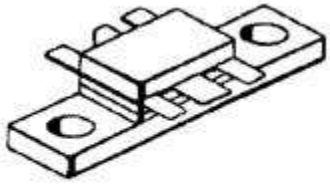
ADVANCED POWER TECHNOLOGY RF®

140 COMMERCE DRIVE
MONTGOMERYVILLE, PA
18936-1013
PHONE: (215) 631-9840
FAX: (215) 631-9855

MS1454

RF AND MICROWAVE TRANSISTORS
806-960 MHZ CELLULAR BASE STATIONS

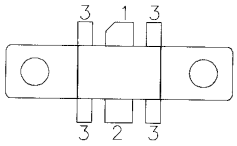


.230 6LFL (M142)
epoxy sealed

Features

- **Gold Metallization**
- **Diffused Emitter Ballasting**
- **Internal Input Matching**
- **Designed for Linear Operation**
- **High Saturated Power Capability**
- **Common Emitter Configuration**
- **P_{OUT} 30 W MIN**
- **Gain 7.5 dB**
- **Efficiency 55% (Typ)**
- **20:1 VSWR**
- **Overdrive Survivability 5 dB**

PIN CONNECTION



1. Collector 3. Base
2. Emitter

DESCRIPTION:

The MS1454 gold/metallized epitaxial silicon NPN planar transistor uses diffused emitter ballast resistors for high linearity class AB operation in cellular base station applications.

ABSOLUTE MAXIMUM RATINGS (Tcase = 25°C)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	48	V
V_{CEO}	Collector-Emitter Voltage	25	V
V_{EBO}	Emitter-Base Voltage	3.5	V
P_{DISS}	Total Power Dissipation	88	W
I_C	Collector Current	7.5	A
T_j	Junction Temperature	+200	°C
T_{stg}	Storage Temperature	-65 to +150	°C

THERMAL DATA

$R_{TH(j-c)}$	Junction-Case Thermal Resistance	2	°C/W

ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
BV_{CES}	I_C = 100 mA	48	55	---	V
BV_{EBO}	I_E = 10 mA	3.5	5	---	V
BV_{CEO}	I_C = 40 mA	25	28	---	V
BV_{CER}	I_E = 40 mA R_{BE} = 100 Ω	30	40	---	V
I_{CBO}	V_{CE} = 24 V	---	---	---	mA
h_{FE}	V_{CE} = 20 V I_C = 2 A	15	40	100	---

