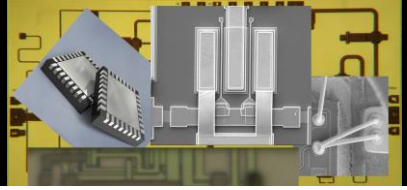
# TMC811-1D
# 3-18 GHz
# Low Loss Balun



mmTRON
Unleashing the mmWave Frontier

## Product Features

- RF frequency: 3 to 18 GHz
- Insertion Loss: 2 dB
- Amplitude Balance: 0.4 dB
- Phase Balance: 1 deg
- High Power Handling
- Die Size: X=1250 um, Y=2170 um, Z=100 um
- Package Size: 3x3, 10Lead, 0.5mm pitch DFN

## Application

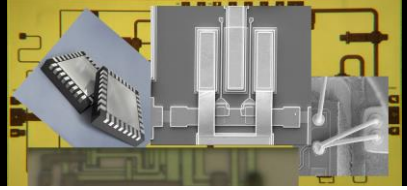
- Instrumentation
- Wireless Communication
- SATCOM
- Radar, EW
- WLAN, WiMax

## Product Description

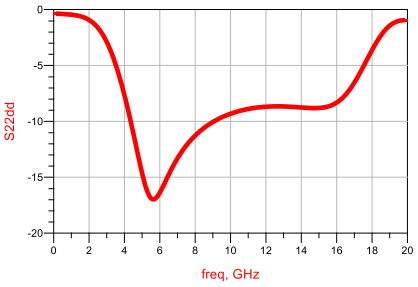
The TMC811-1D is a wideband low loss MMIC balun (balanced to unbalanced transformer) die with an impedance ratio of 1:2 . TMC811-1D is designed for use in 5G wireless, SATCOM, Instrumentation, high-speed track-and-hold amplifiers, digital-to-analog converters, balanced amplifiers, signal integrity and Military Radar and EW applications. The TMC811-1D is a 50 Ω matched, DC-coupled and ROHS-compliant design. To ensure rugged and reliable operation and moisture protection, the TMC811-1D is designed and fabricated for maximum repeatability with low insertion loss, low amplitude unbalance, low phase unbalance, and excellent common mode rejection. Both bond pad and backside metallization are Au-based that are compatible with ribbon and wedge bonding and high conductivity epoxy and eutectic die attach methods. TMC811-1D is layed out symmetrically and is in die format thus enabling the integration of the balun directly into hybrid modules. DXF drawings and S3P files are available upon request. TMC811-1 is the packaged DFN version.

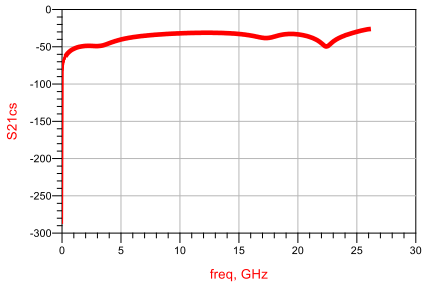
***Electrical Performance***

| | min | Typ | Max | Units |
|---|---|---|---|---|
| **Frequency** | 3 | | 18 | GHz |
| **Excess Insertion Loss** | | 2 | | dB |
| **Return Loss** | | 10 | | dB |
| **Common Mode Rejection** | | 35 | | dB |
| **Amplitude Balance** | | 0.4 | | dB |
| **Phase Match** | | 1 | | deg |








Eqn S22dd=dB(0.5*(S22-S23-S32+S33))

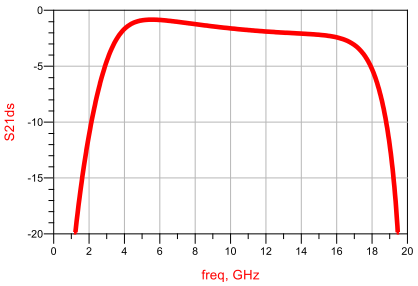
Eqn S21ds=dB((1/sqrt(2))*(S(2,1)-S(3,1)))

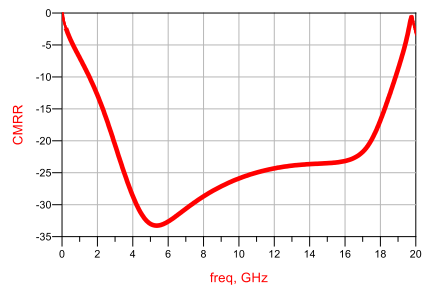
Eqn S21cs=dB((1/sqrt(2))*(S(2,1)+S(3,1)))

