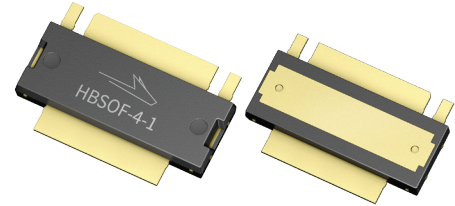


PTVA082407NF

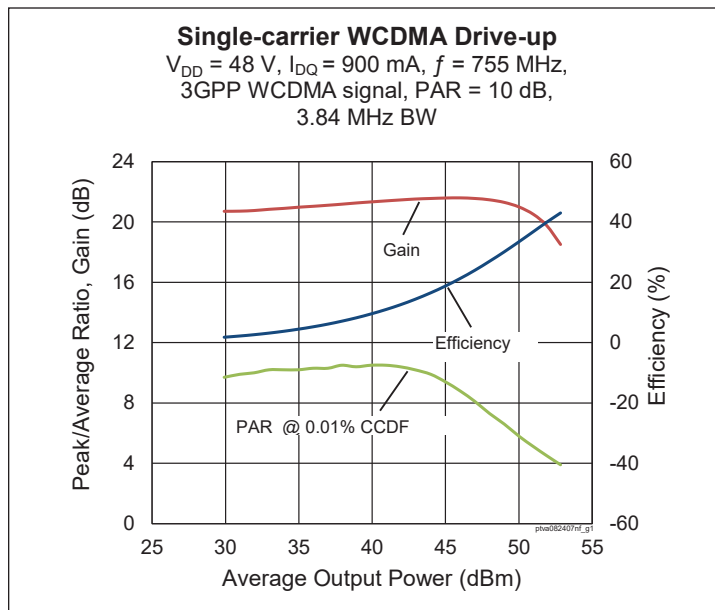
Thermally-Enhanced High Power RF LDMOS FET 240 W, 48 V, 746 – 821 MHz

Description

The PTVA082407NF is a 240-watt LDMOS FET manufactured with Wolfspeed's 48-V LDMOS process. It is designed for use in multi-standard cellular power amplifier applications. It features a single ended design and input matching that allow for use from 746 MHz to 821 MHz. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PTVA082407NF
Package PG-HBSOF-4-1



Features

- Broadband internal input matching
- Typical CW performance, 755 MHz, 48 V
 - Output power at $P_{1dB} = 225\text{ W}$
 - Output power at $P_{3dB} = 250\text{ W}$
 - Gain = 20.5 dB
 - Efficiency = 43%
- Capable of handling 10:1 VSWR @ 48 V, 80 W CW output power
- Integrated ESD protection
- Human Body Model class 2 (per ANSI/ESDA/JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in Wolfspeed production test fixture)

$V_{DD} = 48\text{ V}$, $I_{DQ} = 900\text{ mA}$, $P_{OUT} = 80\text{ W}$ avg, $f = 755\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 10 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Linear Gain	G_{ps}	21	22.5	—	dB
Drain Efficiency	η_D	33	35.5	—	%
Adjacent Channel Power Ratio	ACPR	—	-31.5	-29.5	dBc

All published data at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	105	—	—	V
Drain Leakage Current	$V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1	μA
	$V_{DS} = 105\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10	μA
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.16	—	Ω
Operating Gate Voltage	$V_{DS} = 48\text{ V}$, $I_{DQ} = 0.9\text{ A}$	V_{GS}	3.0	3.78	4.0	V

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	105	V
Gate-Source Voltage	V_{GS}	−6 to +12	V
Operating Voltage	V_{DD}	0 to +55	V
Junction Temperature	T_J	225	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	−65 to +150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 240 W CW)	$R_{\theta JC}$	0.32	$^{\circ}\text{C/W}$

