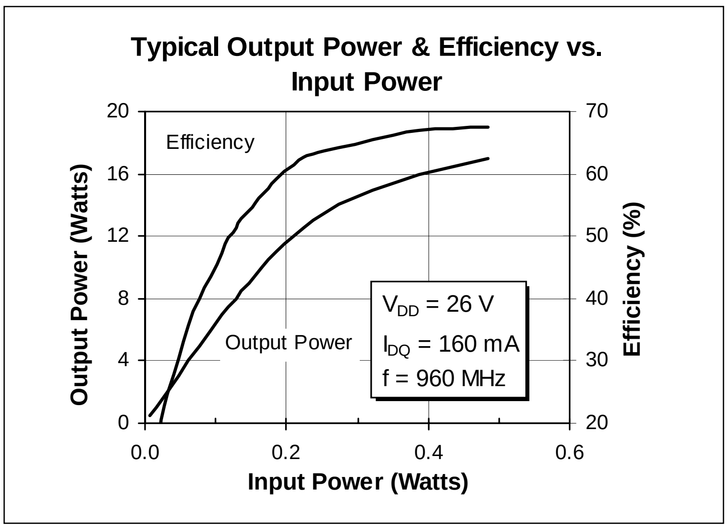
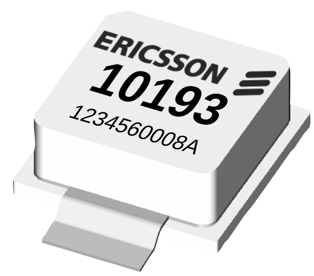
PTF 10193
12 Watts, 860-960 MHz
GOLDMOS Field Effect Transistor

Description

The PTF 10193 is an internally matched, 12–watt *GOLDMOS* FET intended for GSM, CDMA and TDMA amplifier applications from 860 to 960 MHz. This device operates at 60% efficiency with 18 dB typical gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- ***INTERNALLY MATCHED***
- **Performance at 960 MHz, 26 Volts**
  - Output Power = 12 Watts
  - Efficiency = 60% Typ
  - Power Gain = 18 dB Typ
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **Surface Mountable**
- **Available in Tape and Reel**
- **100% Lot Traceability**





Package 20259

RF Specifications (100% Tested)

Characteristic	Symbol	Min	Typ	Max	Units
Common Source Power Gain (V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 160 mA, f = 960 MHz)	G_{ps}	17.0	18	—	dB
Power Output at 1 dB Compressed (V_{DD} = 26 V, I_{DQ} = 160 mA, f = 960 MHz)	P-1dB	12	14	—	Watts
Drain Efficiency (V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 160 mA, f = 960 MHz)	η	55	60	—	%
Load Mismatch Tolerance (V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 160 mA, f = 921 MHz —all phase angles at frequency of test)	Ψ	—	—	10:1	—

All published data at T_{CASE} = 25°C unless otherwise indicated.

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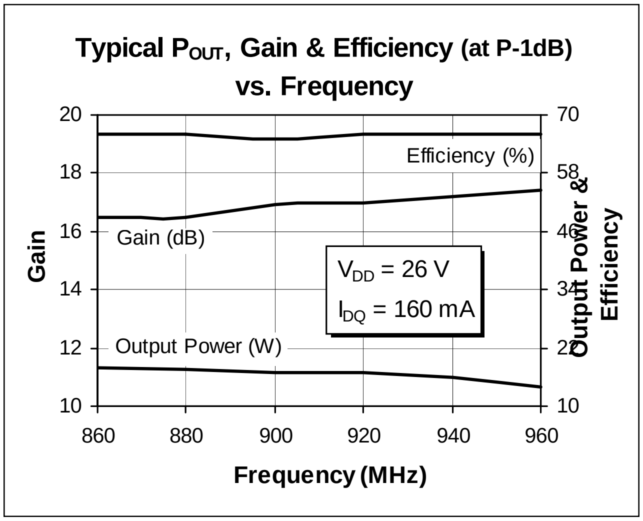
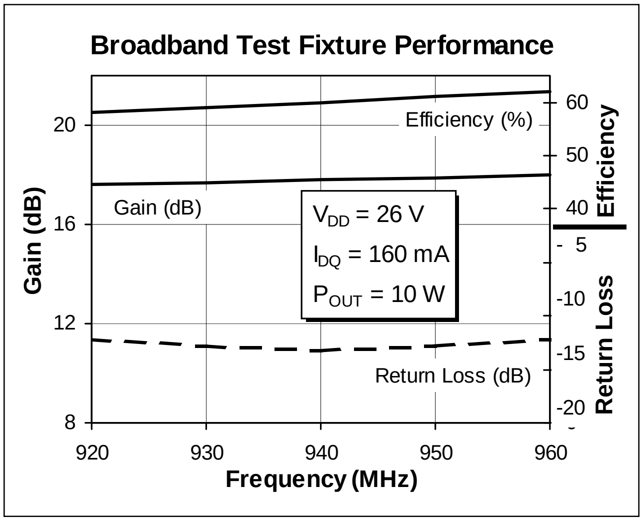
Electrical Characteristics (100% Tested)