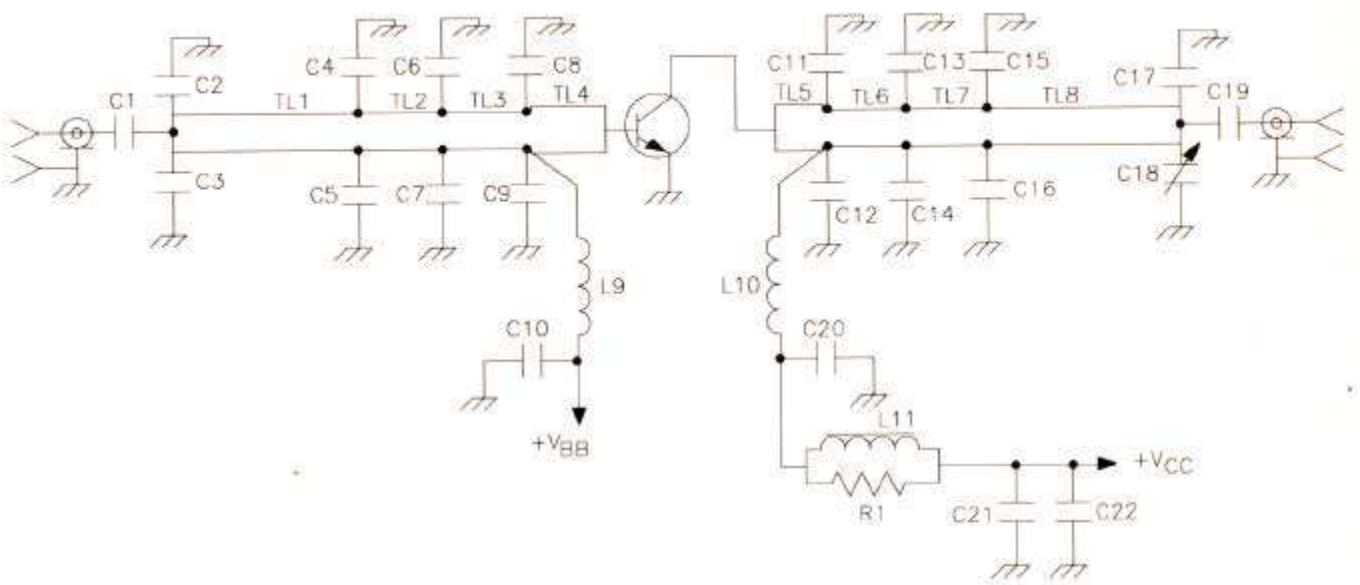
DYNAMIC

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
P_{OUT}	f = 860 MHz I_{CQ} = 60 mA V_{CE} = 25 V	30	---	---	W
η_C	f = 860 MHz I_{CQ} = 60 mA V_{CE} = 25 V	---	55	---	%
G_P	f = 860 MHz I_{CQ} = 60 mA V_{CE} = 25 V	7.5	9	---	DB
C_{OB}	V_{CB} = 25 V f_0 = 1 MHz	---	42	---	pF
IMD_3	P_{OUT} = 30 W PEP f_1 = 860.0 MHz f_2 = 860.1 MHz	---	–35	---	dBc
$VSWR_1$	VSWR = 20:1 V_{CE} = 25 V VSWR = 10:1 V_{CE}= 25 V ± 20%	NO DEGRADATION IN OUTPUT DEVICE			Typ.
$VSWR_2$	VSWR = 5:1 V_{CE} = 25 V ± 20% P_{IN} = P_{IN} (norm) + 3 dB	NO DEGRADATION IN OUTPUT DEVICE			Typ.
OVD	P_{IN}(norm) = +5dB V_{CE} = 25 V P_{IN}(norm) = +5dB V_{CE} = 25 V ± 20%	NO DEGRADATION IN OUTPUT DEVICE			Typ.

IMPEDANCE DATA

Freq.	Z_{IN} (Ω)	Z_{CL} (Ω)
800 MHz	4.3 + j 5.8	3.5 + j 0.2
830 MHz	3.2 + j 6.1	3.5 + j 0.1
860 MHz	3.5 + j 7.1	2.9 – j 0.2
900 MHz	5.3 + j 6.4	2.0 – j 0.6
915 MHz	6.1 + j 6.3	3.2 – j 0.7
930 MHz	9.4 + j 6.3	3.2 – j 1.1
945 MHz	6.6 + j 3.0	3.3 – j 1.2
960 MHz	5.9 + j 1.0	3.4 – j 1.5

