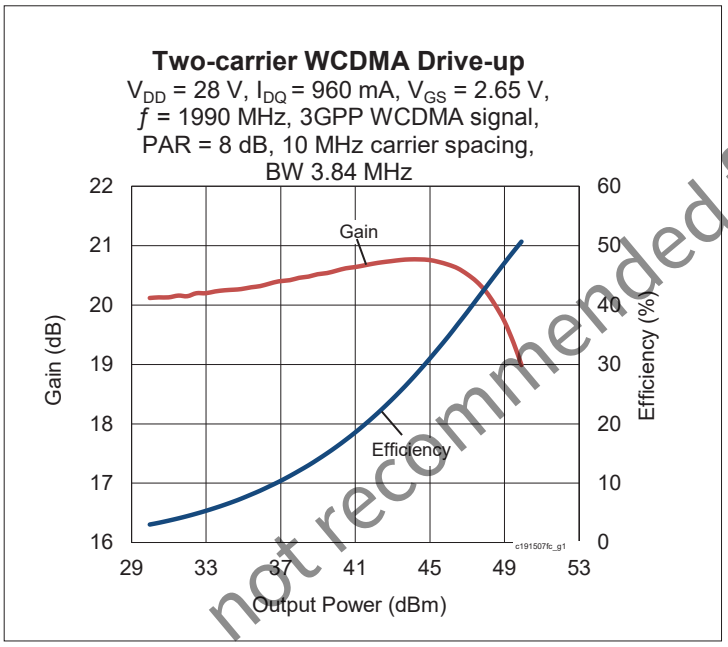
PXFC191507FC

Thermally-Enhanced High Power RF LDMOS FET
150 W, 28 V, 1805 – 1990 MHz

Description

The PXFC191507FC is a 150-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 1805 to 1990 MHz frequency band. Features include input and output matching, high gain and thermally-enhanced package with earless flanges. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PXFC191507FC
Package H-37248G-4/2



Features

- Broadband internal input and output matching
- Typical Pulsed CW performance, 1990 MHz, 28 V, 10 µs pulse width, 10% duty cycle, class AB test
  - Output power at P_{1dB} = 140 W
  - Efficiency = 54%
  - Gain = 19.5 dB
- Typical single-carrier WCDMA performance, 1990 MHz, 28 V, 10 dB PAR @ 0.01% CCDF, Test Model 1 with 16DPCH
  - Output power = 32 W avg
  - Efficiency = 34%
  - Gain = 20 dB
  - ACPR = –31 dBc@ 5 MHz
- Capable of handling 10:1 VSWR @28 V, 150 W (CW) output power
- Integrated ESD protection : Human Body Model, Class 1C (per JESD22-A114)
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Two-carrier WCDMA Specifications (tested in Wolfspeed production test fixture)
V_{DD} = 28 V, I_{DQ} = 960 mA, P_{OUT} = 32 W avg, f_1 = 1980 MHz, f_2 = 1990 MHz, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	19	20.5	—	dB
Drain Efficiency	η_D	29	31	—	%
Intermodulation Distortion	IMD	—	–33	–31	dBc

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

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DC Characteristics (each side)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 10 mA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	0.05	1	µA
	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10	µA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.05	—	Ω
Operating Gate Voltage	V_{DS} = 26 V, I_{DQ} = 960 mA	V_{GS}	2.3	2.6	2.9	V
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1	µA