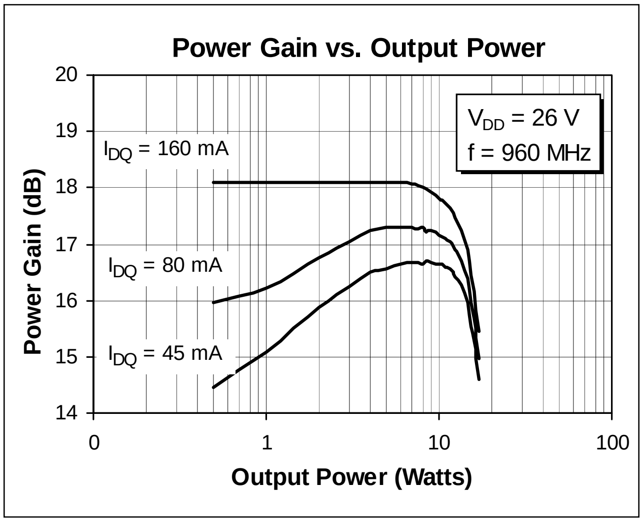
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 25 mA	$V_{(BR)DSS}$	65	—	—	Volts
Drain-Source Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 75 mA	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance	V_{DS} = 10 V, I_D = 0.5 A	g_{fs}	—	0.9	—	Siemens

