



## SD1727 (THX15)

### RF POWER BIPOLAR TRANSISTORS HF SSB APPLICATIONS

#### FEATURES SUMMARY

- OPTIMIZED FOR SSB
- 30 MHz
- 50 VOLTS
- IMD -30 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT} = 150\text{ W PEP MIN. WITH } 14\text{ dB GAIN}$

#### DESCRIPTION

The SD1727 is a 50 V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting to achieve extreme ruggedness under severe operating conditions.

Figure 1. Package

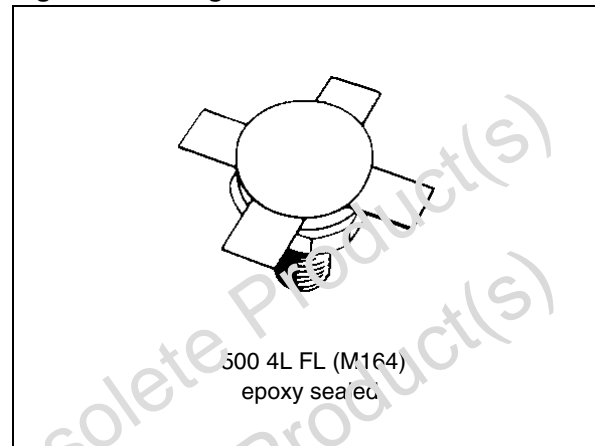


Figure 2. Pin Connection

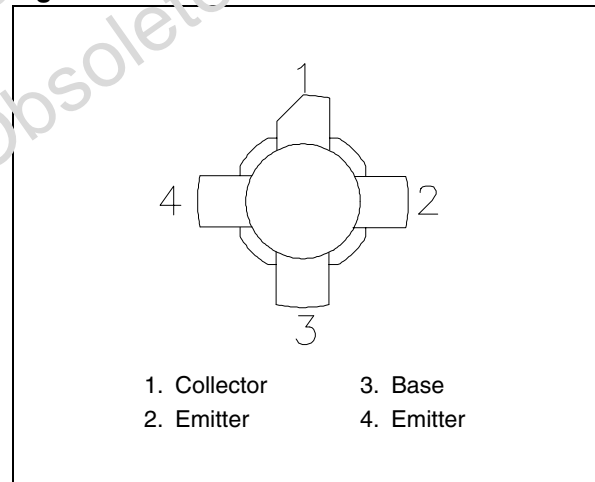


Table 1. Order Codes

Order Codes	Marking	Package	Packaging
SD1727 (THX15)	SD1727	M164	BLACK CARDBOARDS

## SD1727 (THX15)

**Table 2. Absolute Maximum Ratings ( $T_{\text{case}} = 25^{\circ}\text{C}$ )**

Symbol	Parameter	Value	Unit
$V_{\text{CBO}}$	Collector-Base Voltage	110	V
$V_{\text{CEO}}$	Collector-Emitter Voltage	55	V
$V_{\text{EBO}}$	Emitter-Base Voltage	4.0	V
$I_{\text{C}}$	Device Current	10	A
$P_{\text{DISS}}$	Power Dissipation	233	W
$T_{\text{J}}$	Junction Temperature	+200	$^{\circ}\text{C}$
$T_{\text{STG}}$	Storage Temperature	- 65 to +150	$^{\circ}\text{C}$

**Table 3. Thermal Data**

Symbol	Parameter	Value	Unit
$R_{\text{TH(j-c)}}$	Junction-Case Thermal Resistance	0.75	$^{\circ}\text{C/W}$

## ELECTRICAL SPECIFICATIONS ( $T_{\text{case}} = 25^{\circ}\text{C}$ )

**Table 4. Static**

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$BV_{\text{CBO}}$	$I_{\text{C}} = 100 \text{ mA}; I_{\text{E}} = 0 \text{ mA}$	110	—	—	V
$BV_{\text{CES}}$	$I_{\text{C}} = 100 \text{ mA}; V_{\text{BE}} = 0 \text{ V}$	110	—	—	V
$BV_{\text{CEO}}$	$I_{\text{C}} = 100 \text{ mA}; I_{\text{E}} = 0 \text{ mA}$	55	—	—	V
$BV_{\text{EBO}}$	$I_{\text{E}} = 10 \text{ mA}; I_{\text{C}} = 0 \text{ mA}$	4.0	—	—	V
$I_{\text{CEO}}$	$V_{\text{CE}} = 30 \text{ V}; I_{\text{E}} = 0 \text{ mA}$	—	—	5	mA
$I_{\text{CES}}$	$V_{\text{CE}} = 60 \text{ V}; I_{\text{E}} = 0 \text{ mA}$	—	—	5	mA
$h_{\text{FE}}$	$V_{\text{CE}} = 6 \text{ V}; I_{\text{C}} = 1.4 \text{ A}$	18	—	43.5	—

