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SYMBOL AND ABBREVIATION LISTS

EH_0 : quasi-TEM mode

EH_1 : first higher-order mode

Quasi-TEM: quasi-transverse electromagnetic

CCS: Complementary-Conducting-Strip

CCSs: Complementary Conducting Strips

MS: microstrip

MSs: microstrips

TL: transmission line

TLs: transmission lines

CMOS: Complementary Metal-Oxide-Semiconductor

TSMC: Taiwan Semiconductor Manufacturing Company

1P5M: one ploy and five metal layers

MIM: Metal-Isolator-Metal

2-D TL: two-dimensional transmission line

Z_c : characteristic impedance

SWF: slow-wave factor

MICs: microwave integrated circuits

MIC: microwave integrated circuit

$\underline{\underline{S_p}}$: power-wave scattering parameter matrix

γ : propagation constant, $\gamma = j\beta + \alpha$ ($e^{j\omega t} e^{-\gamma}$ assumed)

β : phase constant

α : attenuation constant

$\text{Re}(Z_c)$: real part of characteristic impedance

$\text{Im}(Z_c)$: imaginary part of characteristic impedance

k_0 : the free-space wave number ($= \frac{2\pi}{\lambda_0}$ or $\frac{2\pi f}{c}$)

β/k_0 : normalized phase constant
 α/k_0 : normalized attenuation constant
 λ_g : the guided wavelength
 λ_0 : the free-space guided wavelength
D.C., DC: direct current
LTCCs: low-temperature co-fired ceramics
PCBs: printed circuit boards
MMIC: monolithic microwave integrated circuit
MMICs: monolithic microwave integrated circuits
GaAs: gallium arsenide
 ϵ_r : relative permittivity
 μ_r : relative permeability
MIS: metal-insulator-semiconductor
MS: microstrip
SWF: slow-wave factor
TFMSs: thin-film microstrips
TFMS: thin-film microstrip
HMICs: hybrid microwave integrated circuits
HMIC: hybrid microwave integrated circuit
SiON: silicon oxynitride
CPW: coplanar waveguide
PLL: phase-locked-loop
DIL: dielectric imaging line
1-D: one-dimensional
2-D: two-dimensional
pHEMT: pseudomorphic high electron-mobility transistor
ARF: area reduction factor
 Z_0 : referenced impedance, typically equal to 50 ohm



SMA: subminiature A

BFN: Beam forming network

UC-PBG: uniplanar compact photonic-bandgap

EME: electric-magnetic-electric

2-D TL: two-dimensional transmission-line

RFIC: radio frequency integrated circuit

RFICs: radio frequency integrated circuits

RF: radio frequency