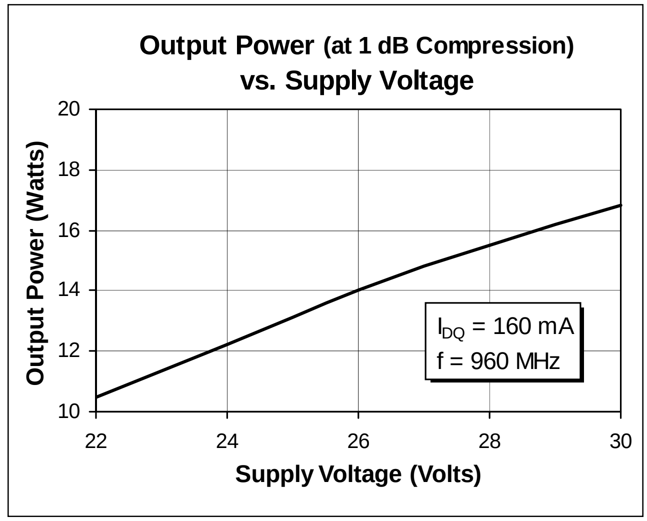
Maximum Ratings

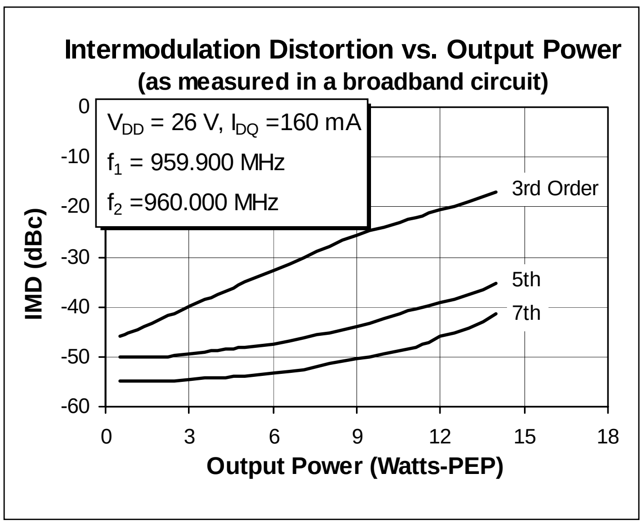
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	±20	Vdc
Operating Junction Temperature	T_J	200	°C
Total Device Dissipation Above 25°C derate by	P_D	58 0.33	Watts W/°C
Storage Temperature Range	T_{STG}	–40 to 150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	3.0	°C/W

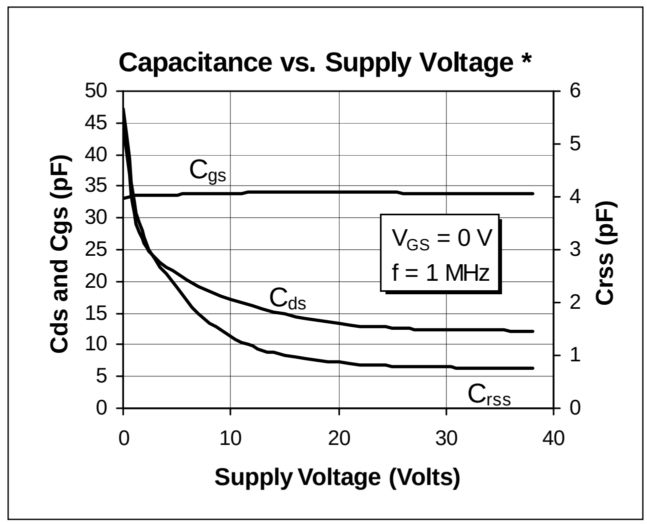


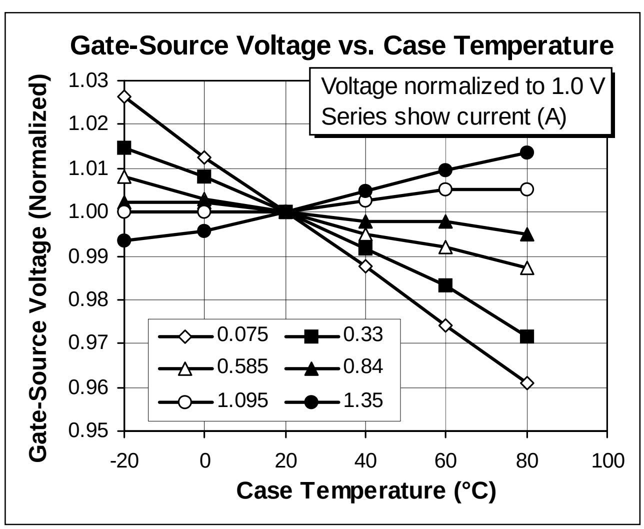










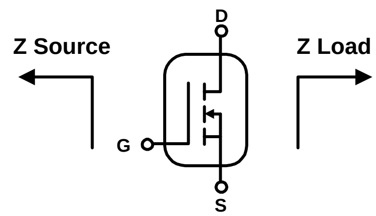


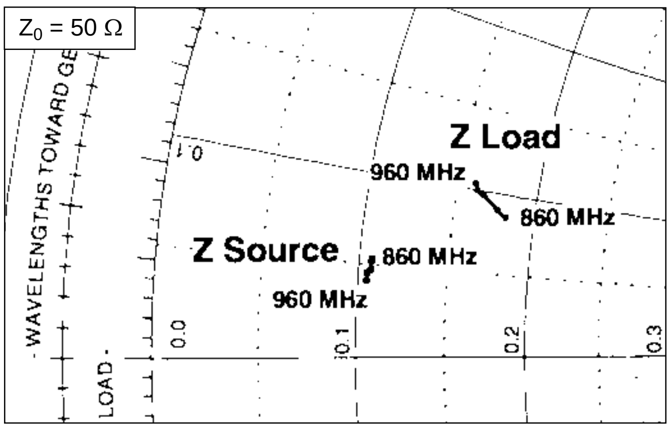
* This part is internally matched. Measurements of the finished product will not yield these figures.