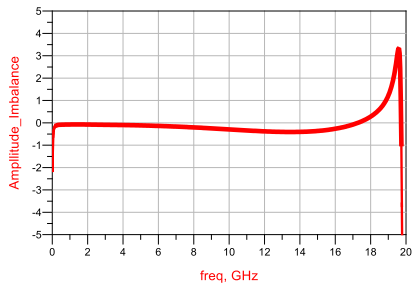
Eqn CMRR=20*log(S21ds/S21cs)

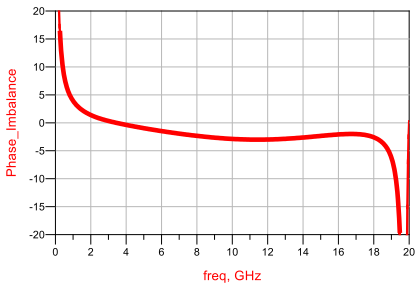
Eqn Ampllitude_Imbalance=dB(-S21/S31)

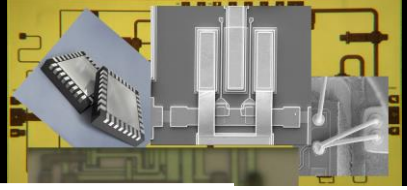
Eqn Phase_Imbalance=phase(-S21/S31)



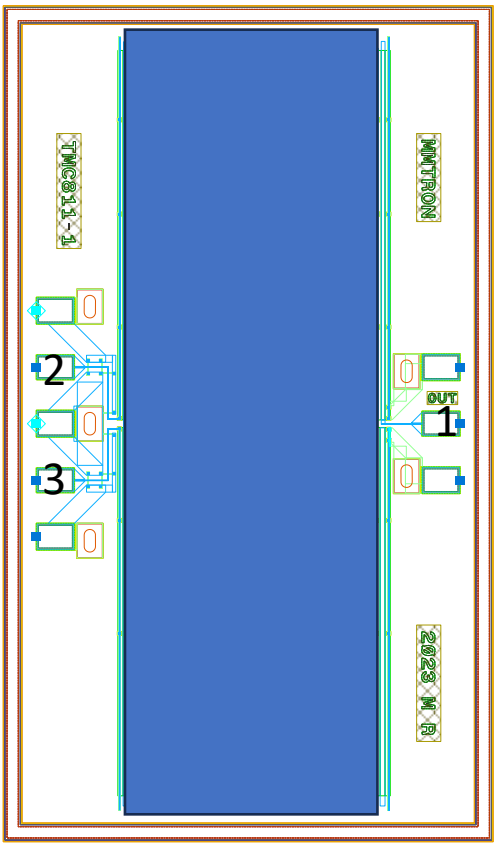



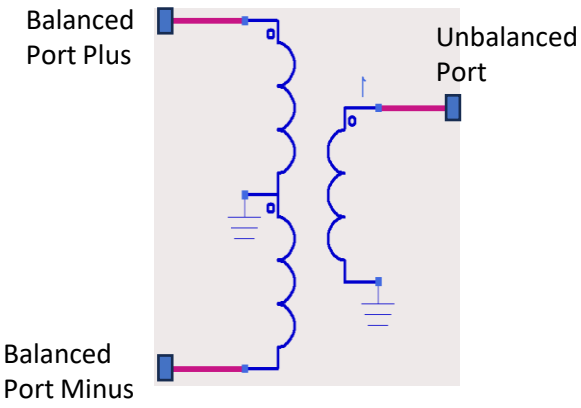





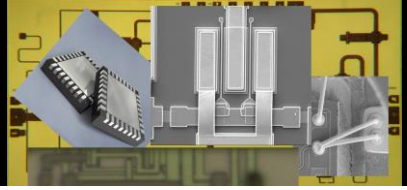




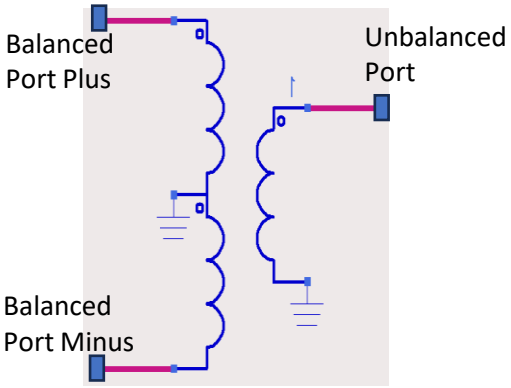




| Pad # | Function |
|---|---|
| 1 | Unbalanced Common port |
| 2 | Balanced Port Plus |
| 3 | Balanced Port Minus |

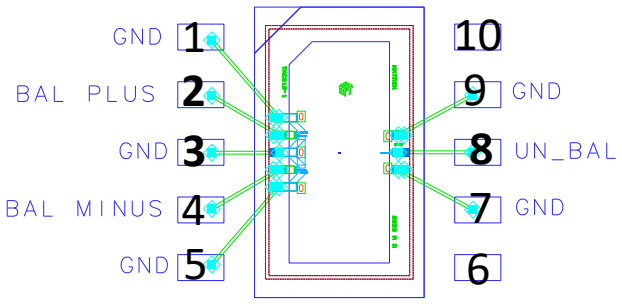
Pad 1 is open to ground and pads 2 and 3 are short to ground. The remaining 5 pads are GND.