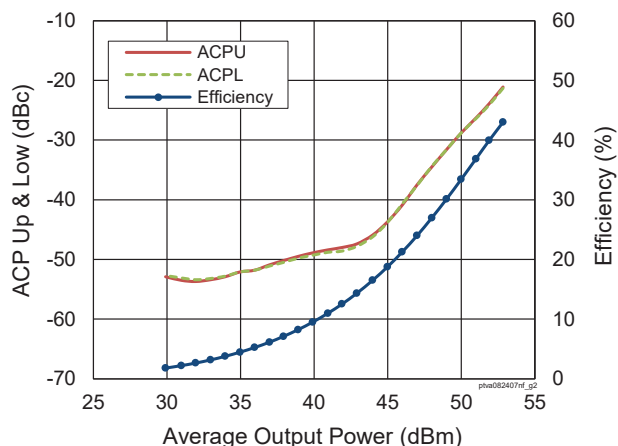
Ordering Information

Type and Version	Order Code	Package Description	Shipping
PTVA082407NF V1 R5	PTVA082407NF-V1-R5	PG-HBSOF-4-1, plastic package	Tape & Reel, 500 pcs

Typical RF Performance (data taken in production test fixture)

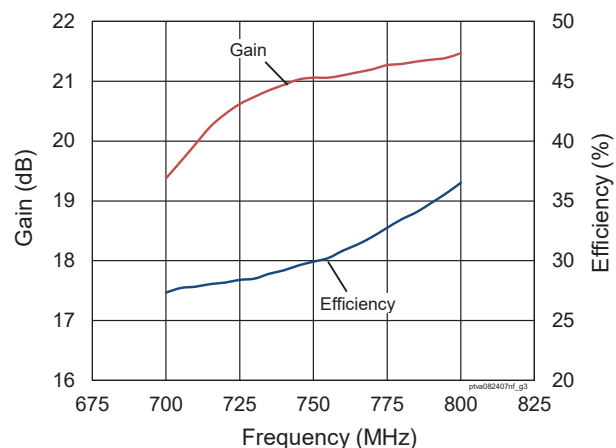
Single-carrier WCDMA Drive-up

$V_{DD} = 48\text{ V}$, $I_{DQ} = 900\text{ mA}$, $f = 755\text{ MHz}$,
3GPP WCDMA signal, PAR = 10 dB,
BW = 3.84 MHz



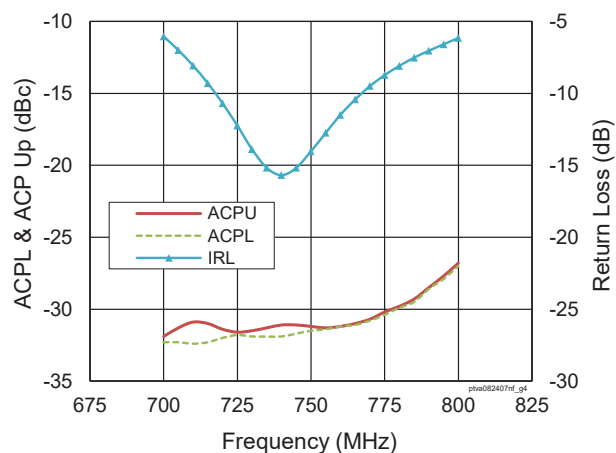
Single-carrier WCDMA Broadband Performance

$V_{DD} = 48\text{ V}$, $I_{DQ} = 900\text{ mA}$, $P_{OUT} = 49.03\text{ dBm}$,
3GPP WCDMA signal, PAR = 10 dB



