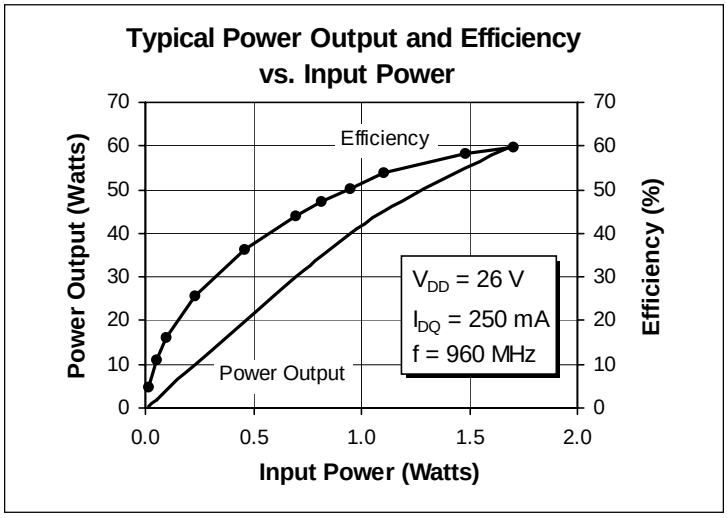
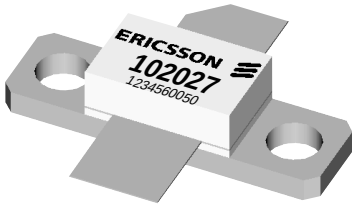
PTF 102027
40 Watts, 925–960 MHz
GOLDMOS® Field Effect Transistor

Description

The PTF 102027 is a 40–watt *GOLDMOS* FET intended for EDGE applications from 925 to 960 MHz. This device operates at 53% efficiency with 15 dB of gain typical. Full gold metallization ensures excellent device lifetime and reliability.

- **Performance at 960 MHz, 26 Volts**
  - **Output Power = 40 Watts**
  - **Power Gain = 15.0 dB Typical**
  - **Efficiency = 53% Typical**
- **Full Gold Metallization**
- **Excellent Thermal Stability**
- **100% Lot Traceability**





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RF Specifications (100% Tested)

Characteristic	Symbol	Min	Typ	Max	Units
Gain (V_{DD} = 26 V, P_{OUT} = 40 W, I_{DQ} = 250 mA, f = 960 MHz)	G_{pe}	14.5	15	—	dB
Power Output at 1 dB Compression (V_{DD} = 26 V, I_{DQ} = 250 mA, f = 960 MHz)	P-1dB	40	45	—	Watts
Drain Efficiency (V_{DD} = 26 V, P_{OUT} = 40 W, I_{DQ} = 250 mA, f = 960 MHz)	η	40	53	—	%
Load Mismatch Tolerance (V_{DD} = 26 V, P_{OUT} = 40 W, I_{DQ} = 250 mA, f = 960 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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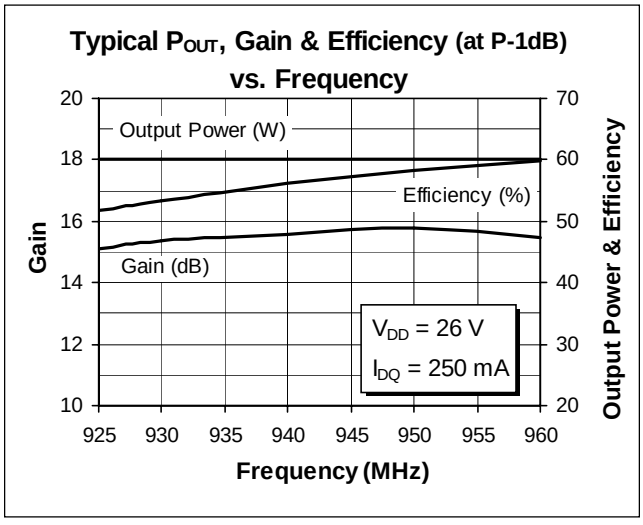
Electrical Characteristics (100% Tested)