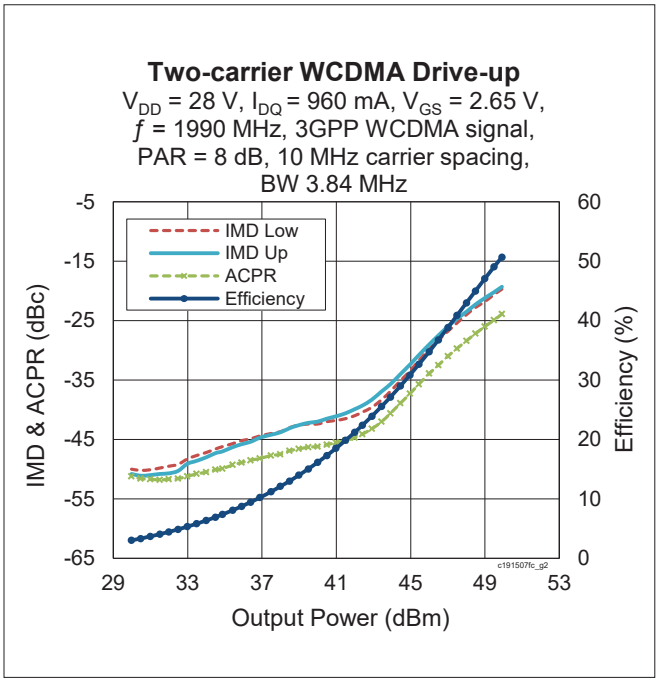
Maximum Ratings

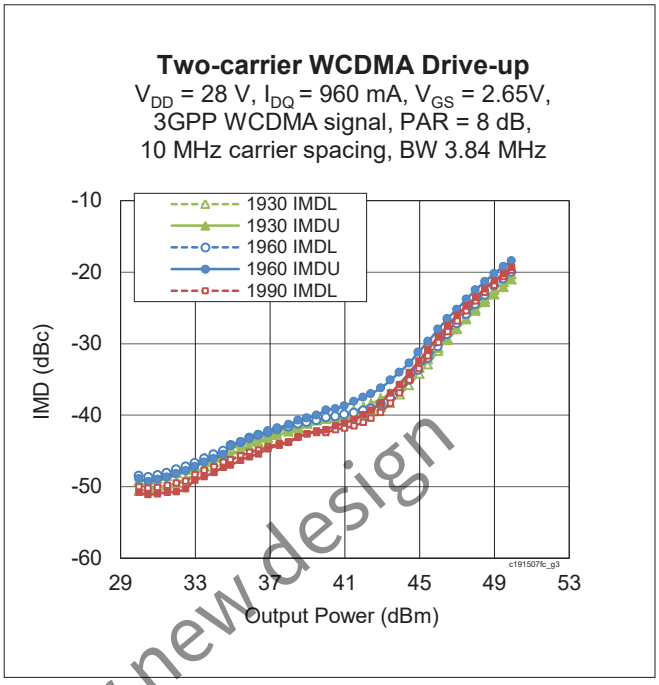
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–6 to +10	V
Operating Voltage	V_{DD}	0 to +32	V
Junction Temperature	T_J	225	°C
Storage Temperature Range	T_{STG}	–65 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 140 W CW)	$R_{\theta JC}$	0.43	°C/W

