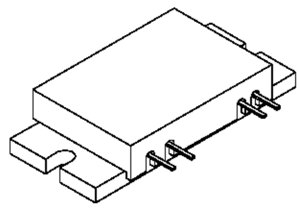
STM961-15

RF POWER MODULE DIGITAL CELLULAR APPLICATIONS

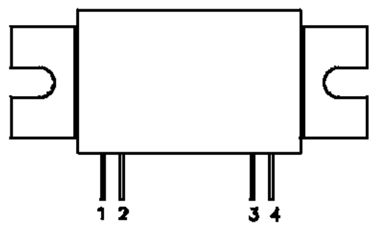
- LINEAR POWER AMPLIFIER
- 915-960 MHz
- 26 VOLTS
- INPUT/OUTPUT 50 OHMS
- P_{OUT} = 42 dBm CW or PEP
- GAIN = 30 dB



CASE STYLE H110

ORDER CODE	BRANDING
STM961-15	STM961-15

PIN CONNECTION



1. RF Input
2. V_B 26V
3. V_{S1} 26V
4. RF Output

DESCRIPTION

The STM961-15 module is designed for digital cellular radio base station applications in the 915-960 MHz frequency range operating at 26V.

The STM961-15 is designed to meet the low distortion, high linearity requirements of modern digital cellular base station equipment.

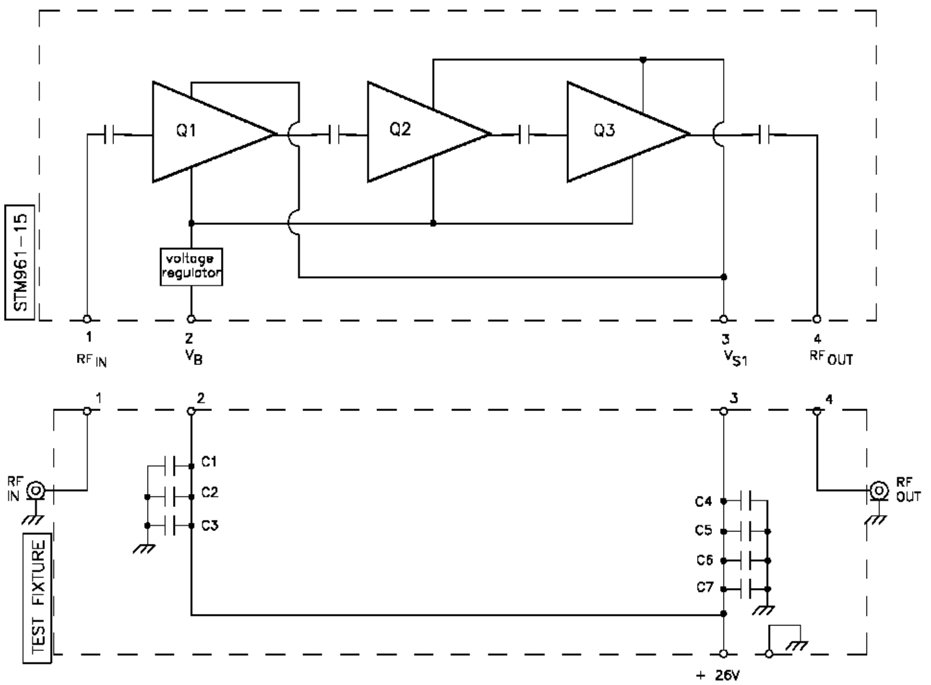
ABSOLUTE MAXIMUM RATINGS (T_{case} = 85°C)

Symbol	Parameter	Value	Unit
V_{S1}, V_{S2}	DC Supply Voltage	28.0	Vdc
V_B	DC Bias Voltage Bias	28.0	Vdc
P_{IN}	RF Input Power	14	dBm CW
P_{OUT}	RF Output Power (V = 26V)	43	dBm CW
T_{STG}	Storage Temperature	– 30 to +100	°C

ELECTRICAL SPECIFICATIONS (T_{case} = -10°C to +85°C, V_B = 26.0 to 27.0V)

