PTFA080551E/F

Thermally-Enhanced High Power RF LDMOS FETs
55 W, 869 – 960 MHz

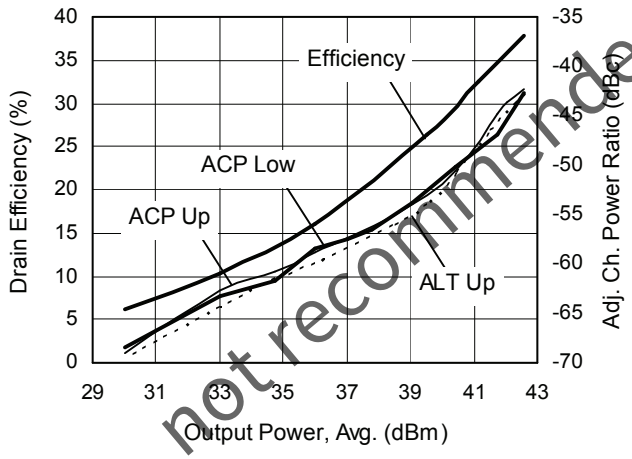
Description

The PTFA080551E and PTFA080551F are 55-watt LDMOS FETs designed for EDGE and CDMA power amplifier applications in the 869 to 960 MHz band. Features include input matching and thermally-enhanced packages with slotted or earless flanges. Manufactured with Wolfspeed's advanced LDMOS process, these devices provide excellent thermal performance and superior reliability.

PTFA080551E
Package H-36265-2

PTFA080551F
Package H-37265-2

Three-carrier CDMA2000 Performance
V_{DD} = 28 V, I_{DQ} = 450 mA, f = 960 MHz



Features

- Broadband internal matching
- Typical EDGE performance
  - Average output power = 26 W
  - Gain = 18 dB
  - Efficiency = 44%
- Typical CW performance
  - Output power at P–1dB = 75 W
  - Gain = 17 dB
  - Efficiency = 67%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 55 W (CW) output power
- Pb-free and RoHS compliant

RF Characteristics

EDGE Measurements (not subject to production test—verified by design/characterization in Wolfspeed test fixture)
V_{DD} = 28 V, I_{DQ} = 450 mA, P_{OUT} = 26 W AVG, f = 959.8 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Error Vector Magnitude	EVM (RMS)	—	2.5	—	%
Modulation Spectrum @ 400 kHz	ACPR	—	–60	—	dBc
Modulation Spectrum @ 600 kHz	ACPR	—	–75	—	dBc
Gain	G_{ps}	—	18	—	dB
Drain Efficiency	η_D	—	44	—	%

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics (cont.)

Two-tone Measurements (tested in Wolfspeed test fixture)

V_{DD} = 28 V, I_{DQ} = 600 mA, P_{OUT} = 55 W PEP, f = 960 MHz, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	18	18.5	—	dB
Drain Efficiency	η_D	46.5	48	—	%
Intermodulation Distortion	IMD	—	–31	–29	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 10 µA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10.0	µA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.15	—	Ω
Operating Gate Voltage	V_{DS} = 28 V, I_{DQ} = 450 mA	V_{GS}	2.0	2.3	3.0	V
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1.0	µA

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–0.5 to +12	V
Junction Temperature	T_J	200	°C
Total Device Dissipation	P_D	219	W
Above 25°C derate by		1.25	W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	0.8	°C/W

