

PTFA080551E/F

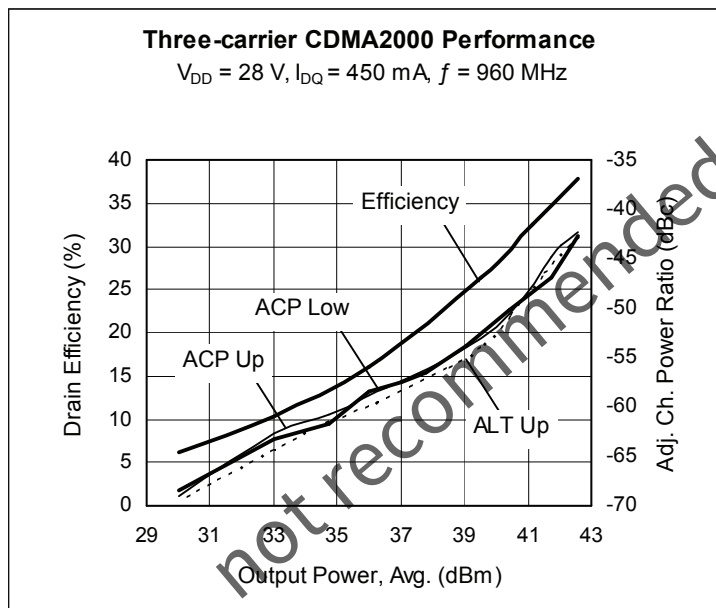
Thermally-Enhanced High Power RF LDMOS FETs 55 W, 869 – 960 MHz

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



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)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $P_{OUT} = 26\text{ W AVG}$, $f = 959.8\text{ MHz}$

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 $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics (cont.)**Two-tone Measurements** (tested in WolfSpeed test fixture)
 $V_{DD} = 28\text{ V}$, $I_{DQ} = 600\text{ mA}$, $P_{OUT} = 55\text{ W PEP}$, $f = 960\text{ MHz}$, 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	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ }\mu\text{A}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.15	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$	V_{GS}	2.0	2.3	3.0	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	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	$^{\circ}\text{C}$
Total Device Dissipation	P_D	219	W
Above 25 $^{\circ}\text{C}$ derate by		1.25	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	0.8	$^{\circ}\text{C/W}$

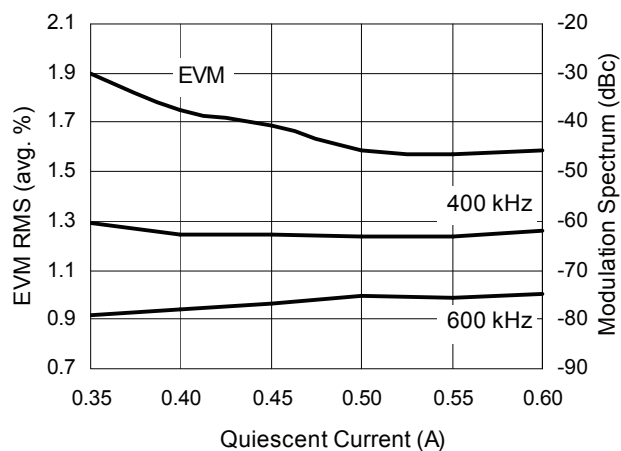
Ordering Information

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)

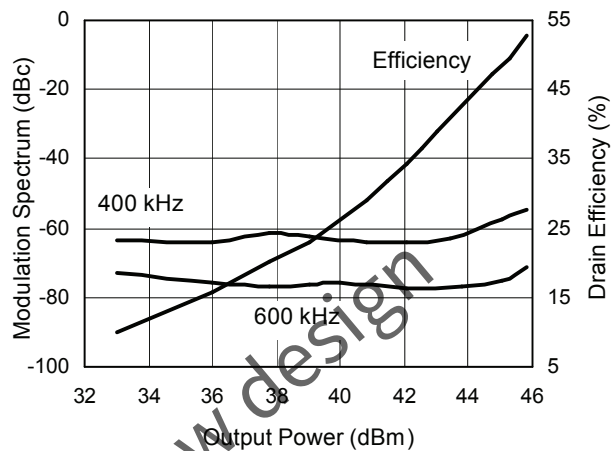
Edge EVM and Modulation Spectrum vs. Quiescent Current