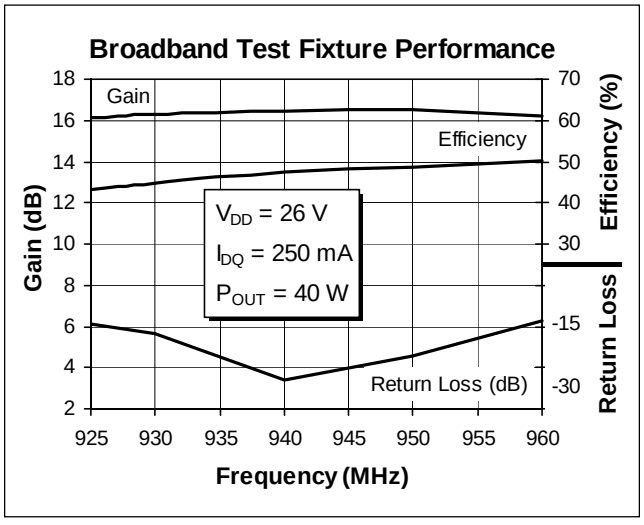
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 25 mA	$V_{(BR)DSS}$	65	—	—	Volts
Drain-Source Leakage Current	V_{DS} = 26 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 100 mA	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance	V_{DS} = 5 V, I_D = 3 A	g_{fs}	—	2.0	—	Siemens

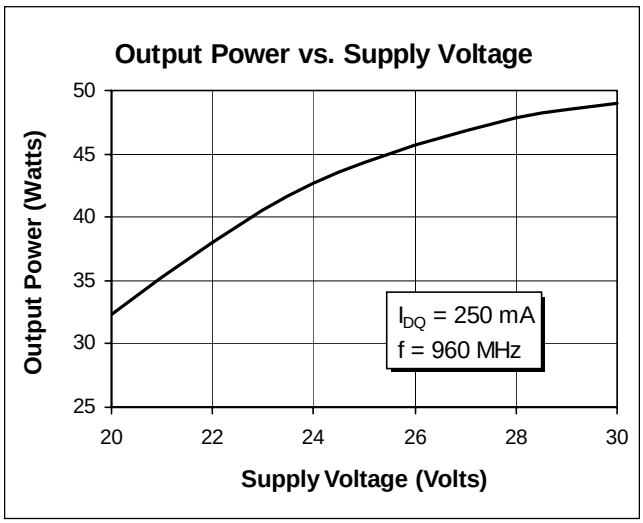
Maximum Ratings

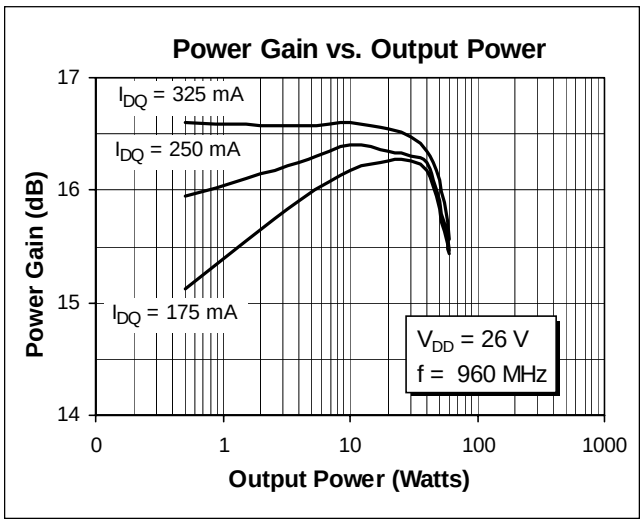
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	±20	Vdc
Operating Junction Temperature	T_J	200	°C
Total Device Dissipation Above 25°C derate by	P_D	125 0.714	Watts W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	1.4	°C/W