Impedance Data

V_{DD} = 26 V, I_{DQ} = 160 mA, P-1dB = 12 W

Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
860	2.0	2.7	5.8	4.4
880	2.0	2.6	5.5	4.6
900	2.0	2.4	5.0	5.0
920	1.9	2.3	4.8	5.1
960	1.9	2.1	4.7	5.3



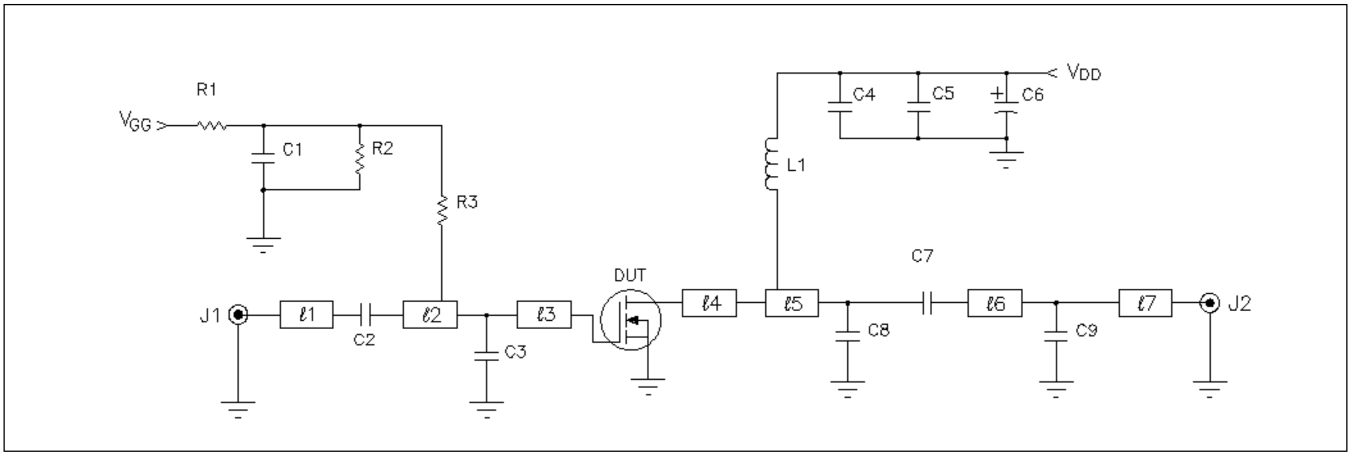


Typical Scattering Parameters

(V_{DS} = 26 V, I_D = 400 mA)

f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
300	-0.284	-169	12.4	47.8	-42.7	-34.2	-1.62	-99.9
350	-0.266	-171	10.7	41.6	-43.7	-38.9	-1.34	-108
400	-0.241	-172	9.20	36.1	-44.7	-41.9	-1.24	-115
450	-0.243	-173	7.86	31.2	-45.4	-45.0	-1.08	-121
500	-0.231	-175	6.68	26.7	-46.7	-47.2	-0.958	-126
550	-0.223	-176	5.74	22.6	-47.6	-49.8	-0.852	-131
600	-0.231	-177	4.90	18.8	-48.7	-51.6	-0.818	-135
650	-0.233	-178	4.22	14.9	-49.6	-50.6	-0.697	-138
700	-0.241	-179	3.77	11.3	-50.7	-50.0	-0.633	-141
750	-0.250	-180	3.53	7.19	-51.5	-51.1	-0.593	-144
800	-0.287	179	3.36	2.91	-52.3	-48.2	-0.576	-146
850	-0.325	178	3.54	-1.78	-53.1	-50.9	-0.449	-148
900	-0.397	177	4.04	-7.86	-53.4	-52.3	-0.391	-150
950	-0.539	176	4.89	-15.7	-53.4	-56.9	-0.342	-152
1000	-0.839	174	6.06	-27.7	-52.4	-68.8	-0.247	-154
1050	-1.45	174	7.55	-47.7	-50.9	-97.0	-0.114	-156
1100	-1.98	180	8.01	-79.6	-49.6	-140	-0.232	-159
1150	-1.33	-175	5.76	-113	-49.5	175	-0.463	-160
1200	-0.689	-176	2.23	-134	-50.5	147	-0.527	-161
1250	-0.379	-177	-1.11	-146	-50.5	127	-0.535	-162
1300	-0.231	-178	-4.10	-155	-50.5	118	-0.552	-162
1350	-0.170	-179	-6.82	-159	-50.2	109	-0.463	-163
1400	-0.123	-180	-9.12	-164	-49.8	104	-0.470	-164
1450	-0.101	179	-11.2	-167	-49.3	101	-0.493	-164
1500	-0.072	179	-13.2	-170	-49.1	99.7	-0.466	-165