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
BW	Frequency Range		915	—	960	MHz
G_P	Power Gain	P_{OUT} = +42 dBm CW	28	30	—	dB
η	Efficiency	P_{OUT} = +42 dBm CW	32	35	—	%
—	VSWR	P_{OUT} = +42 dBm CW Z_S, Z_L = 50Ω	—	—	2:1	VSWR
I_Q	Quiescent Current	P_{IN} = 0 dBm	—	580	—	mA
$2F_O$	Harmonics	P_{OUT} = +42 dBm CW	—	—	–30	dBc
$3F_O$	Harmonics	P_{OUT} = +42 dBm CW	—	—	–50	dBc
F	Gain Flatness	P_{OUT} = +42 dBm CW	—	1	—	dB
P_{1dB}	Output Power @ 1 dB Compression		41	—	—	dBm
—	Load Mismatch	VSWR = 3:1 P_{OUT} = +42 dBm CW	No Degradation in Output Power			
	Stability	P_{OUT} = 10 dBm to +42 dBm Load VSWR = 3:1 All phase angles	All Spurious outputs more than 60dB below carrier			

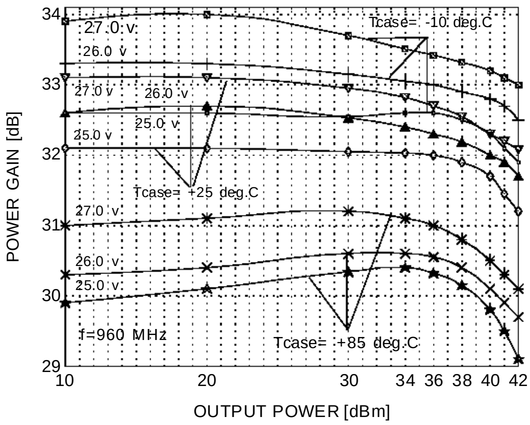
MODULE DC AND TEST FIXTURE CONFIGURATION



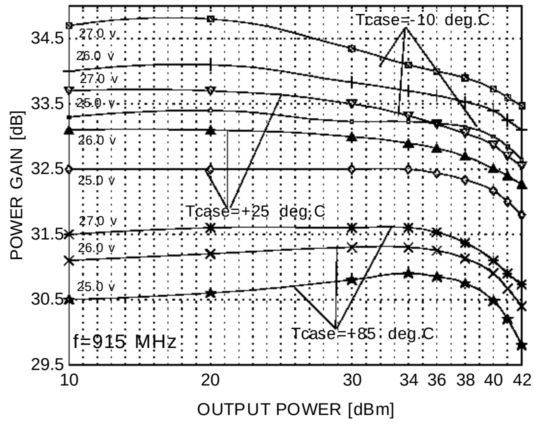
C1, C4 : 100pf
C2, C5 : 1000pf
C3, C6 : .1μF
C7 : 100μF

