$; $P_D = -30$ dBm; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $T_{mb} = 25$ °C.

Fig.7 Small signal in band input return losses as a function of frequency; typical values.



$Z_S = Z_L = 50\ \Omega$; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $P_D = -30$ dBm; $T_{mb} = 25$ °C.

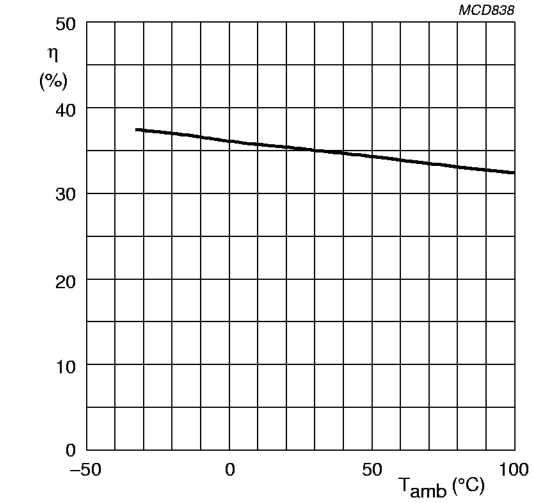
Fig.8 Small signal out band power gain as a function frequency; typical values.



$Z_S = Z_L = 50\ \Omega$; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $T_{mb} = 25$ °C.

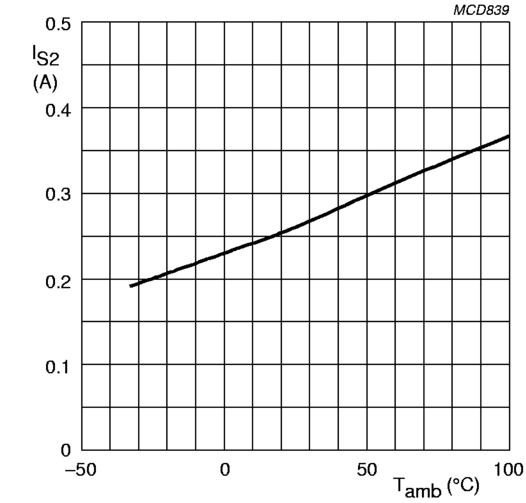
(1) $T_{amb} = -33$°C.
(2) $T_{amb} = -20$°C.
(3) $T_{amb} = 3$°C.
(4) $T_{amb} = 25$°C.
(5) $T_{amb} = 50$°C.
(6) $T_{amb} = 75$°C.
(7) $T_{amb} = 100$°C.

Fig.9 Power gain as a function of load power; typical values



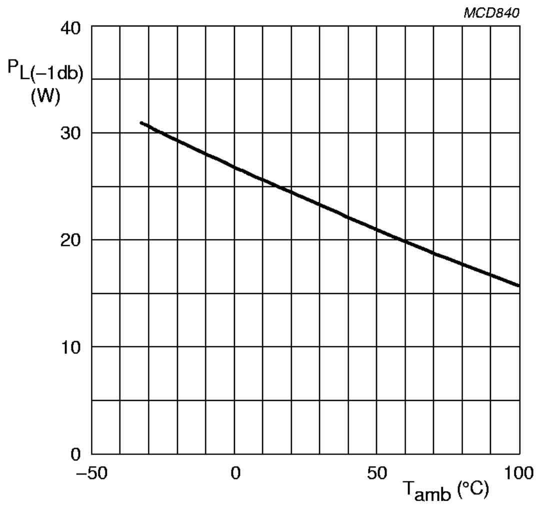
$Z_S = Z_L = 50\ \Omega$; $P_L = 16$ W; $V_{S1} = 5$ V; $V_{S2} = 26$ V.

Fig.10 Efficiency as a function of ambient temperature; typical values.



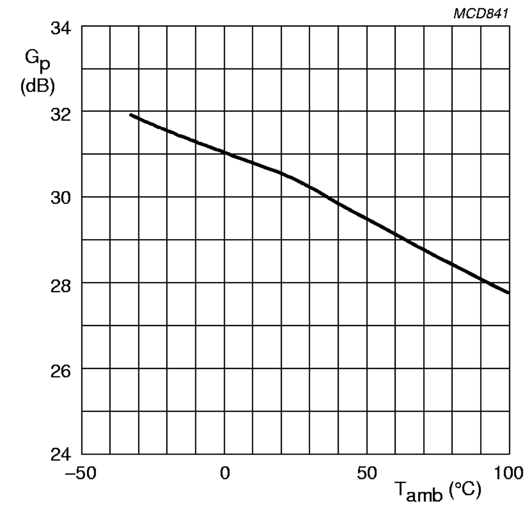
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = 5$ V; $V_{S2} = 26$ V; $P_D = 0$.

Fig.11 Quiescent current as a function of ambient temperature; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_{ref} = 5$ W; $V_{S1} = 5$ V; $V_{S2} = 26$ V.