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



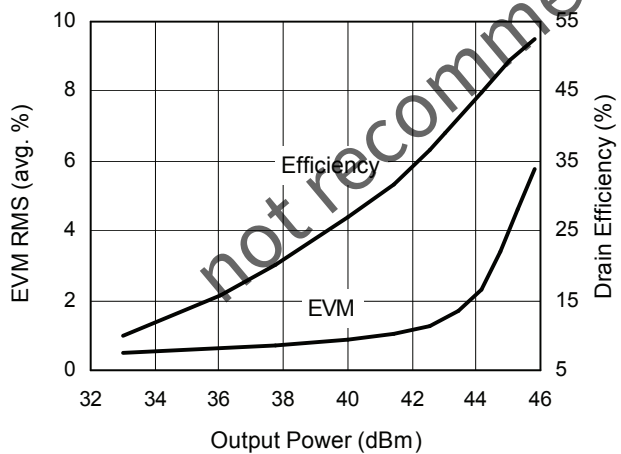
EDGE Modulation Spectrum Performance

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



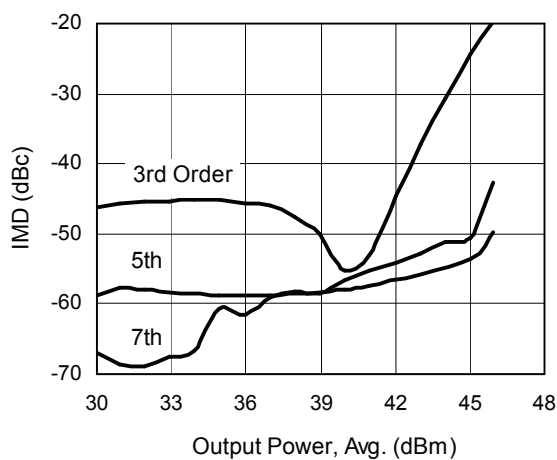
EDGE EVM Performance

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



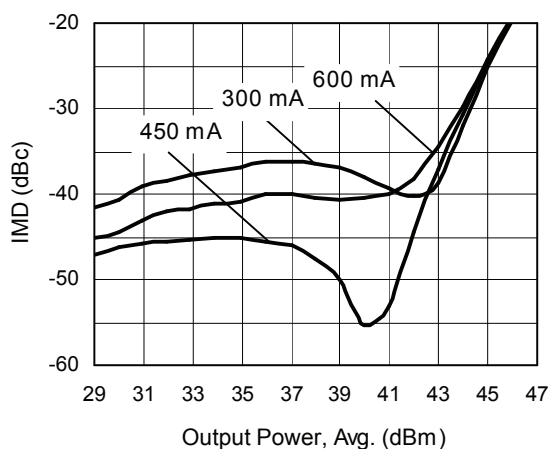
Intermodulation Distortion vs. Output Power
(as measured in a broadband circuit)

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

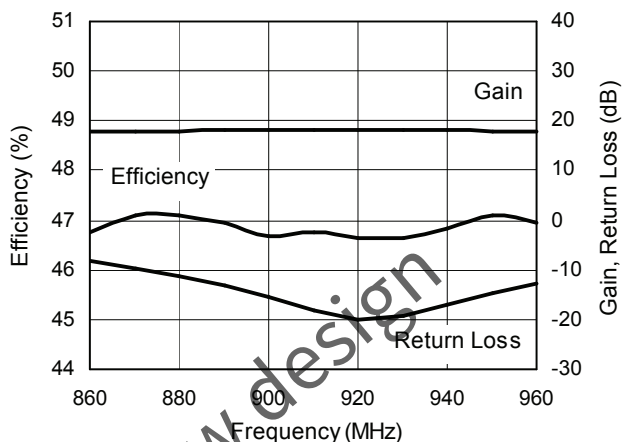


Typical Performance (cont.)