TYPICAL PERFORMANCE

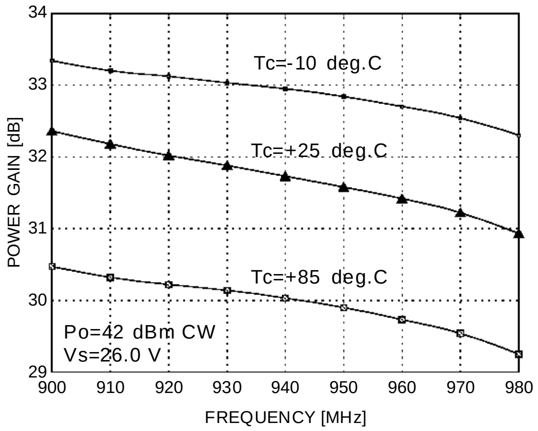
OUTPUT POWER vs POWER GAIN



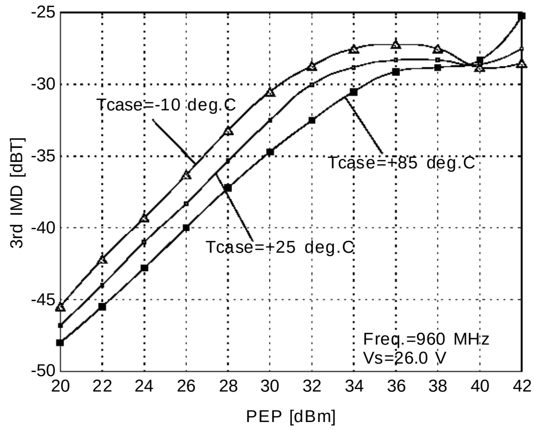
OUTPUT POWER vs POWER GAIN



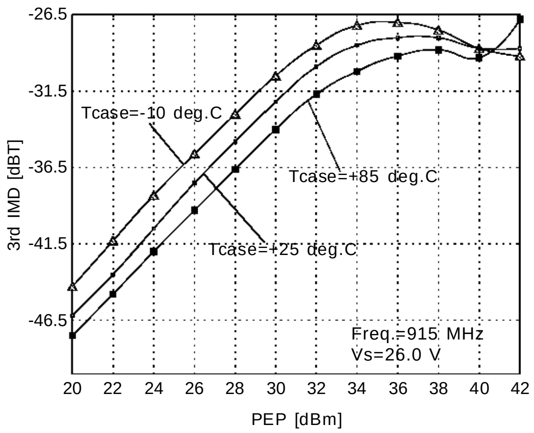
POWER GAIN vs FREQUENCY & TEMPERATURE



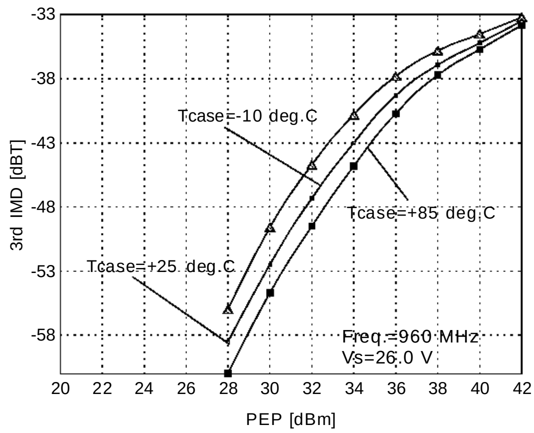
3rd IMD vs OUTPUT POWER & TEMPERATURE



3rd IMD vs OUTPUT POWER & TEMPERATURE

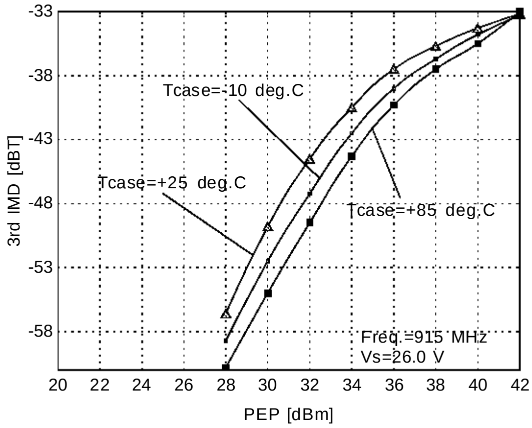


5th IMD vs OUTPUT POWER & TEMPERATURE

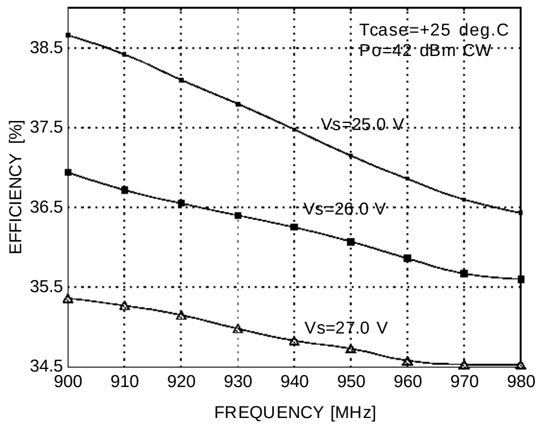


TYPICAL PERFORMANCE (cont'd)