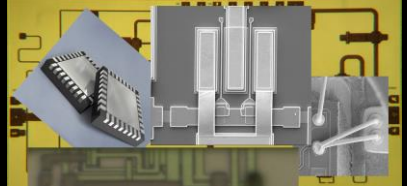





| Pad # | Function |
|---|---|
| 8 | Unbalanced port |
| 2 | Balanced Port Plus |
| 4 | Balanced Port Minus |
| 1,3,5,7,9 | GND |

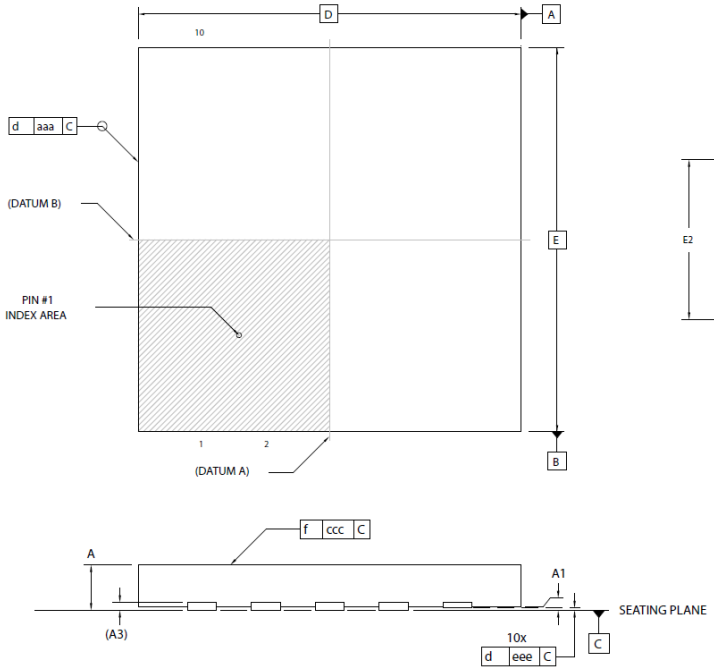



Packaged Version





| REVISIONS | | |
|---|---|---|
| REV | DESCRIPTION | DATE |
| B | ADDED PACKAGE THICKNESS OPTIONS | 4-1-2016 |




NOTES:
1) ALL DIMENSIONS IN MM
2) DIMENSIONING AND TOLERANCING PER ASME Y14.5-2009
3) DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM TERMINAL TIP



| SYMBOL | MIN | MAX | SYMBOL | MIN | MAX |
|---|---|---|---|---|---|
| A, V | 0.80 | 1.00 | E2 | 1.15 | 1.35 |
| A, W | 0.70 | 0.80 | e | 0.50 BSC | |
| A, L | 1.40 | 1.70 | k | 0.20 | - |
| A1 | 0.00 | 0.05 | L | 0.45 | 0.55 |
| A3 | 0.20 REF | | aaa | 0.10 | |
| b | 0.18 | 0.30 | bbb | 0.10 | |
| D | 3.00 BSC | | ccc | 0.10 | |
| D2 | 2.20 | 2.40 | ddd | 0.05 | |
| E | 3.00 BSC | | eee | 0.08 | |