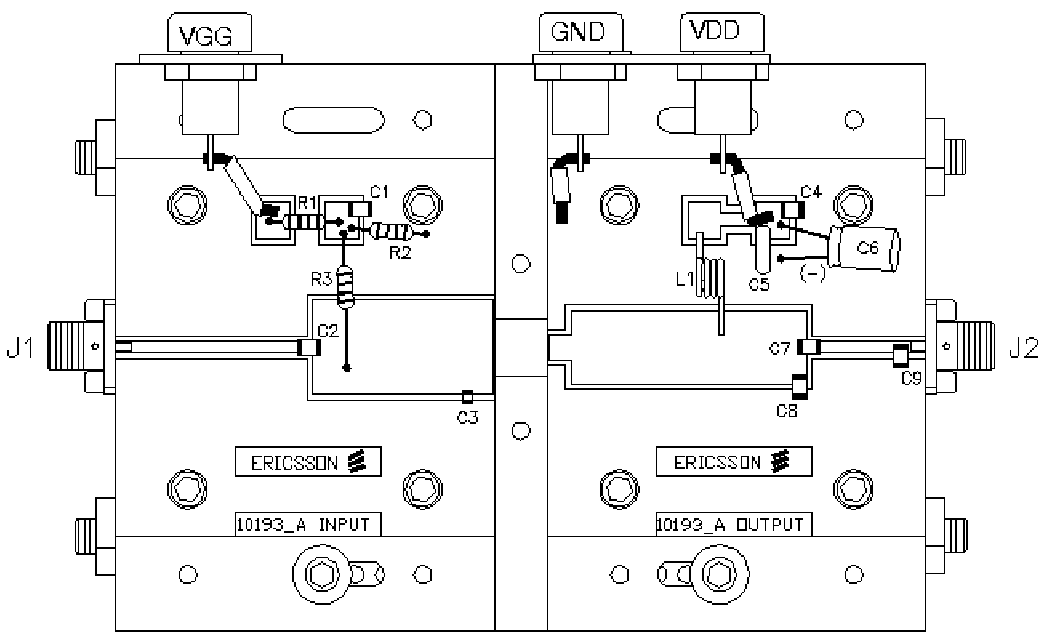
Test Circuit



Test Circuit Schematic for f = 960 MHz

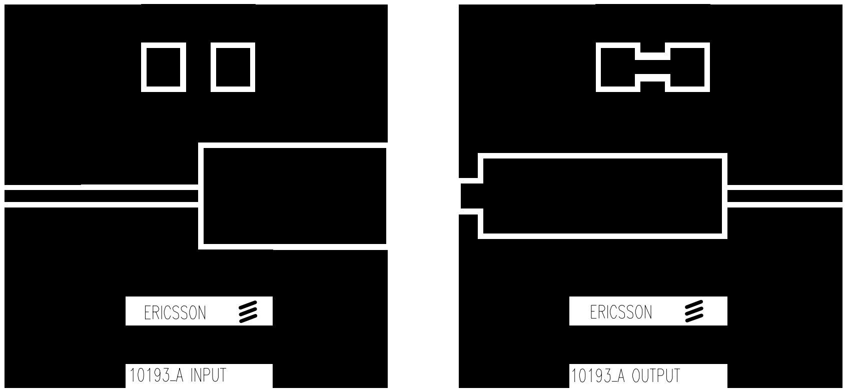
DUT	PTF 10193	
ℓ1	0.1425 λ 960 MHz	Microstrip 50 Ω
ℓ2	0.1309 λ 960 MHz	Microstrip 9.29 Ω
ℓ3	0.1640 λ 960 MHz	Microstrip 9.29 Ω
ℓ4	0.0174 λ 960 MHz	Microstrip 29.4 Ω
ℓ5	0.1916 λ 960 MHz	Microstrip 11.72 Ω
ℓ6	0.0535 λ 960 MHz	Microstrip 50 Ω
ℓ7	0.0321 λ 960 MHz	Microstrip 50 Ω

C1, C2, C4, C7	Capacitor, 36 pF	100B 360
C3	Capacitor, 5.1 pF	100A 5R1
C5	Capacitor, 0.1 μF, 50 V	DIGI-KEY P4525-ND
C6	Capacitor, 100 μF, 50 V	DIGI-KEY P5182-ND
C8	Capacitor, 3.6 pF	100B 3R6
C9	Capacitor, 2.7 pF	100B 2R7