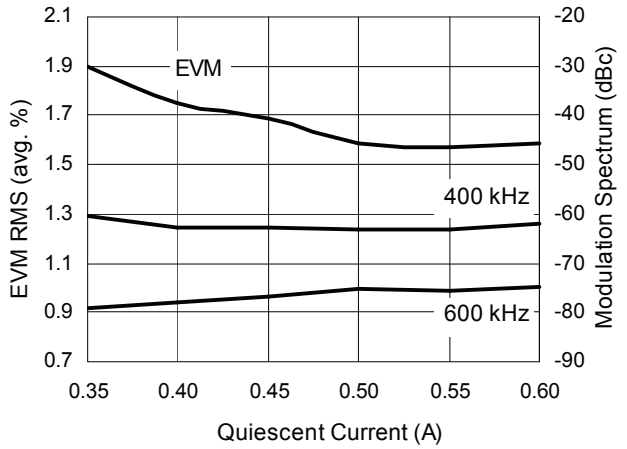
Ordering Information

Type and Version	Order Code	Package Description	Shipping
PTFA080551E V4 R0	PTFA080551E-V4-R0	H-36265-2, bolt-down	Tape & Reel, 50 pcs
PTFA080551E V4 R250	PTFA080551E-V4-R250	H-36265-2, bolt-down	Tape & Reel, 250 pcs
PTFA080551F V4 R0	PTFA080551F-V4-R0	H-37265-2, earless flange	Tape & Reel, 50 pcs
PTFA080551F V4 R250	PTFA080551F-V4-R250	H-37265-2, earless flange	Tape & Reel, 250 pcs

Typical Performance (data taken in a production test fixture)

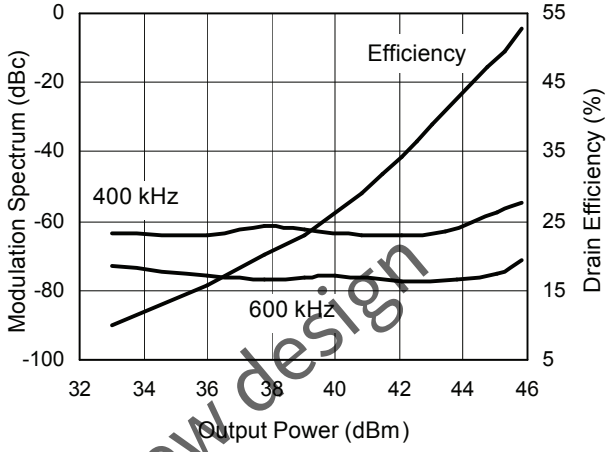
Edge EVM and Modulation Spectrum vs. Quiescent Current

V_{DD} = 28 V, f = 959.8 MHz, P_{OUT} = 22 W



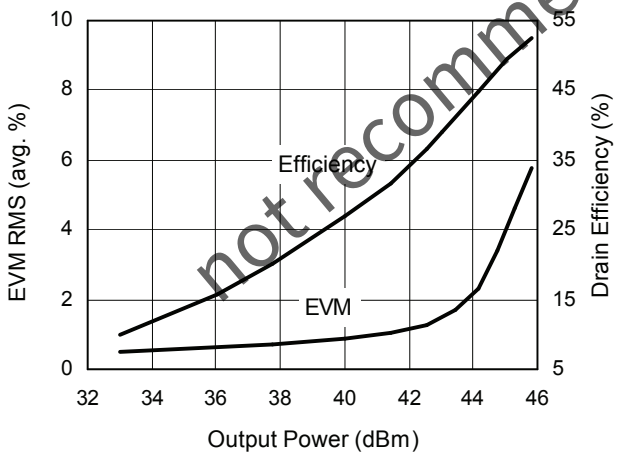
EDGE Modulation Spectrum Performance

V_{DD} = 28 V, I_{DQ} = 450 mA, f = 959.8 MHz



EDGE EVM Performance

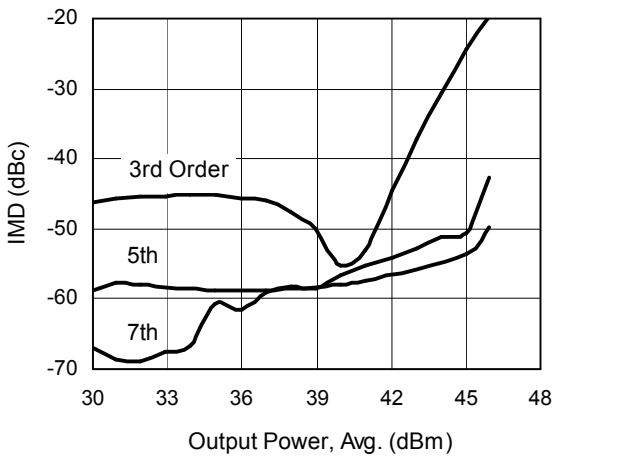
V_{DD} = 28 V, I_{DQ} = 450 mA, f = 959.8 MHz