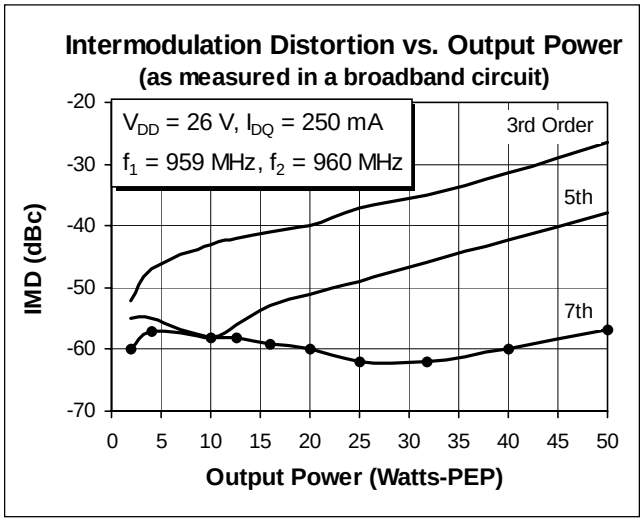
Typical Performance

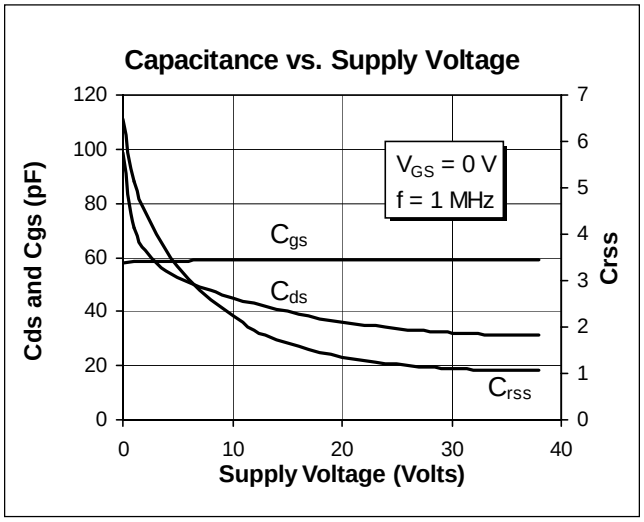


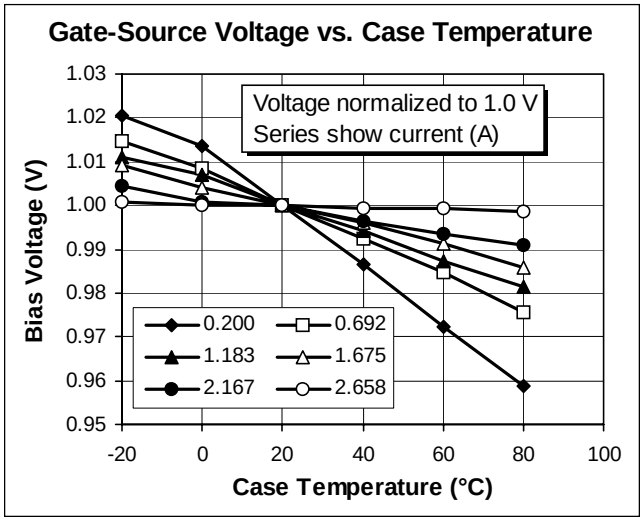



Output Power vs. Supply Voltage
Output Power (Watts)
50
45
40
35
30
25
20
22
24
26
28
30
Supply Voltage (Volts)
I_{DQ} = 250 mA
f = 960 MHz


Power Gain vs. Output Power
Power Gain (dB)
17
16
15
14
0
1
10
100
1000
Output Power (Watts)
I_{DQ} = 325 mA
I_{DQ} = 250 mA
I_{DQ} = 175 mA
V_{DD} = 26 V
f = 960 MHz


Intermodulation Distortion vs. Output Power
(as measured in a broadband circuit)
IMD (dBc)
-20
-30
-40
-50
-60
-70
0
5
10
15
20
25
30
35
40
45
50
Output Power (Watts-PEP)
V_{DD} = 26 V, I_{DQ} = 250 mA
f_1 = 959 MHz, f_2 = 960 MHz
3rd Order
5th
7th


Capacitance vs. Supply Voltage
Cds and Cgs (pF)
120
100
80
60
40
20
0
Crss
7
6
5
4
3
2
1
0
0
10
20
30
40
Supply Voltage (Volts)
V_{GS} = 0 V
f = 1 MHz
C_{gs}
C_{ds}
C_{rss}