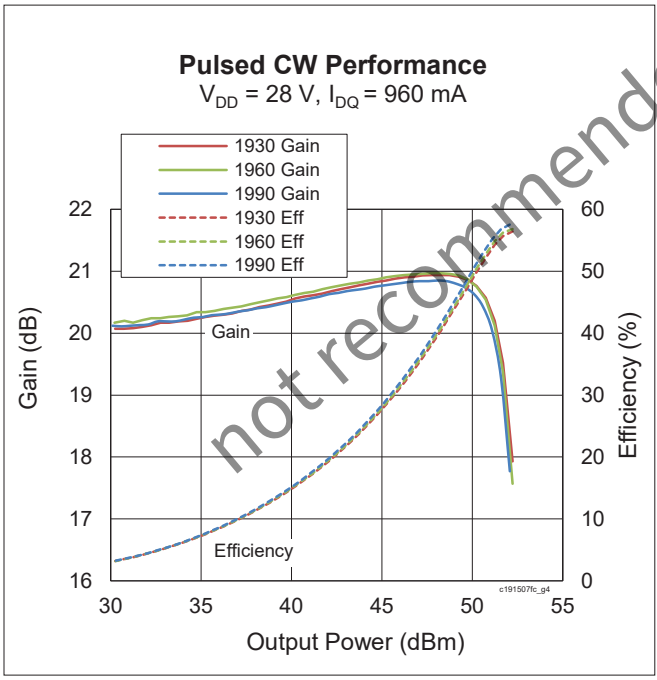
Ordering Information

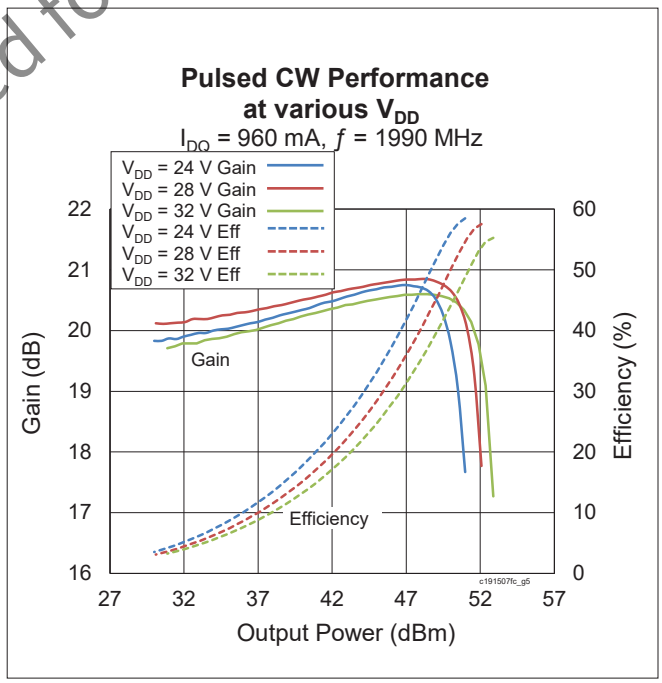
Type and Version	Order Code	Package Description	Shipping
PXFC191507FC V1 R0	PXFC191507FC-V1-R0	H-37248G-4/2, earless flange	Tape & Reel, 50 pcs
PXFC191507FC V1 R250	PXFC191507FC-V1-R250	H-37248G-4/2, earless flange	Tape & Reel, 250 pcs

Typical Performance (data taken in a production test fixture)

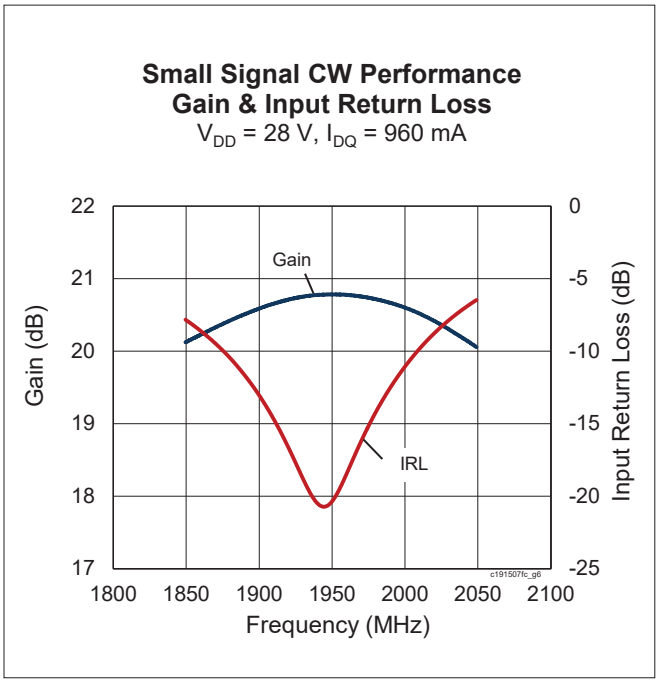




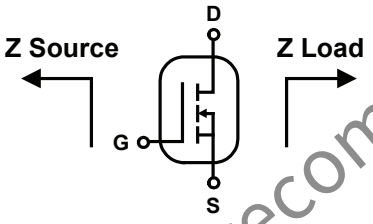




Typical Performance (cont.)