Intermodulation Distortion vs. Output Power

(as measured in a broadband circuit)

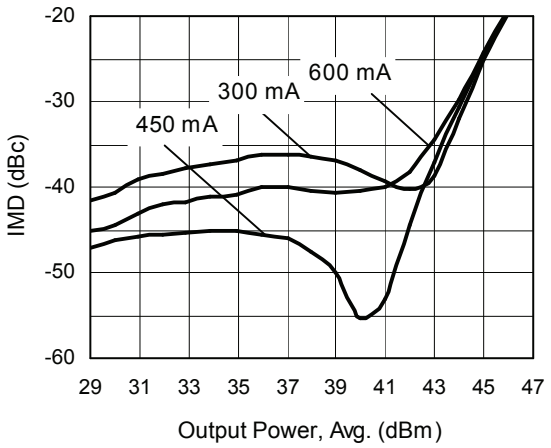
V_{DD} = 28 V, I_{DQ} = 450 mA, f_1 = 959 MHz, f_2 = 960 MHz



Typical Performance (cont.)

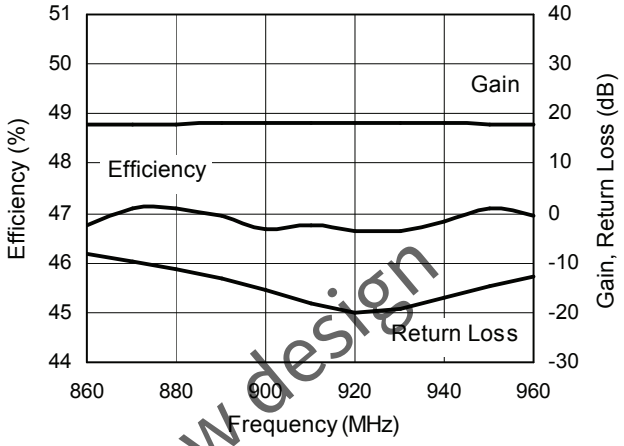
IM3 vs. Output Power at Selected Biases

V_{DD} = 28 V, f_1 = 959, f_2 = 960 MHz



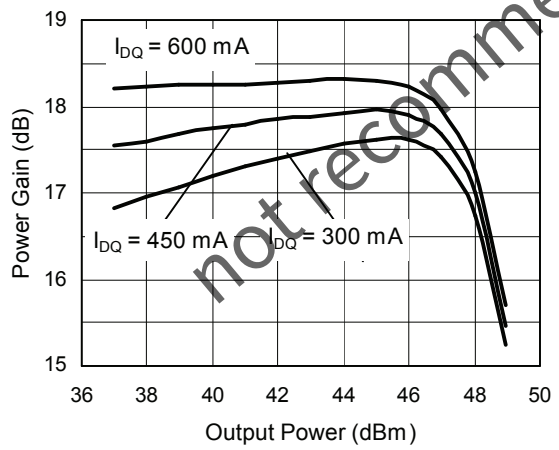
Linear Broadband Performance

V_{DD} = 28 V, I_{DQ} = 600 mA, P_{OUT} Avg = 44.39 dBm



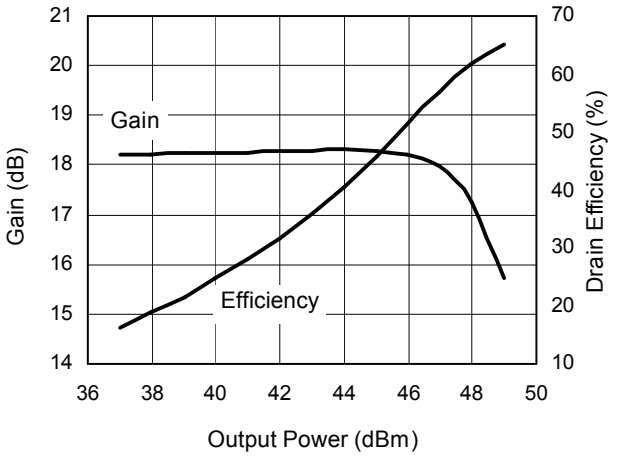
Power Sweep