Gate-Source Voltage vs. Case Temperature
Bias Voltage (V)
1.03
1.02
1.01
1.00
0.99
0.98
0.97
0.96
0.95
-20
0
20
40
60
80
100
Case Temperature (°C)
Voltage normalized to 1.0 V
Series show current (A)
0.200
0.692
1.183
1.675
2.167
2.658

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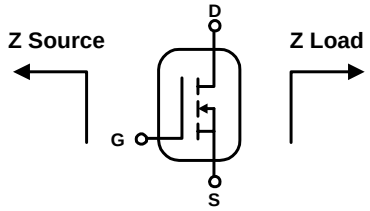
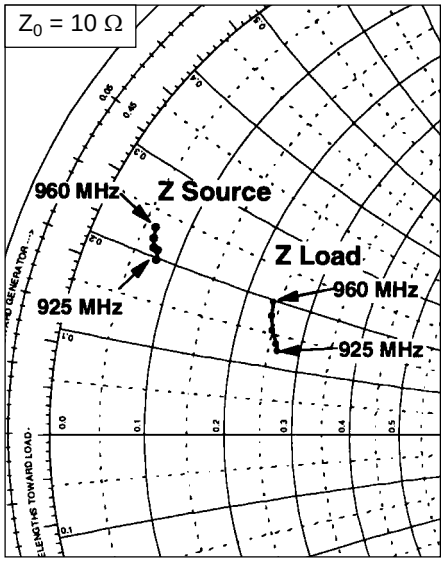
Impedance Data

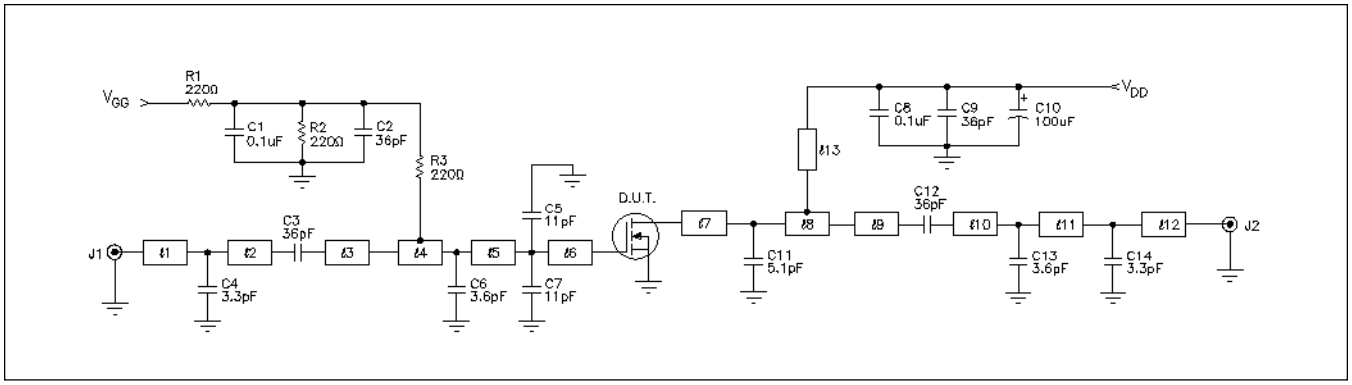
V_{DD} = 26 V, P_{OUT} = 40 W, I_{DQ} = 250 mA





Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
925	0.770	1.98	2.64	1.28
930	0.750	2.09	2.60	1.38
940	0.700	2.10	2.50	1.57
950	0.650	2.20	2.43	1.78
960	0.625	2.32	2.40	1.98