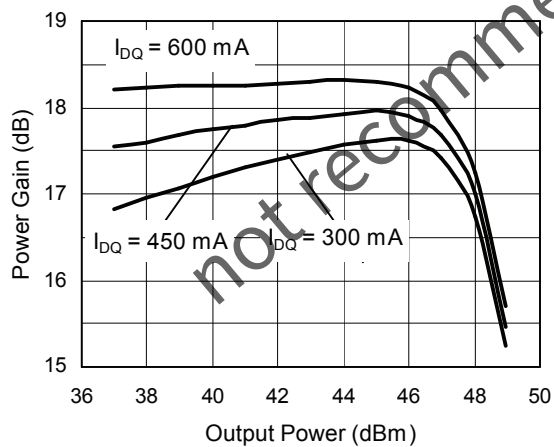
IM3 vs. Output Power at Selected Biases

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

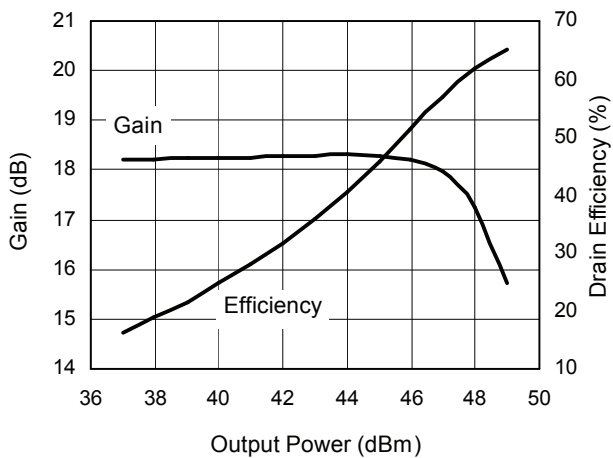
Linear Broadband Performance

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

Power Sweep

 $V_{DD} = 28\text{ V}$, $f = 960\text{ MHz}$ 

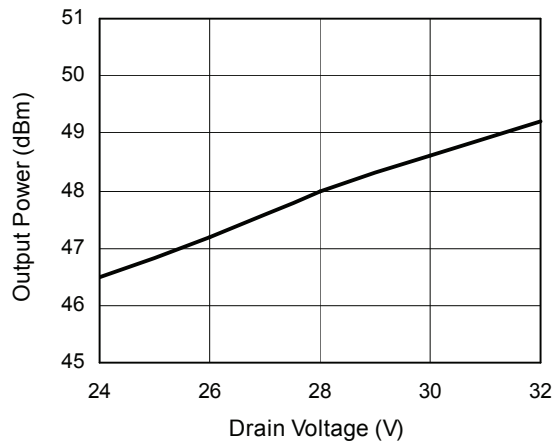
Gain & Efficiency vs. Output Power

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

Typical Performance (cont.)

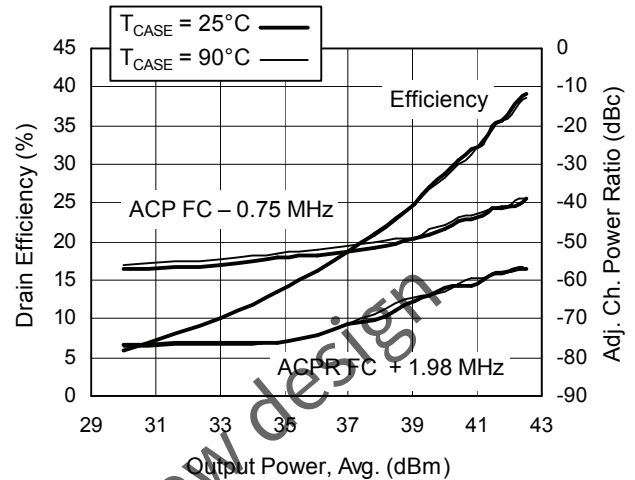
Output Power (P-1dB) vs. Drain Voltage

$I_{DQ} = 600 \text{ mA}$, $f = 960 \text{ MHz}$



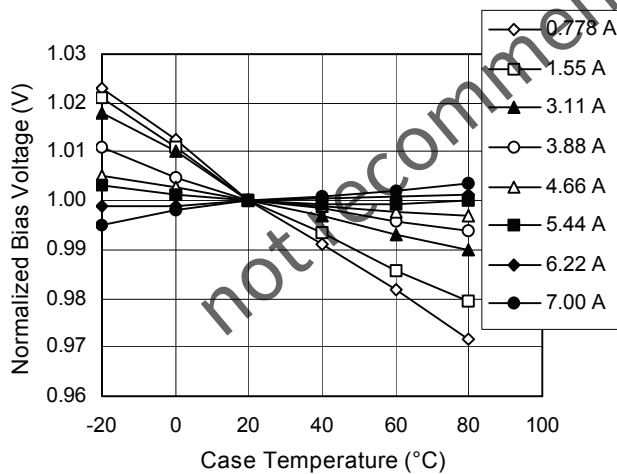
IS-95 CDMA Performance

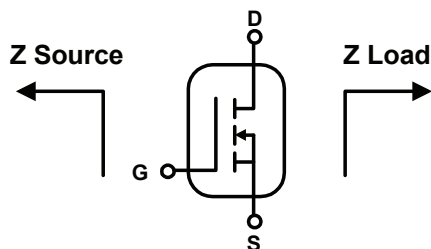
$V_{DD} = 28 \text{ V}$, $I_{DQ} = 450 \text{ mA}$, $f = 960 \text{ MHz}$