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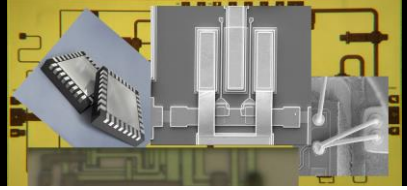
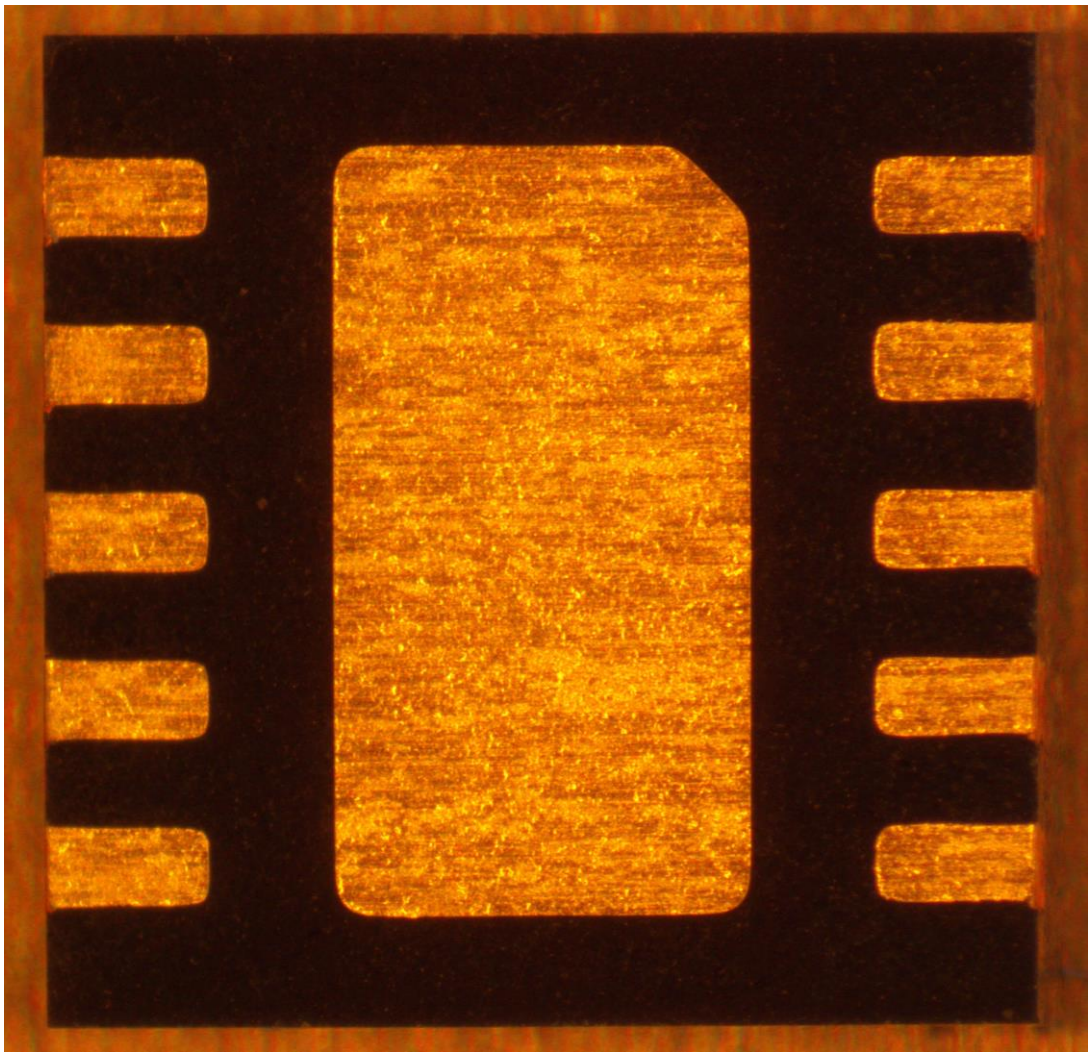
TITLE
DFN 10L 3x3 mm 0.50 PITCH
PACKAGE OUTLINE

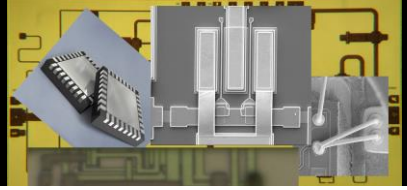
| LEADFRAME PART NO: | REV |
|---|---|
| 235-00054 | C |

| DO NOT SCALE | FILE NAME | SHEET |
|---|---|---|
| | 10L-DFN-3x3-50P-MOD.DWG | 1 OF 1 |











- Assembly Techniques
  - The TMC811-1D is fabricated using a GaAs-based semiconductor material structure. The die is back-metalized and can be mounted with standard assembly techniques. The mounting surface should be clean and flat.

- ESD Warning
  - III-V MMICs are ESD-sensitive. Preventative ESD measures must be employed in all aspects of storage, handling, and assembly. MMIC ESD precautions, handling considerations, and die-attach and bonding methods are critical factors in successful III-V MMIC performance and reliability.

- RoHS Compliance
  - This part is RoHS compliant, meeting the requirements of the EU Restriction of Hazardous Substances Directive 2002/95/EC, commonly known as RoHS. Six substances are regulated: lead, mercury, cadmium, chromium VI (hexavalent chromium), polybrominated biphenyls (PBB), and polybrominated biphenyl ethers (PBDE). RoHS compliance requires that any residual concentration of these substances is below the Directive's maximum concentration values (MCV): cadmium 100ppm by weight and all others 1000ppm by weight.

- Maximum Ratings

| Parameter | Function |
|---|---|
| Operating Temperature | -55 °C to 100 °C |
| Input RF Power | 35 dBm at 25 °C |