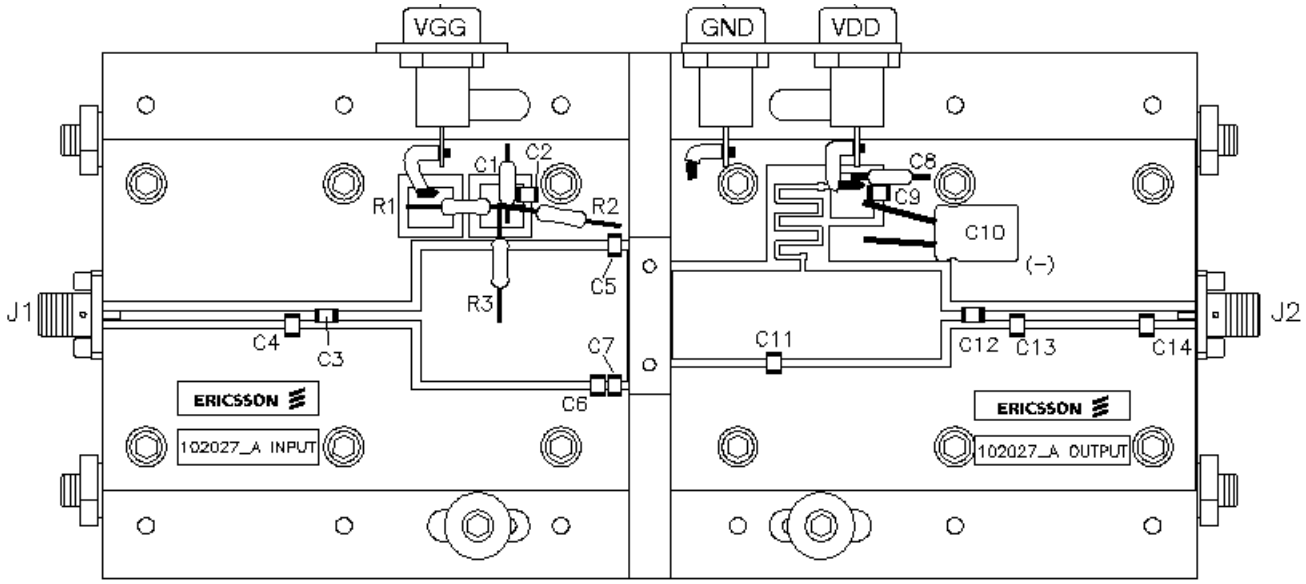
Test Circuit



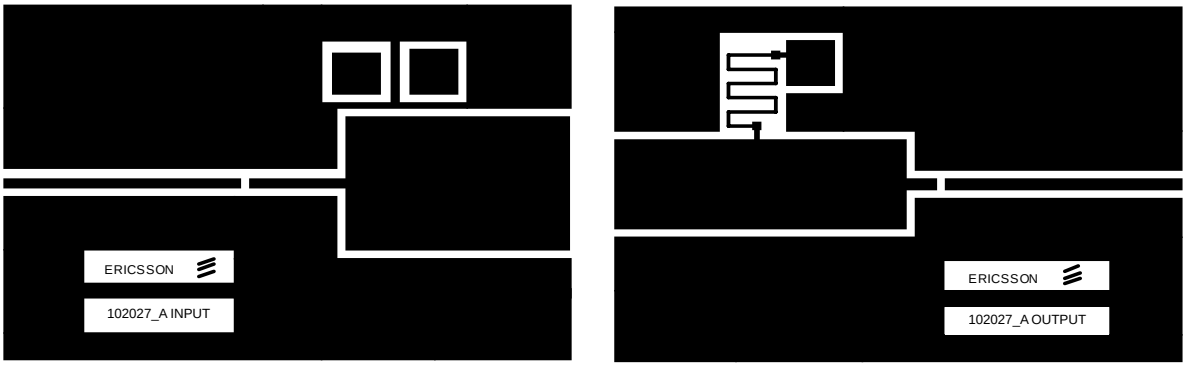
Test Circuit Schematic for f = 960 MHz

DUT	PTF 102027	LDMOS Transistor
ℓ 1, ℓ 9	0.169 λ 960 MHz	Microstrip 50 Ω
ℓ 2	0.020 λ 960 MHz	Microstrip 50 Ω
ℓ 3	0.079 λ 960 MHz	Microstrip 50 Ω
ℓ 4	0.158 λ 960 MHz	Microstrip 7.0 Ω
ℓ 5, ℓ 6	0.016 λ 960 MHz	Microstrip 7.0 Ω
ℓ 7	0.095 λ 960 MHz	Microstrip 10 Ω
ℓ 8	0.150 λ 960 MHz	Microstrip 10 Ω
ℓ 10	0.047 λ 960 MHz	Microstrip 50 Ω
ℓ 11	0.118 λ 960 MHz	Microstrip 50 Ω
ℓ 12	0.254 λ 960 MHz	Microstrip 50 Ω
ℓ 13	0.315 λ 960 MHz	Microstrip 85 Ω