Bias Voltage vs. Temperature

Voltage normalized to typical gate voltage,
series show current

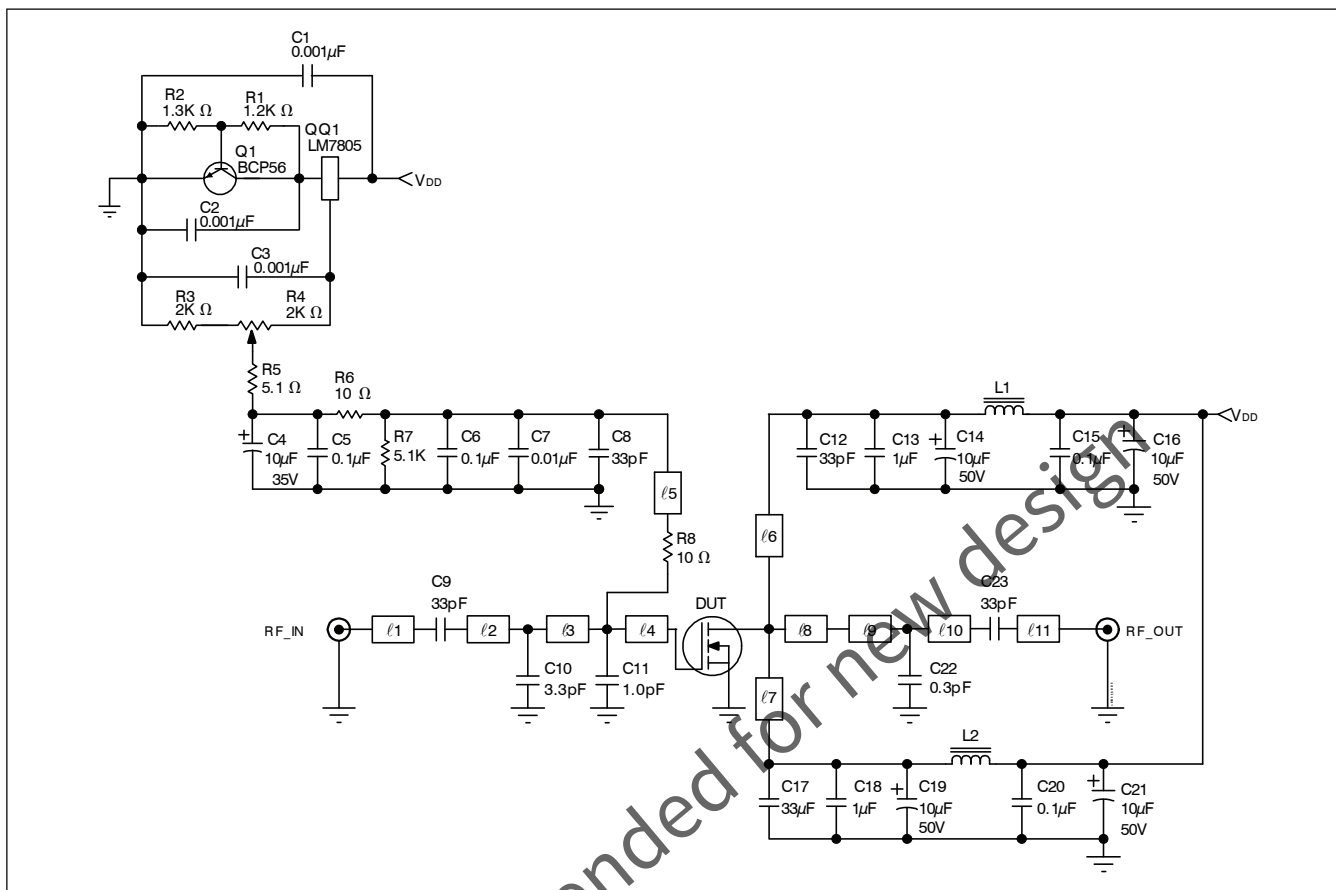


Broadband Circuit Impedance

Frequency MHz	Z Source		Z Load	
	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 $f = 960 \text{ MHz}$