Fig.12 Load power at −1 dB gain as a function of ambient temperature; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_L = 5$ W; $V_{S1} = 5$ V; $V_{S2} = 26$ V.

Fig.13 Power gain as a function of ambient temperature; typical values.

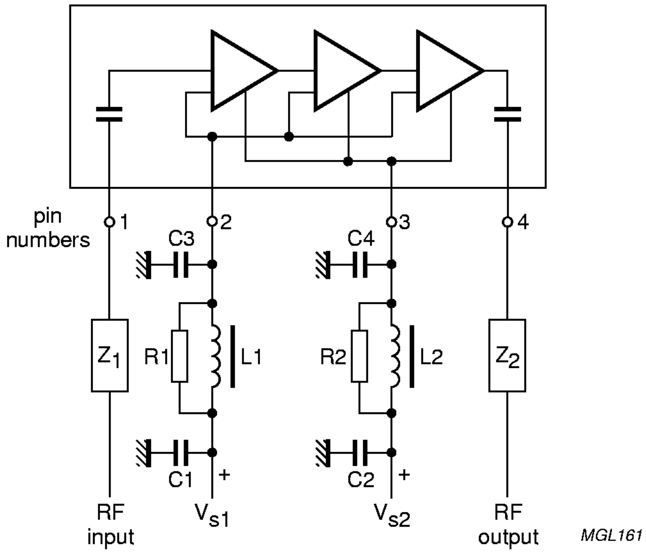
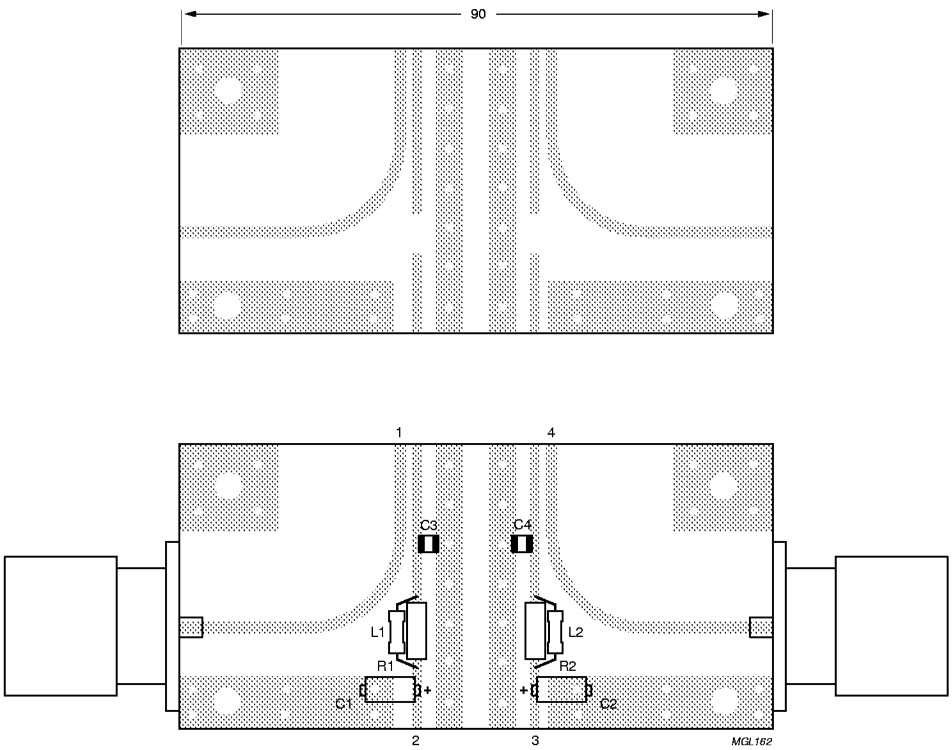


Fig.14 Test circuit.



Dimensions in mm.

Fig.15 Printed-circuit board component layout.

List of components (See Figs 14 and 15)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1, C2	electrolytic capacitor	10 μF; 35 V	
C3, C4	multilayer ceramic chip capacitor	100 nF; 50 V	
L1, L2	Grade 4S2 Ferroxcube bead		4330 030 36300
R1, R2	metal film resistor	10 Ω; 0.4 W	2322 195 13109
Z_1, Z_2	stripline; note 1	50 Ω	

Note

1. The striplines are on a double copper-clad printed-circuit board with epoxy dielectric (ε_r = 4.5); thickness = 1 mm.

MOUNTING RECOMMENDATIONS

To ensure a good thermal contact and to prevent mechanical stress when bolted down, the flatness of the mounting base is designed to be typically better than 0.1 mm. The mounting area of the heatsink should be flat and free from burrs and loose particles. The heatsink should be rigid and not prone to bowing under thermal cycling conditions. The thickness of a solid heatsink should be not less than 5 mm to ensure a rigid assembly.

A thin, even layer of thermal compound should be applied between the mounting base and the heatsink to achieve the best possible thermal contact resistance. Excessive use of thermal compound will result in an increase in thermal resistance and possible bowing of the mounting-base; too little will also result in poor thermal conduction.