C1, C8	Capacitor, 0.1 µF, 50V	Digi-Key P4525-ND
C2, C3, C9, C12	Capacitor, 36 pF	100B 360
C6, C13	Capacitor, 3.6 pF	100B 3R6
C4, C14	Capacitor, 3.3 pF	100B 3R3
C5, C7	Capacitor, 11 pF	100B 110
C10	Capacitor, 100 µF, 50 V	Digi-Key P5182-ND
C11	Capacitor, 5.1 pF	100B 5R1
J1, J2	Connector, SMA, Female, Panel Mount	
	Ericsson, #Rpm 513 412/53	
R1, R2, R3	Resistor, 220 ohm, 1/4W	Digi-Key 220QBK-ND
PCB	.031” Thick, 2 Oz Copper Both Sides	
	AlliedSignal, G200	



Assembly Diagram (not to scale)



Artwork (not to scale)

Case Outline Specifications

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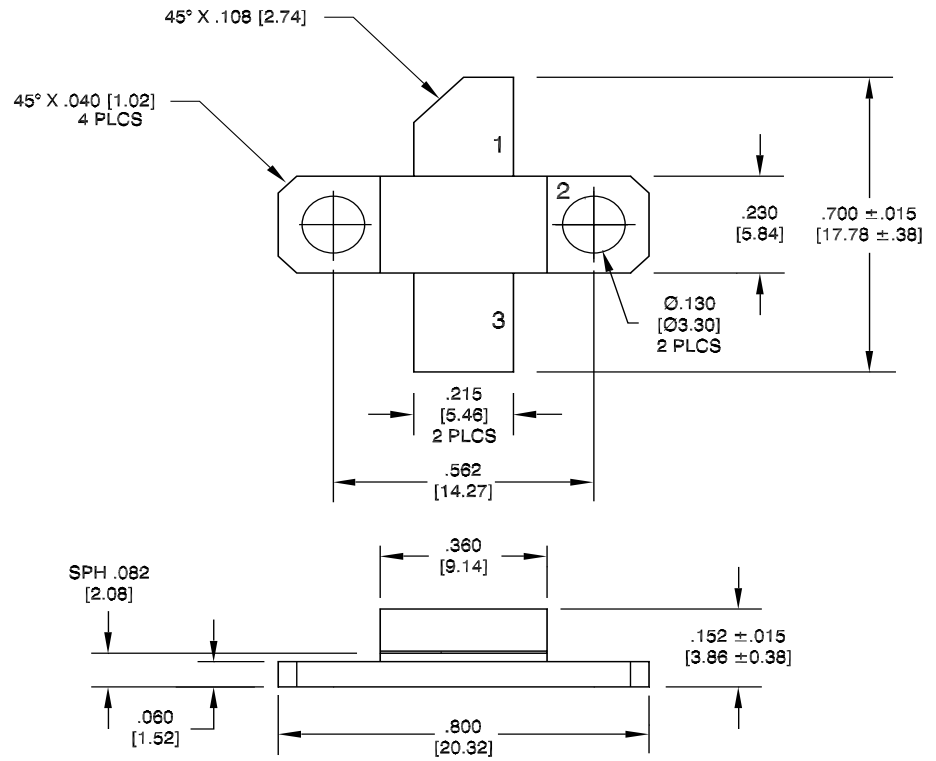

Unless Otherwise Specified
all tolerance ±0.005" [0.13mm]

Pins: 1. Drain 2. Source 3. Gate
Lead Thickness: 0.004±0.001" [0.10±0.03mm]

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