Circuit Assembly Information

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

Microstrip	Electrical Characteristics at 960 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ_1	0.070λ , 50.0Ω	12.19 x 1.37	0.480 x 0.054
ℓ_2	0.122λ , 50.0Ω	20.93 x 1.37	0.824 x 0.054
ℓ_3	0.031λ , 50.0Ω	5.31 x 1.37	0.209 x 0.054
ℓ_4	0.063λ , 7.5Ω	9.58 x 16.21	0.377 x 0.638
ℓ_5	0.162λ , 67.0Ω	28.45 x 0.79	1.120 x 0.031
ℓ_6, ℓ_7	0.150λ , 55.0Ω	25.65 x 1.17	1.010 x 0.046
ℓ_8	0.198λ , 11.1Ω	30.73 x 10.46	1.210 x 0.412
ℓ_9	0.145λ , 38.0Ω	24.21 x 2.16	0.953 x 0.085
ℓ_{10}	0.009λ , 38.0Ω	1.52 x 2.16	0.060 x 0.085
ℓ_{11}	0.026λ , 50.0Ω	4.50 x 1.37	0.177 x 0.054

¹Electrical characteristics are rounded.

Package Outline Specifications

Package H-36265-2

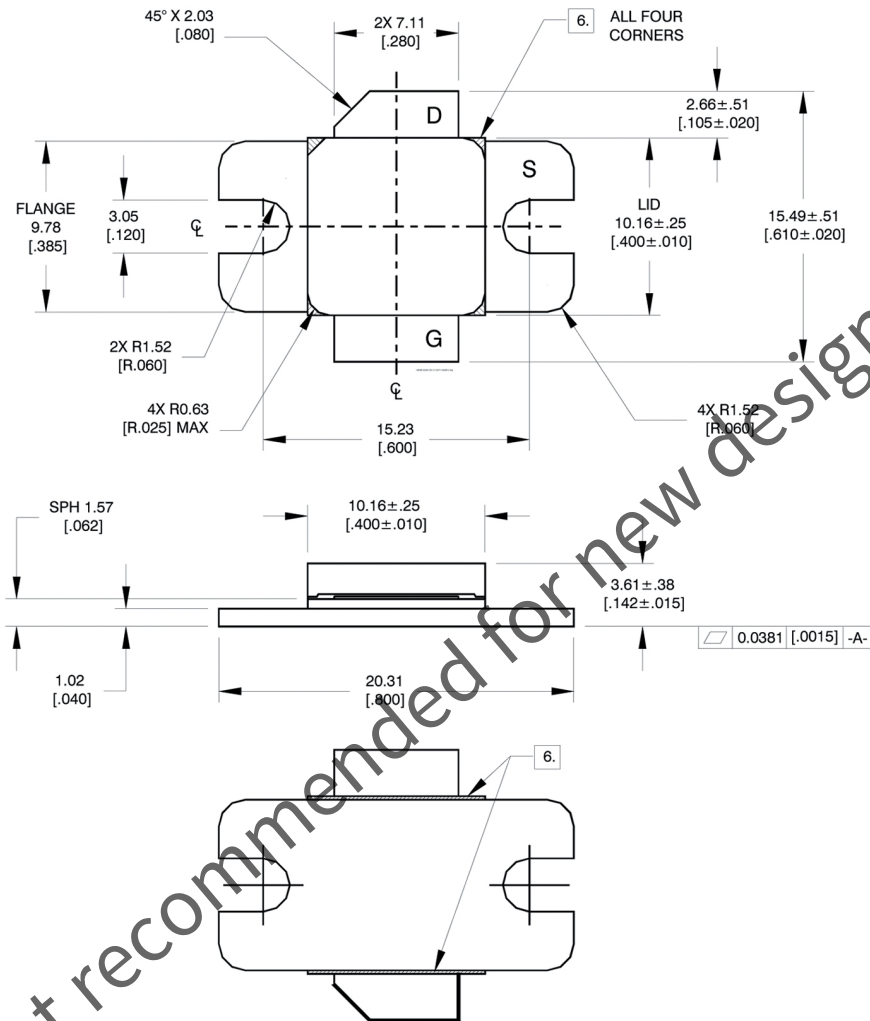