Broadband Circuit Impedance



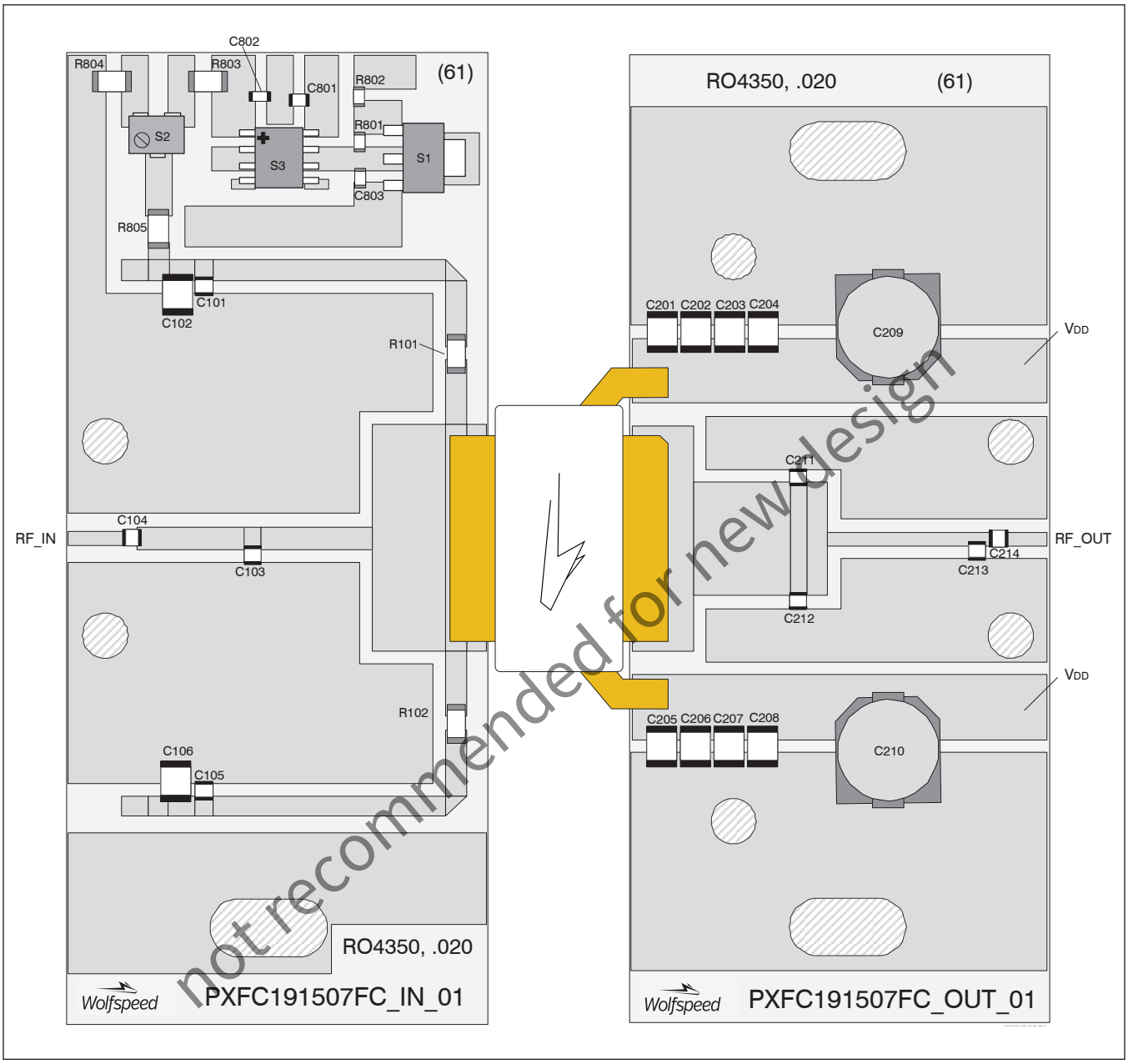
Freq [MHz]	Z Source Ω		Z Load Ω	
	R	jX	R	jX
1930	1.34	–4.30	1.55	–3.14
1960	1.28	–4.15	1.54	–2.99
1990	1.25	–4.04	1.52	–2.86

Load Pull Performance

Main Side Load Pull Performance – Pulsed CW signal: 100 µs, 10% duty cycle, V_{DD} = 28 V, I_{DQ} = 960 mA

		P_{1dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Zs [Ω]	Zl [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]	Zl [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]
1805	1.00 – j3.39	1.36 – j2.81	18.2	52.30	170	58.1	2.82 – j2.46	20.4	50.40	110	65.7
1880	1.38 – j3.80	1.26 – j3.35	17.8	52.10	164	54.7	2.48 – j2.33	20.2	50.50	112	64.8
1930	1.88 – j4.65	1.14 – j3.38	17.6	52.10	162	52.1	2.25 – j2.06	20.1	50.20	104	63.7
1990	2.85 – j4.62	1.31 – j3.40	18.4	52.00	157	56.4	1.81 – j2.40	19.9	50.60	116	62.8

Reference Circuit , 1930 – 1990 MHz



Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)

Reference Circuit Assembly

DUT	PXFC191507FC V1
Test Fixture Part No.	LTN/PXFC191507FC V1
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, ε_r = 3.66, f = 1930 – 1990 MHz
Find Gerber files for this test fixture on the Wolfspeed Web site at www.wolfspeed.com/RF	