**Table 5. Dynamic**

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$P_{\text{OUT}}$	$f = 30 \text{ MHz}; V_{\text{CE}} = 50 \text{ V}; I_{\text{CQ}} = 100 \text{ mA}$	150	—	—	W
$G_{\text{P}}^{(1)}$	$P_{\text{OUT}} = 150 \text{ W PEP}; V_{\text{CE}} = 50 \text{ V}; I_{\text{CQ}} = 100 \text{ mA}$	14	—	—	dB
$\text{IMD}^{(1)}$	$P_{\text{OUT}} = 150 \text{ W PEP}; V_{\text{CE}} = 50 \text{ V}; I_{\text{CQ}} = 100 \text{ mA}$	—	—	-30	dBc
$\eta_{\text{c}}^{(1)}$	$P_{\text{OUT}} = 150 \text{ W PEP}; V_{\text{CE}} = 50 \text{ V}; I_{\text{CQ}} = 100 \text{ mA}$	37	—	—	%
$C_{\text{OB}}$	$f = 1 \text{ MHz}; V_{\text{CB}} = 50 \text{ V}$	—	—	220	pF

Note: The SD1727 is also usable in Class A at 40 V. Typical performance is:  
 $P_{\text{OUT}} = 30 \text{ W PEP}$ ,  $G_{\text{P}} = 14 \text{ dB}$ ,  $\text{IMD} = -40 \text{ dBc}$