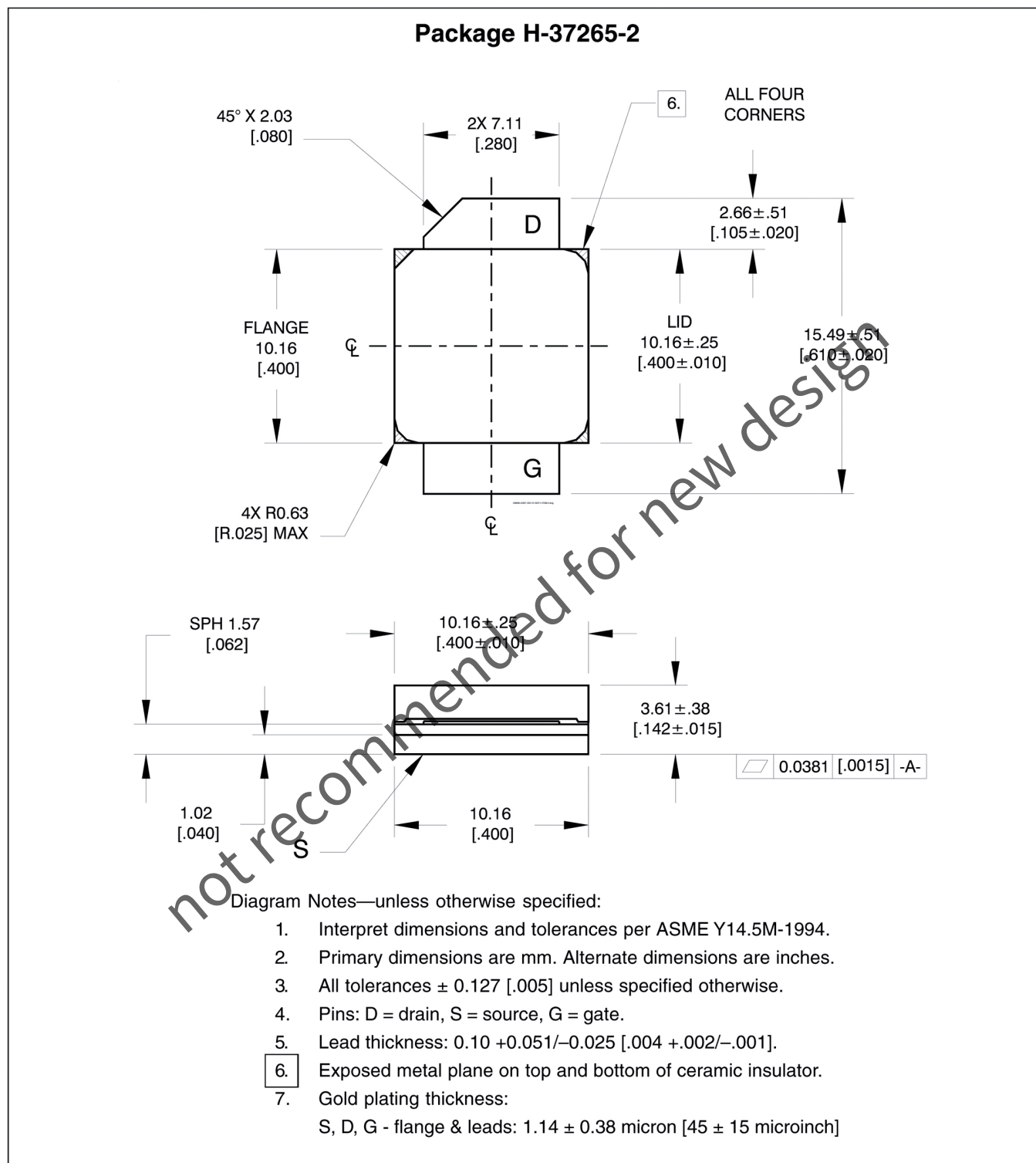


Diagram Notes—unless otherwise specified:

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.)



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

Disclaimer

Specifications are subject to change without notice. Cree, Inc. believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Cree for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Cree. Cree makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. “Typical” parameters are the average values expected by Cree in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer’s technical experts for each application. Cree products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Cree product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[MACOM:](#)

[PTFA080551E-V4-R0](#)