V_{DD} = 28 V, f = 960 MHz



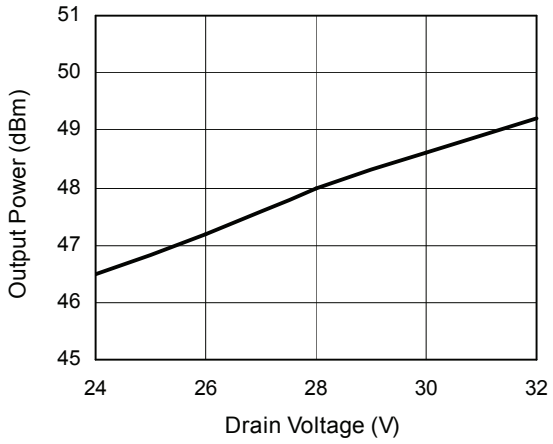
Gain & Efficiency vs. Output Power

V_{DD} = 28 V, I_{DQ} = 600 mA, f = 960 MHz

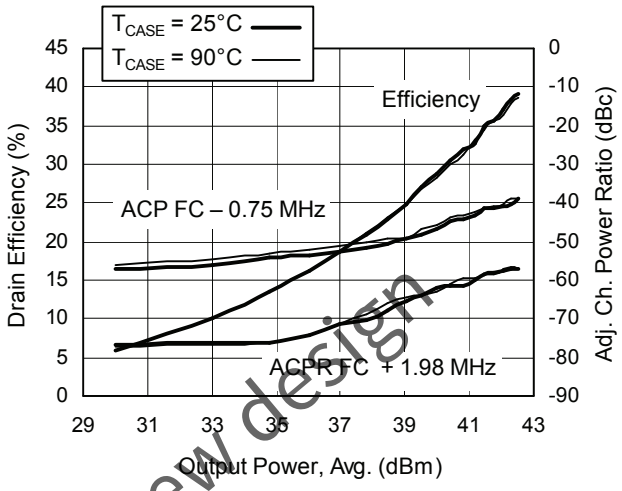


Typical Performance (cont.)

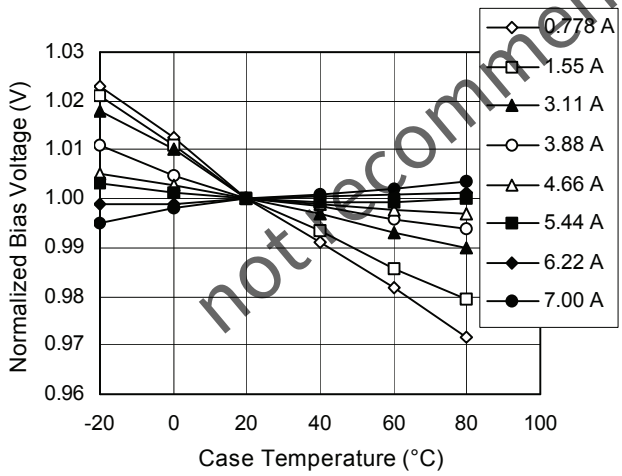
Output Power (P–1dB) **vs. Drain Voltage**
I_{DQ} = 600 mA, f = 960 MHz



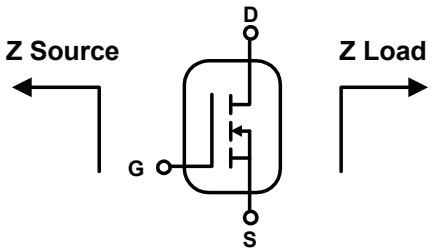
IS-95 CDMA Performance
V_{DD} = 28 V, I_{DQ} = 450 mA, f = 960 MHz



Bias Voltage vs. Temperature
Voltage normalized to typical gate voltage,
series show current