Components Information

Component	Description	Suggested Manufacturer	P/N
Input			
C101, C104, C105,	Capacitor, 33 pF	ATC	ATC800A330JT250
C102, C106	Capacitor, 10 µF	Taiyo Yuden	UMK325C7106MM-T
C103	Capacitor, 1.0 pF	ATC	ATC800A1R0BT250
C801, C802, C803	Capacitor, 1000 pF	Panasonic Electronic Components	ECJ-1VB1H102K
R101, R102, R805	Capacitor, 10 ohms	Panasonic Electronic Components	ERJ-8GEYJ100V
R801	Resistor, 1200 Ohm	Panasonic Electronic Components	ERJ-3GEYJ122V
R802	Resistor, 1300 Ohm	Panasonic Electronic Components	ERJ-3GEYJ132V
R803, R804	Capacitor, 100 ohms	Panasonic Electronic Components	ERJ-8GEYJ101V
S1	Transistor	Infineon Technologies	BCP56
S2	Potentiometer, 2k Ω	Bourns Inc.	3224W-1-202E
S3	Voltage Regulator	Texas Instruments	LM7805
Output			
C201, C202, C203, C204, C205, C206, C207, C208	Capacitor, 10 µF	Taiyo Yuden	UMK325C7106MM-T
C209, C210	Capacitor, 220 µF	Panasonic Electronic Components	EEE-FP1V221AP
C211, C212, C213	Capacitor, 0.3 pF	ATC	ATC800A0R3BT250
C214	Capacitor, 33 pF	ATC	ATC800A330JT250

Package Outline Specifications

Package H-37248G-4/2

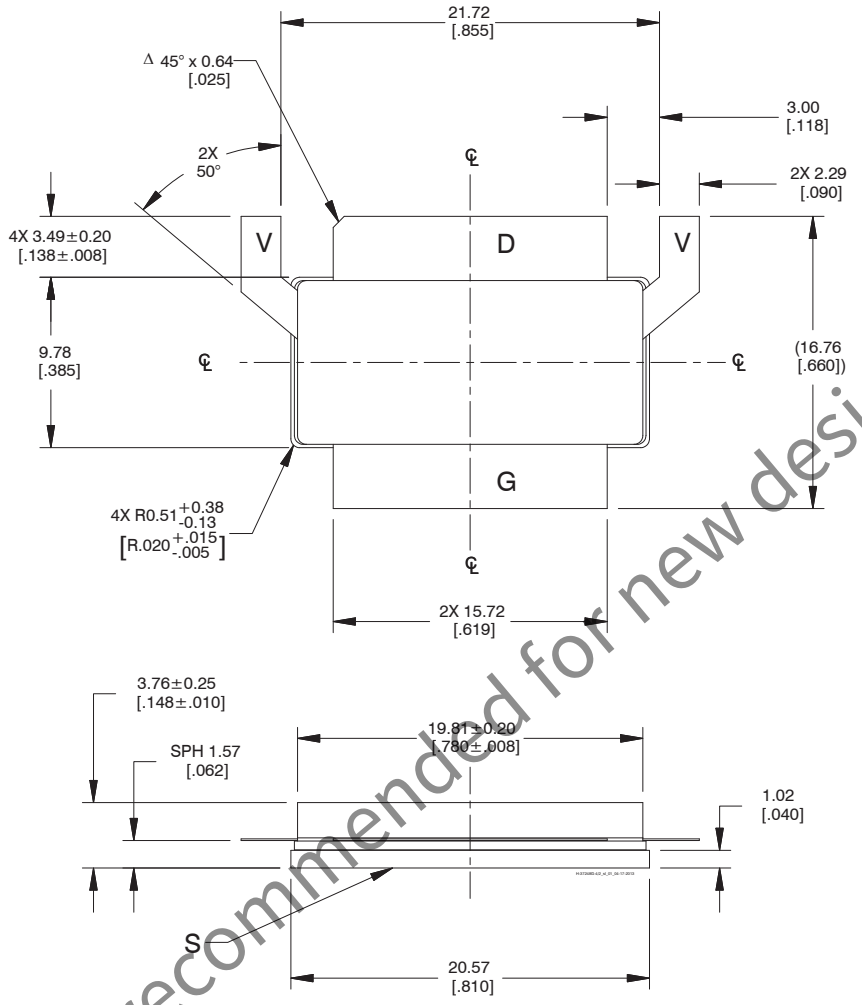


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [.005] unless specified otherwise.
4. Pins: D – drain; G – gate; S – source; V – V_{DD}.
5. Lead thickness: 0.10 + 0.051/-0.025 mm [.004 +0.002/-0.001 inch].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].

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