TEST CIRCUIT



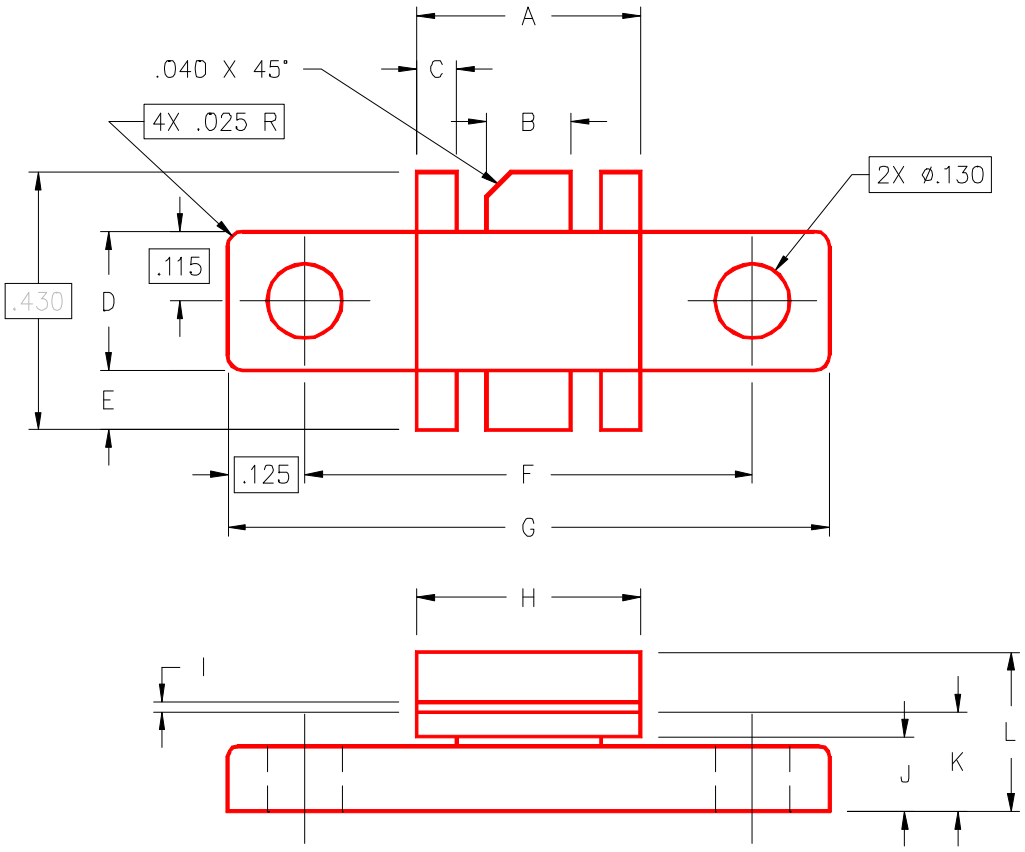
C1, C19	:	33pF ATC 100B Chip Capacitor
C2, C15	:	3.6pF ATC 100B Chip Capacitor
C3	:	4.5pF ATC 100B Chip Capacitor
C4, C16		
C17	:	5.0pF ATC 100B Chip Capacitor
C5	:	2.9pF ATC 100B Chip Capacitor
C6, C7	:	1.8pF ATC 100B Chip Capacitor
C8,C9, C14	:	6.2pF ATC 100B Chip Capacitor
C10,C22 C11,C12	:	300pF ATC 100B Chip Capacitor

C18	:	.5 - 6.0pF Gigatrim Adjustable Capacitor
C20	:	10pF ATC 100B Chip Capacitor
C21	:	10µF (50V) Electrolytic Capacitor
L9	:	4 Turns (tight) I.D. 120mil ENAM Cu 20 AWG
L10	:	4 Turns (tight) I.D. 158mil ENAM Cu 18 AWG
L11	:	1.5 Turns VK-200 Ferrite H.F. Choke
TL1,TL8	:	964 x 85.69 mils (50Ω/36.84˚)
TL2,TL3	:	352 x 85.69 mils (50Ω/13.46˚)
TL4	:	222 x 109.03 mils (42.6Ω/8.56˚)
TL5	:	149 x 109.03 mils (42.6Ω/5.74˚)
TL6	:	334 x 85.69 mils (50Ω/12.75˚)

MS1454

PACKAGE MECHANICAL DATA

PACKAGE STYLE M142



	MINIMUM INCHES/MM	MAXIMUM INCHES/MM		MINIMUM INCHES/MM	MAXIMUM INCHES/MM
A	.355/9,02	.365/9,27	I	.004/0,10	.006/0,15
B	.115/2,92	.125/3,18	J	.120/3,05	.130/3,30
C	.075/1,91	.085/2,16	K	.160/4,06	.180/4,57
D	.225/5,72	.235/5,97	L	.230/5,84	.260/6,60
E	.090/2,29	.110/2,79			
F	.720/18,29	.730/18,54			
G	.970/24,64	.980/24,89			
H	.355/9,02	.365/9,27			