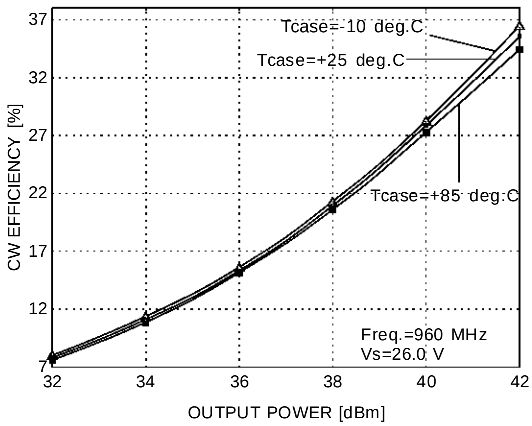
5th IMD vs OUTPUT POWER & TEMPERATURE



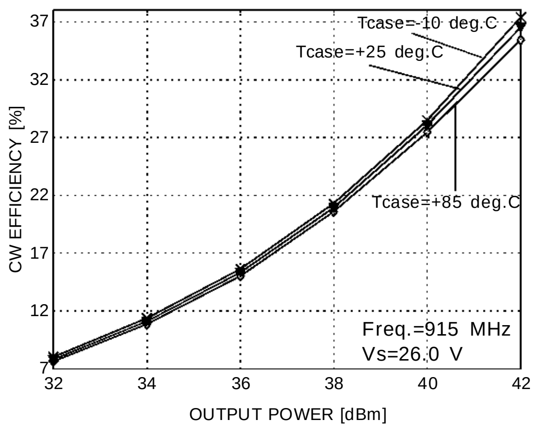
EFFICIENCY vs FREQUENCY



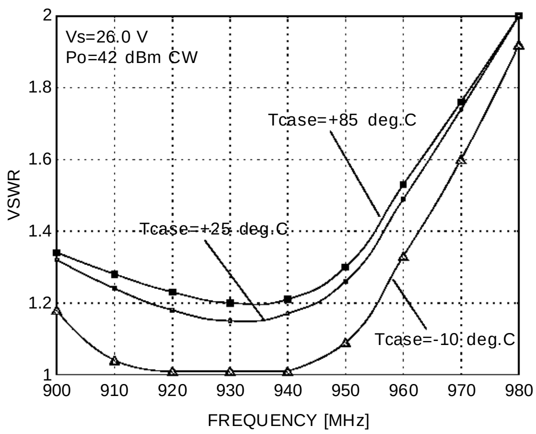
CW EFFICIENCY vs OUTPUT POWER & TEMPERATURE



CW EFFICIENCY vs OUTPUT POWER & TEMPERATURE



VSWR vs FREQUENCY & TEMPERATURE



* Two-Tone test; 20 KHz separation,
dBT - in dB, referenced to tone level

APPLICATIONS RECOMMENDATIONS

OPERATION LIMITS
The STM961-15 power module should never be operated under any condition which exceeds the Absolute Maximum Ratings presented on this data sheet. Nor should the module be operated continuously at any of the specified maximum ratings. If the module is to be subjected to one or more of the maximum rating conditions, care must be taken to monitor other parameters which may be affected.

DECOUPLING
Failure to properly decouple any of the voltage supply pins will result in oscillations at certain operating frequencies. Therefore, it is recommended that these pins be bypassed as indicated in the Module DC and Test Fixture Configuration drawing of this data sheet.

MODULE MOUNTING
To insure adequate thermal transfer from the module to the heatsink, it is recommended that a satisfactory thermal compound such as Dow Corning 340, Wakefield 120-2 or equivalent be applied between the module flange and the heatsink.

The heatsink mounting surface under the module should be flat to within ± 0.05mm (± 0.002 inch). The module should be mounted to the heatsink using 3.5 mm (or 6-32) or equivalent screws torqued to 5-6 kg-cm (4-6 in-lb).