R1, R2, R3	Resistor, 220 Ω	DIGI-KEY 220QBK-ND
L1	4 Turns, 20 AWG, .120 I.D.N/A	
Circuit Board	G200, .031" Thick, 2 oz. Copper	
	ε_r = 4.00, AlliedSignal	



Assembly Diagram (not to scale)

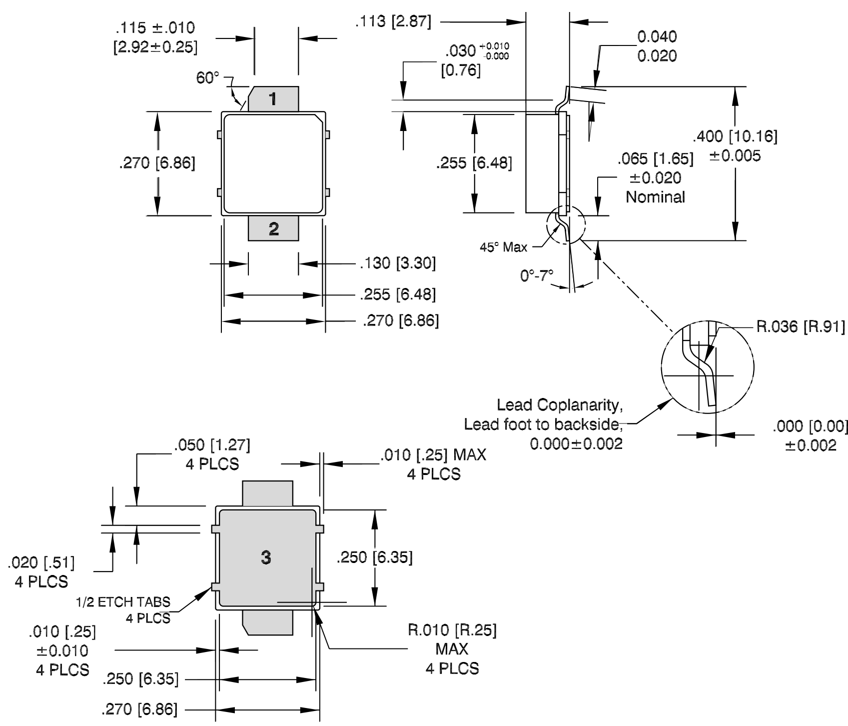
Test Circuit



Artwork (not to scale)

Case Outline Specifications

Package 20259



Pins: 1.Drain 2.Gate 3.Source
All tolerances ±.005" unless
otherwise specified.

Lead Thickness:
.005 +.002/-.001 [0.13 +.05/-0.03]
Shaded areas indicate plated metallization

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Specifications subject to change without notice.
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