Note: 1.  $f_1 = 30.00 \text{ MHz}$ ;  $f_2 = 30.001 \text{ MHz}$

## TYPICAL PERFORMANCE

Figure 3. Intermodulation Distortion vs Power Output PEP

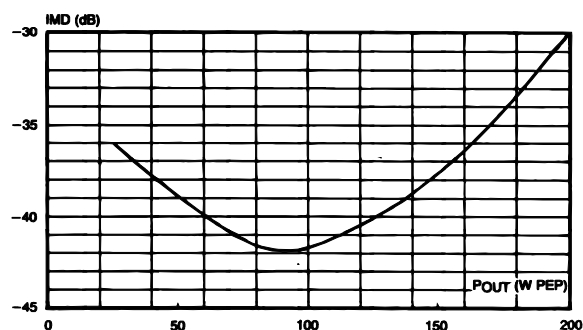


Figure 4. Power Output PEP vs Power Input

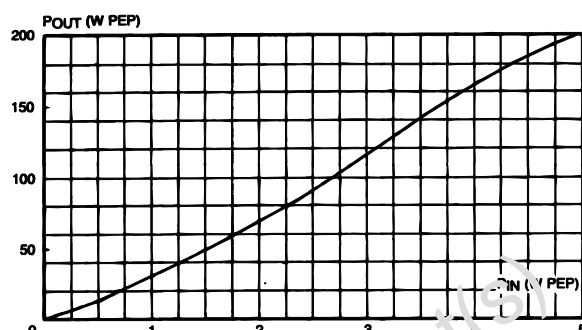


Figure 5. Collector Efficiency vs Power Output PEP

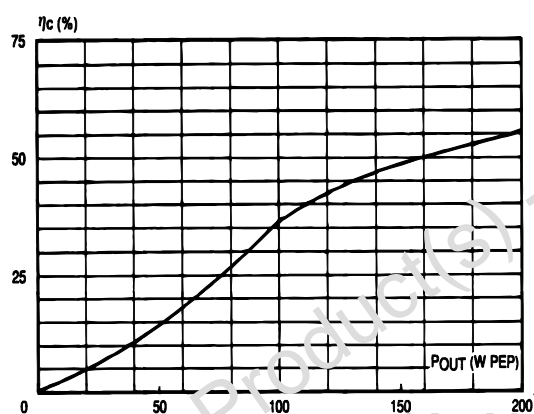


Figure 6. Power Gain vs Frequency

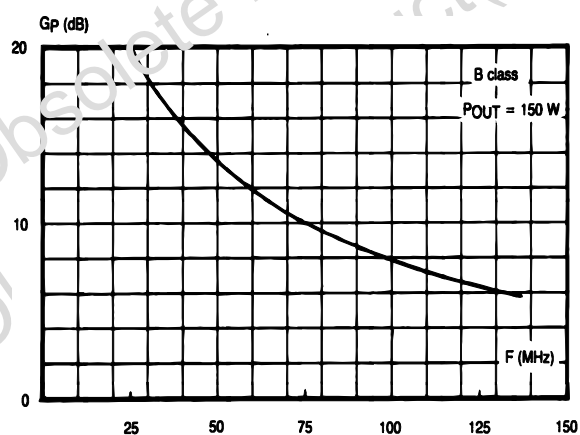


Figure 7. Power Gain vs Power Output PEP

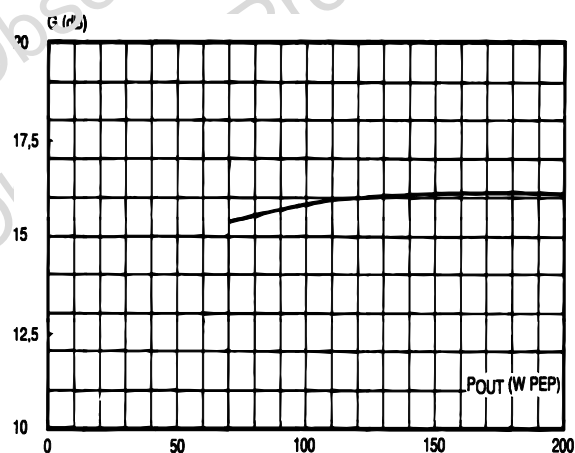
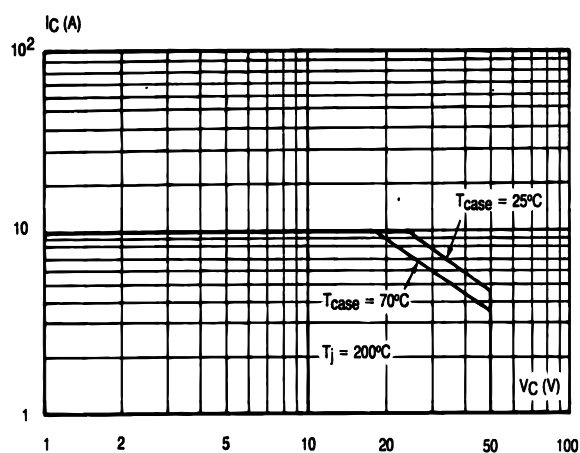
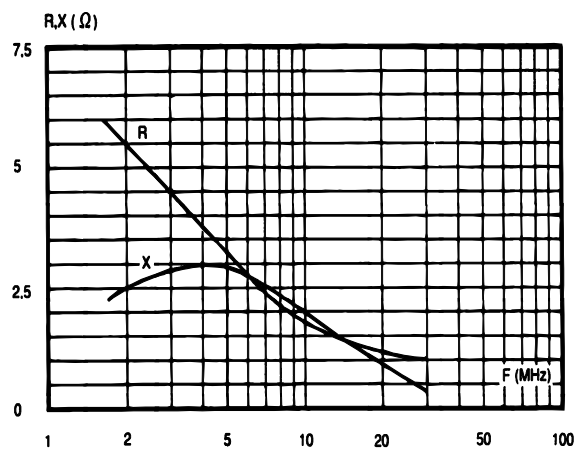