The module leads should be attached to equipment PC board using 180°C solder applied to the leads with a properly grounded soldering iron tip, not to exceed 195°C, applied a minimum of 2 mm (0.080 inch) from the body of the module for a duration not to exceed 15 seconds per lead. It is imperative that no other portion of the module, other than the leads, be subjected to temperatures in excess of 100°C (maximum storage temperature), for any period of time, as the plastic moulded cover, internal components and sealing adhesives may be adversely affected by such conditions.

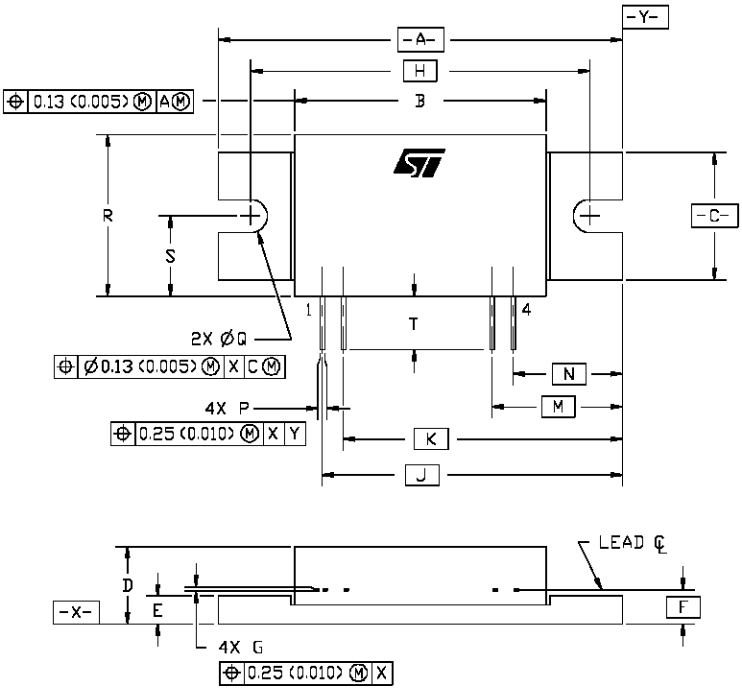
Due to the construction techniques and materials used within the module, reflow soldering of the flange heatsink or leads, is not recommended.

THERMAL CONSIDERATIONS
It will be necessary to provide a suitable heatsink in order to maintain the module flange temperature at or below the maximum case operating temperature. In a case where the module output power will be limited to +42 dBm CW and designing for the worst case efficiency of 32%, the power dissipated by the module will be 33.6 watts. The heatsink must be designed such that the thermal rise will be less than the difference between the maximum operating case temperature of the module while dissipating 33.6 watts.

At Tcase = +85°C, V = 26V, Z_L = 50 ohms and P_{OUT} = 42 dBm, maximum junction temperatures for the individual transistors should be below the following values: Q1 = 140°C, Q2 = 145°C, Q3 = 130°C.

PACKAGE MECHANICAL DATA

Ref.: UDCS No. 1014273 rev. D



SGS-THOMSON MICROELECTRONICS		
	MINIMUM Inches/mm	MAXIMUM Inches/mm
A	1.890/48.01	1.910/48.51
B	1.170/29.72	1.190/30.22
C	0.595/15.12	0.610/15.49
D	0.350/8.89	0.376/9.55
E	0.120/3.05	0.135/3.42
F	0.160/4.06	
G	0.008/0.21	0.012/0.30
H	1.600/40.64	
J	1.415/35.94	
K	1.315/33.40	
L	————	
M	0.615/15.62	
N	0.515/13.08	
P	0.018/0.46	0.022/0.55
Q	0.150/3.81	0.160/4.06
R	0.685/17.40	0.770/19.55
S	0.345/8.77	0.385/9.77
T	0.225/5.72	————

NOTE-
UNLESS OTHERWISE SPECIFIED
TOLERANCES ARE ±0.25mm (0.010in)