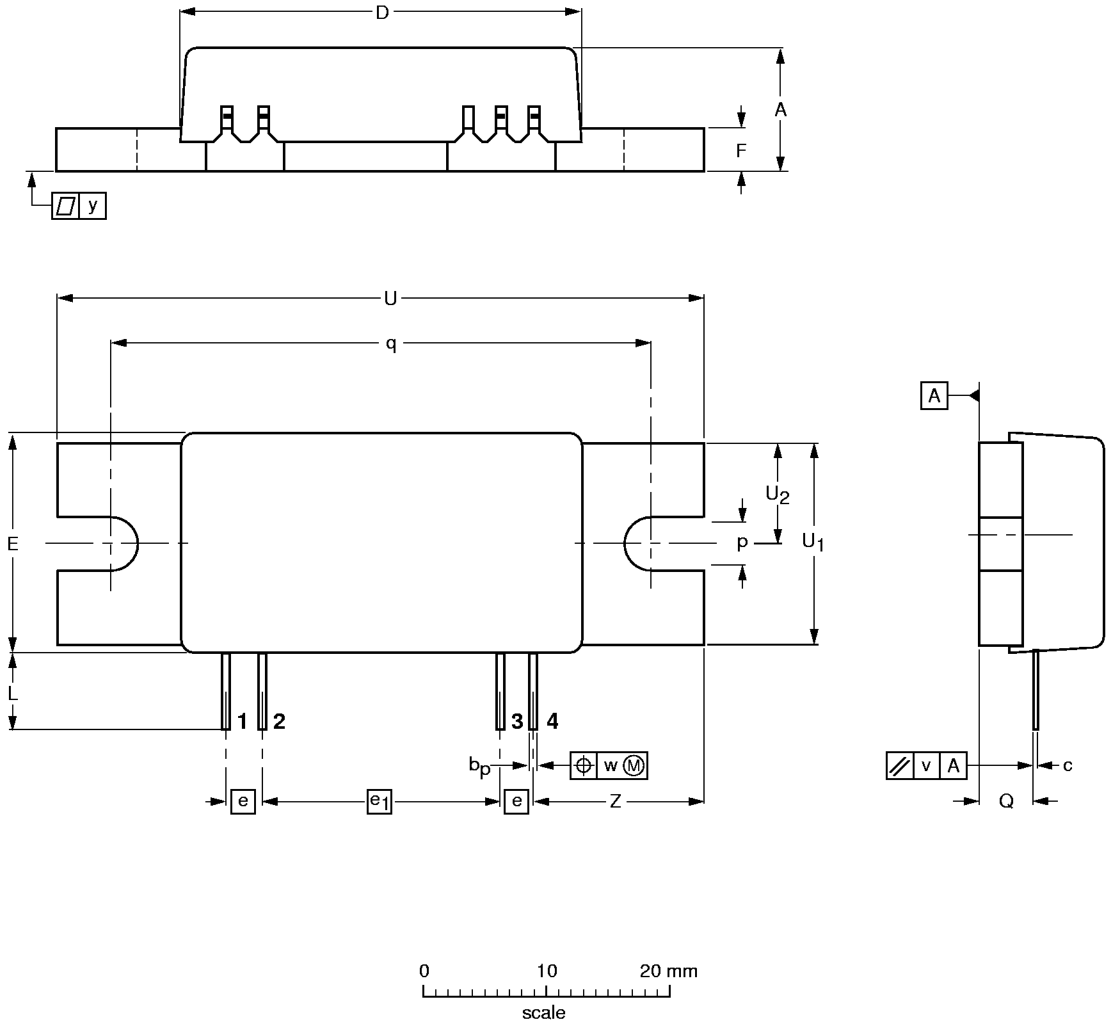
The module should be mounted to the heatsink using 3 mm bolts with flat washers. The bolts should first be tightened to “finger tight” and then further tightened in alternating steps to a maximum torque of 0.4 to 0.6 Nm.

Once mounted on the heatsink, the module leads can be soldered to the printed-circuit board. A soldering iron may be used up to a temperature of 250 °C for a maximum of 10 seconds at a distance of 2 mm from the plastic cap.

ESD precautions must be taken to protect the device from electrostatic damage.

PACKAGE OUTLINE

Plastic rectangular single-ended flat package; flange mounted; 2 mounting holes; 4 in-line leads SOT365A



DIMENSIONS (mm are the original dimensions)

UNIT	A	b_p	c	D	E	e	e_1	F	L	p	Q	q	U	U_1	U_2	v	w	y	Z
mm	9.5 9.0	0.56 0.46	0.3 0.2	30.1 29.9	18.6 18.4	2.54	17.78	3.25 3.15	6.5 6.1	4.1 3.9	4.0 3.8	40.74 40.54	48.0 48.4	15.4 15.2	7.75 7.55	0.3	0.25	0.1	12.8 12.6

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT365A						99-02-06