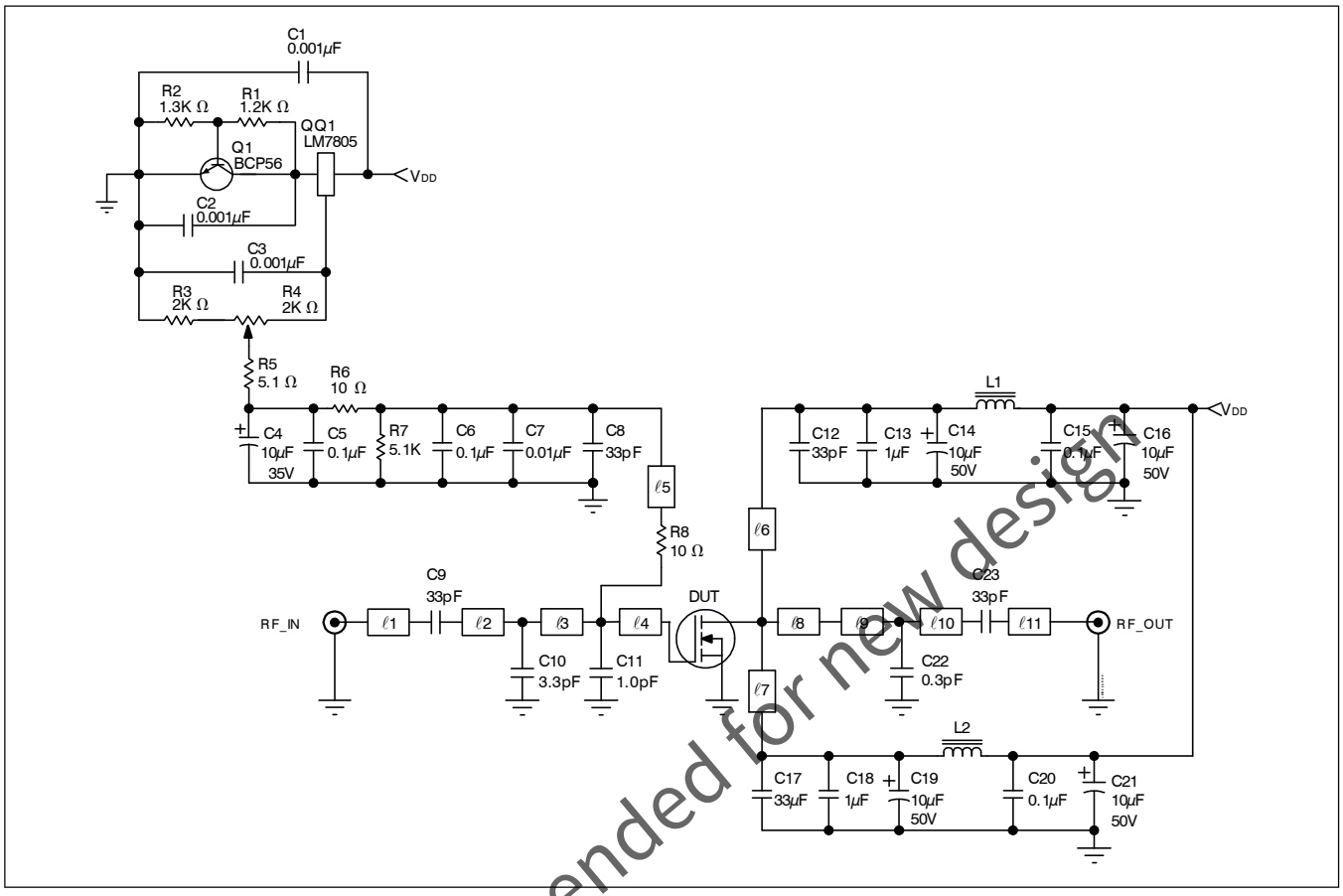
Broadband Circuit Impedance



Frequency	Z Source		Z Load	
MHz	R	jX	R	jX
869	8.91	–10.93	7.42	–1.63
880	3.72	–8.28	4.65	–1.74
894	5.93	–5.43	4.61	0.16
920	4.87	–7.16	4.88	–0.59
960	6.05	–5.57	4.89	0.86

See next page for circuit information

Reference Circuit



Reference circuit schematic diagram for ƒ = 960 MHz

Circuit Assembly Information

DUT	PTFA080551E or PTFA080551F	LDMOS Transistor	
PCB	0.76 mm [.030"] thick, ε_r = 4.5	Rogers TMM4	2 oz. copper