Figure 8. Safe Operating Area



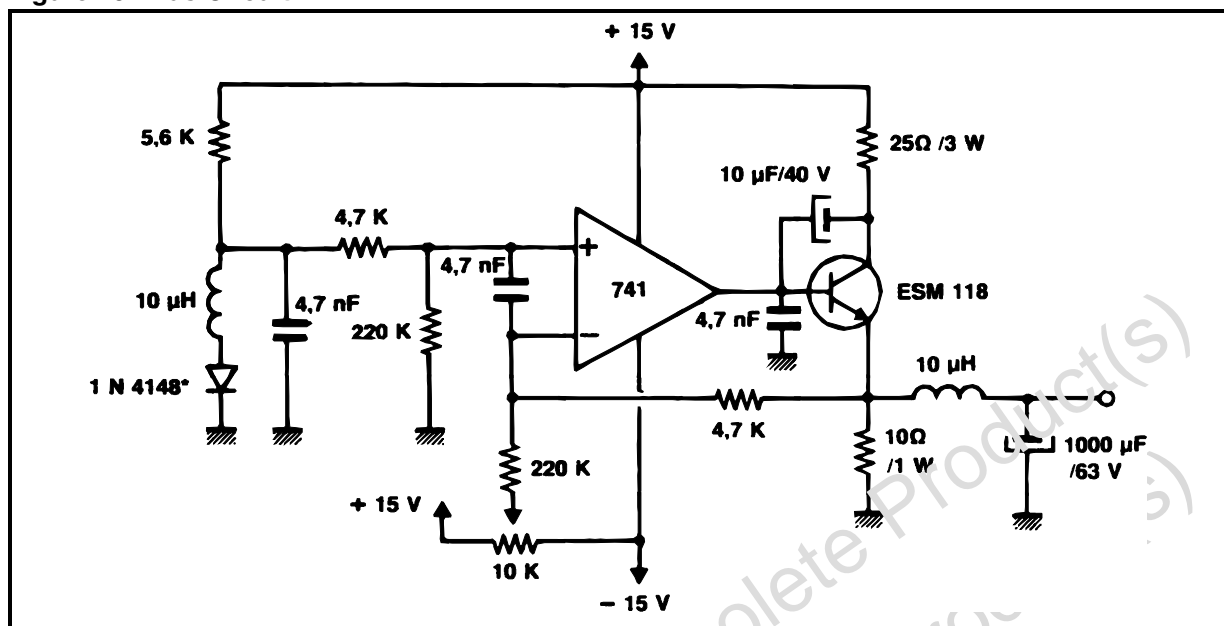
IMPEDANCE DATA

Figure 9. Typical Input Impedance



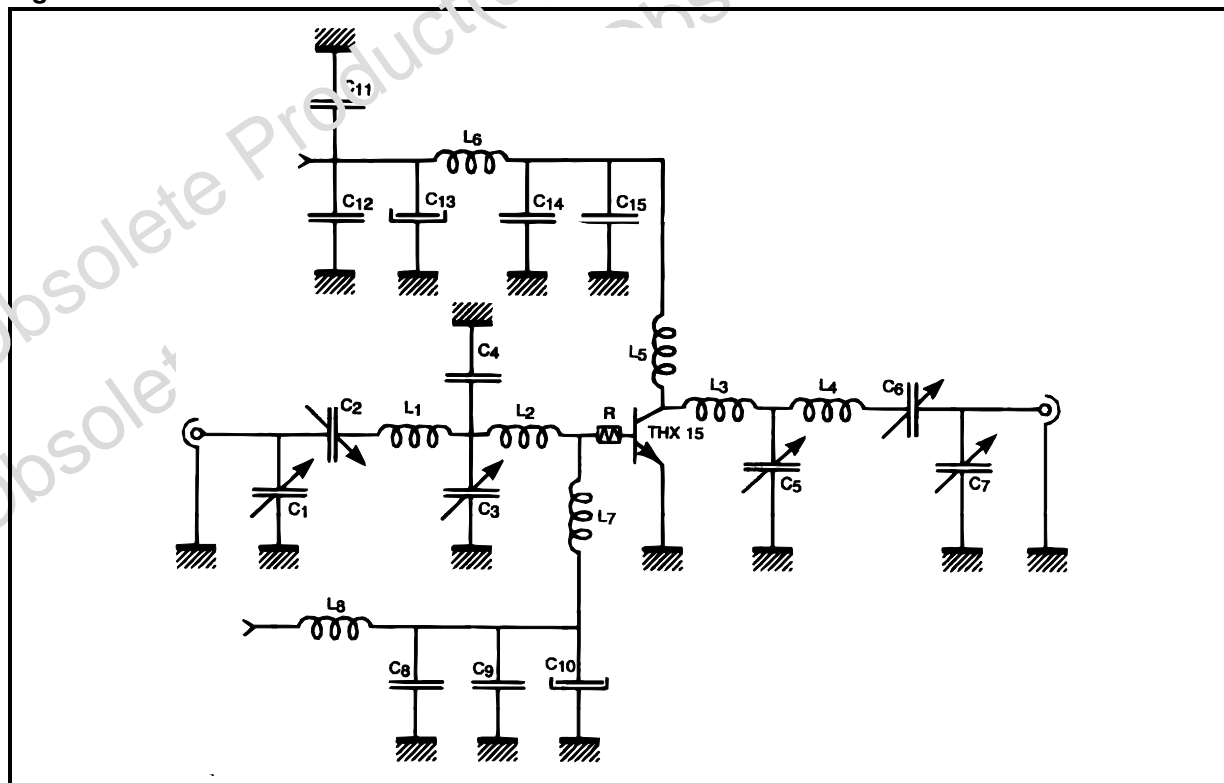
## BIAS CIRCUIT

Figure 10. Bias Circuit



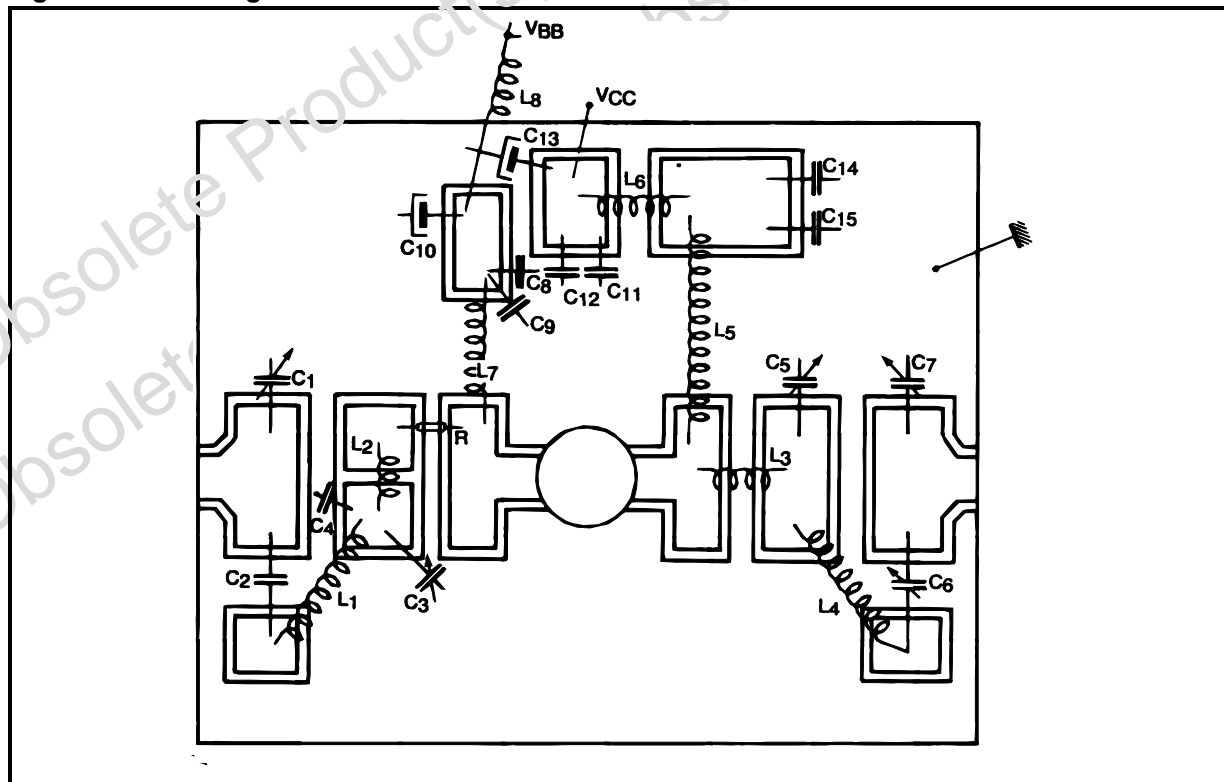
## TEST CIRCUIT - CLASS AB - 30 MHZ

Figure 11. Test Circuit - Class AB - 30 MHz



**Table 6. Test Circuit - Class AB – 30 Mhz**

C1	Arco 427
C2	Arco 4611
C3	Arco 4615
C4	220pF
C5, C6	Arco 4215
C7	Arco 426
C8, C12	100nF 63V
C9, C11, C15	1nF
C10	470μF 40V
C13	220μF 63V
C14	10nF
L1	5 Turns Diameter 8mm, 1.3mm Wire, Length 15mm
L2	Hair Pin Copper Foil 20 x 5mm, 0.2mm Thick
L3	1 Turn Diameter 10mm, 1.3mm Wire, Length 8mm
L4	6 Turns Diameter 8mm, 1.3mm Wire, Length 25mm
L5	4 Turns Diameter 12mm, 2mm Wire, Length 25mm
L6, L7, L8	Choke
R	0.6Ω