Microstrip	Electrical Characteristics at 960 MHz[1]	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ1	0.070 λ, 50.0 Ω	12.19 x 1.37	0.480 x 0.054
ℓ2	0.122 λ, 50.0 Ω	20.93 x 1.37	0.824 x 0.054
ℓ3	0.031 λ, 50.0 Ω	5.31 x 1.37	0.209 x 0.054
ℓ4	0.063 λ, 7.5 Ω	9.58 x 16.21	0.377 x 0.638
ℓ5	0.162 λ, 67.0 Ω	28.45 x 0.79	1.120 x 0.031
ℓ6, ℓ7	0.150 λ, 55.0 Ω	25.65 x 1.17	1.010 x 0.046
ℓ8	0.198 λ, 11.1 Ω	30.73 x 10.46	1.210 x 0.412
ℓ9	0.145 λ, 38.0 Ω	24.21 x 2.16	0.953 x 0.085
ℓ10	0.009 λ, 38.0 Ω	1.52 x 2.16	0.060 x 0.085
ℓ11	0.026 λ, 50.0 Ω	4.50 x 1.37	0.177 x 0.054

[1]Electrical characteristics are rounded.

Package Outline Specifications

Package H-36265-2

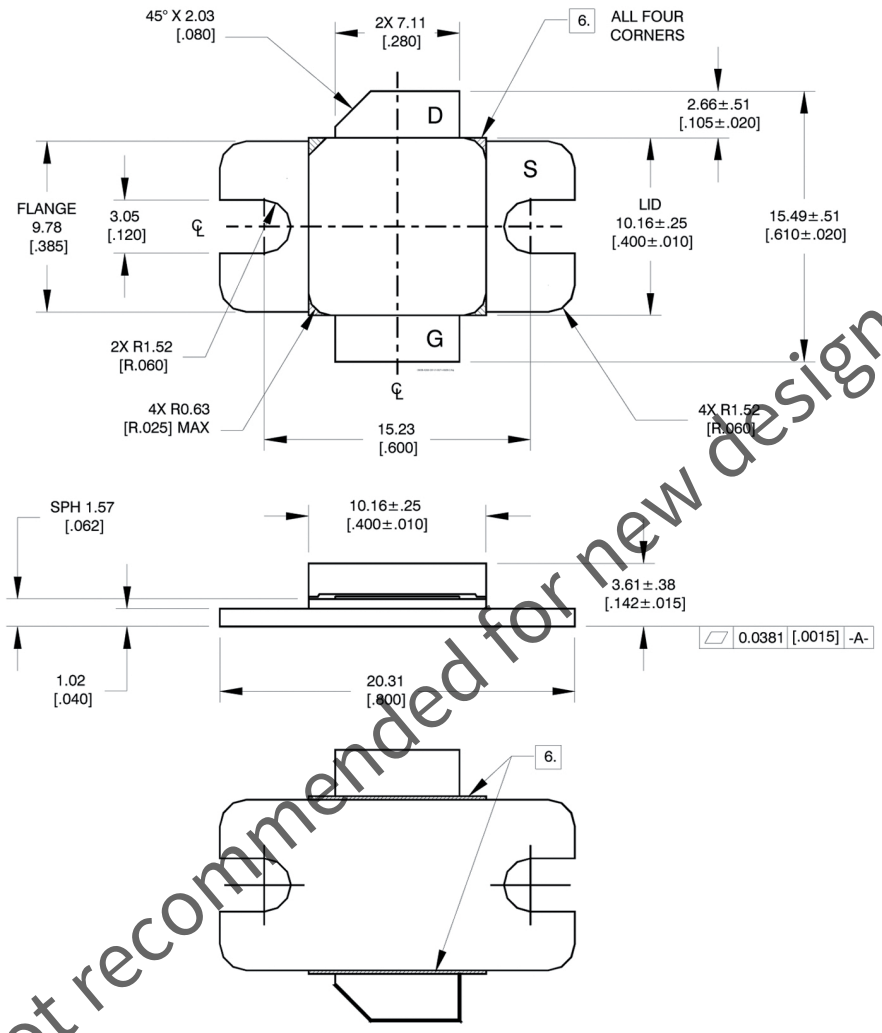
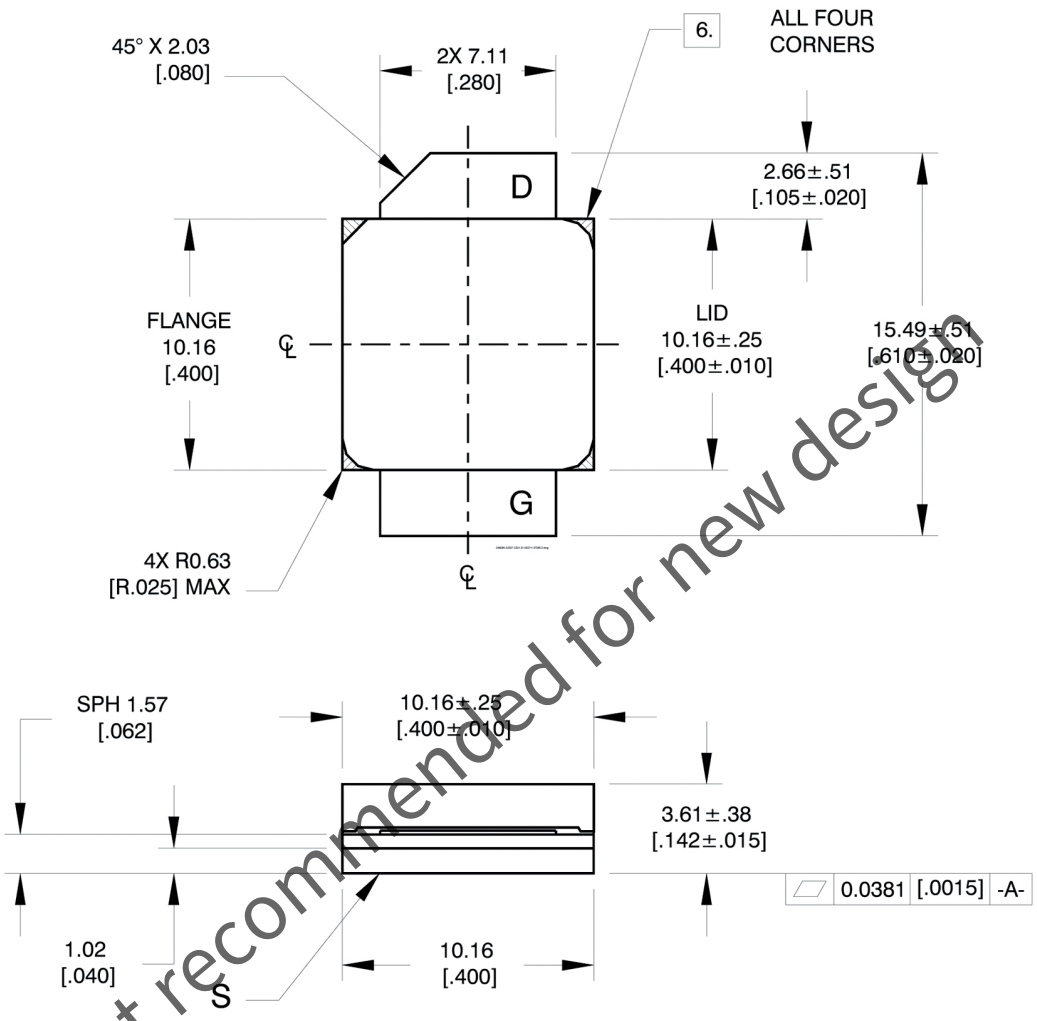


Diagram Notes—unless otherwise specified:

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, S = source, G = gate.
5. Lead thickness: 0.10 +0.051/–0.025 [.004 +.002/–.001].
6. Exposed metal plane on top and bottom of ceramic insulator.
7. Gold plating thickness:
   S, D, G - flange & leads: 1.14 ± 0.38 micron [45 ± 15 microinch]

Package Outline Specifications (cont.)

Package H-37265-2



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Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
05	2018-02-22	Data Sheet	All	Product discontinued
06	2018-08-09	Production	All	Converted to Wolfspeed data sheet, not recommended for new design

For more information, please contact:

4600 Silicon Drive
Durham, North Carolina, USA 27703
www.wolfspeed.com/RF

Sales Contact
RFSales@wolfspeed.com

RF Product Marketing Contact
RFMarketing@wolfspeed.com
919.407.7816

Notes

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