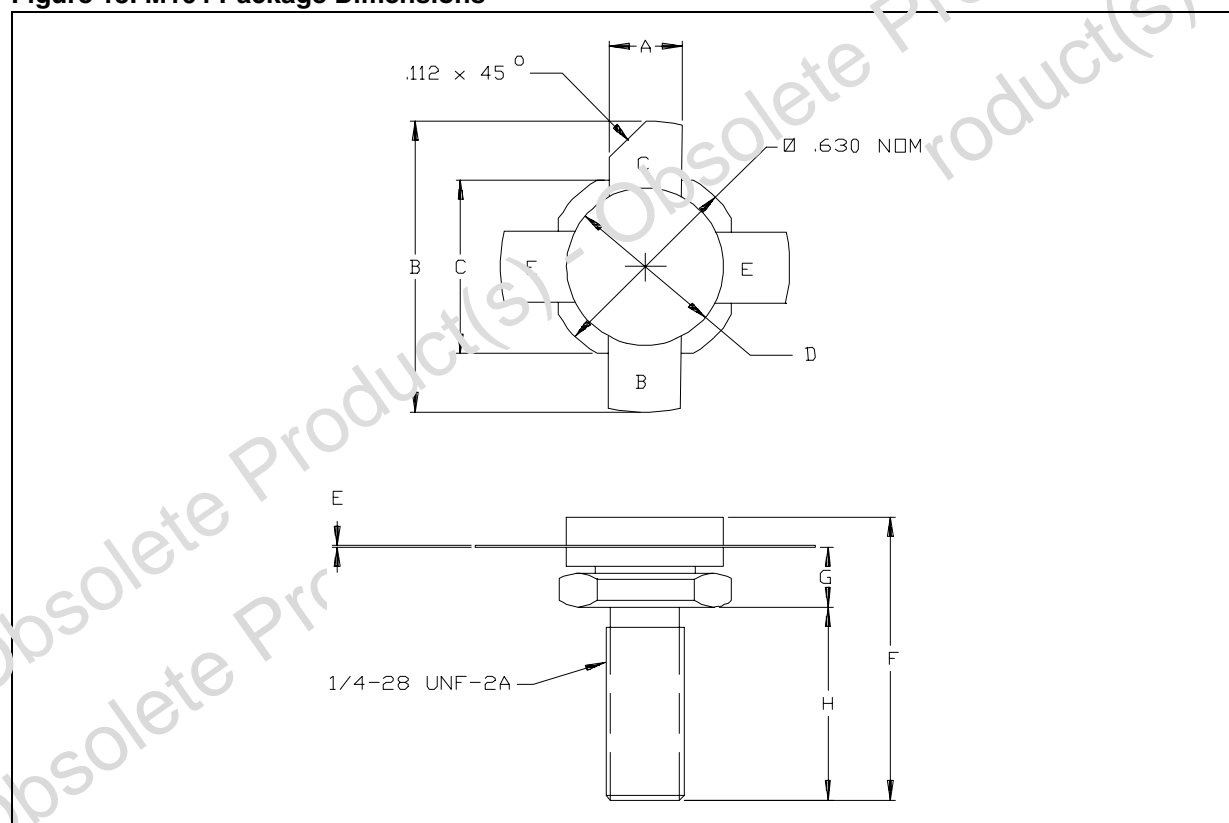
**MOUNTING CIRCUIT - CLASS AB – 30 MHZ****Figure 12. Mounting Circuit - Class AB – 30 Mhz**

## PACKAGE MECHANICAL

Table 7. M164 Mechanical Data

Symbol	millimeters			inches		
	Min	Typ	Max	Min	Typ	Max
A	5.59		5.84	0.220		0.230
B			26.67			1.050
C	13.84		14.10	0.545		0.555
D	12.57		12.83	0.495		0.505
E	0.08		0.18	0.003		0.007
F			21.08			0.830
G	4.70		5.03	0.185		0.198
H	12.62		13.46	0.497		0.530

Figure 13. M164 Package Dimensions



Note: Drawing is not to scale.

**REVISION HISTORY**

**Table 8. Revision History**

<b>Date</b>	<b>Revision</b>	<b>Description of Changes</b>
November-1992	1	First Issue
8-June-2004	2	Stylesheet update. No content change.

Obsolete Product(s) - Obsolete Product(s)  
Obsolete Product(s) - Obsolete Product(s)



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.  
All other names are the property of their respective owners

© 2004 STMicroelectronics - All rights reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -  
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States

[www.st.com](http://www.st.com)