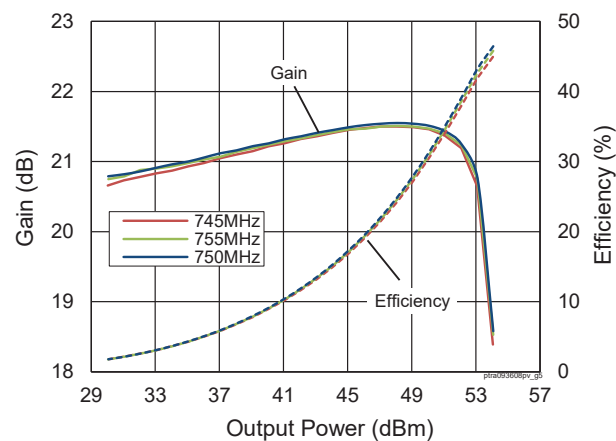
Single-carrier WCDMA Broadband Performance

$V_{DD} = 48\text{ V}$, $I_{DQ} = 900\text{ mA}$, $P_{OUT} = 49.03\text{ dBm}$,
3GPP WCDMA signal, PAR = 10 dB

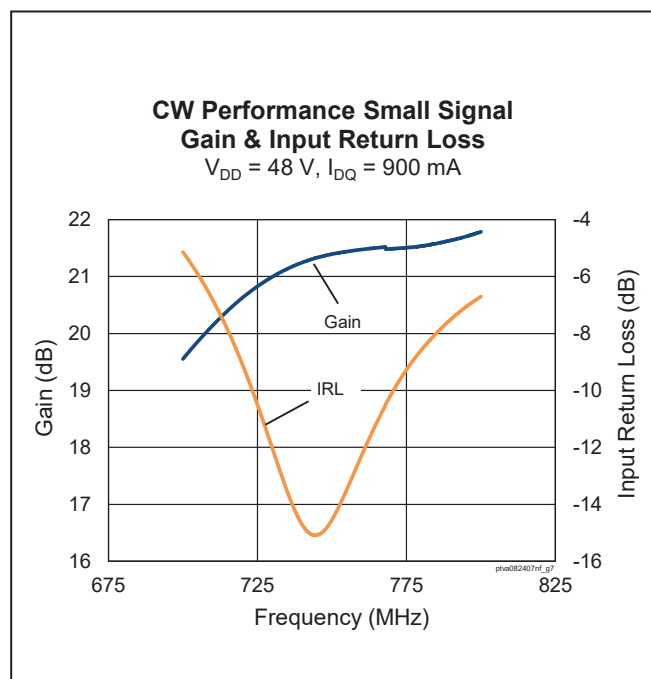
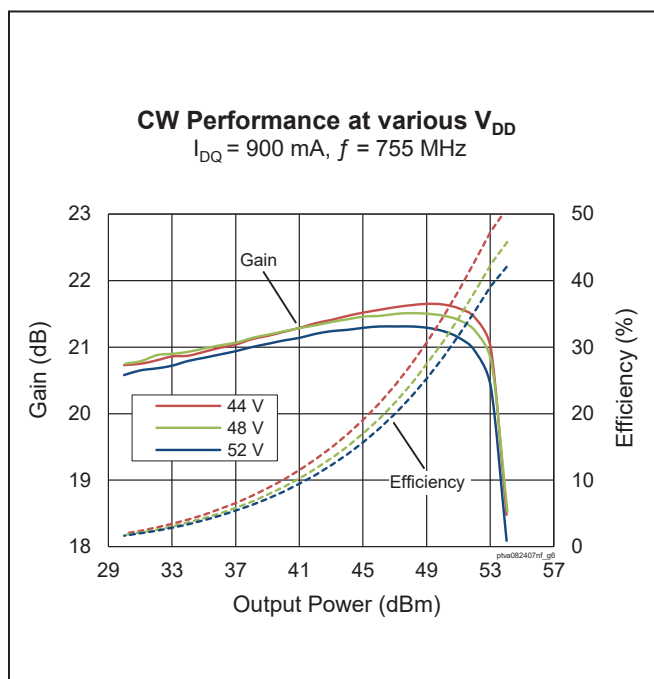


CW Performance

$V_{DD} = 48\text{ V}$, $I_{DQ} = 900\text{ mA}$



Typical RF Performance (cont.)

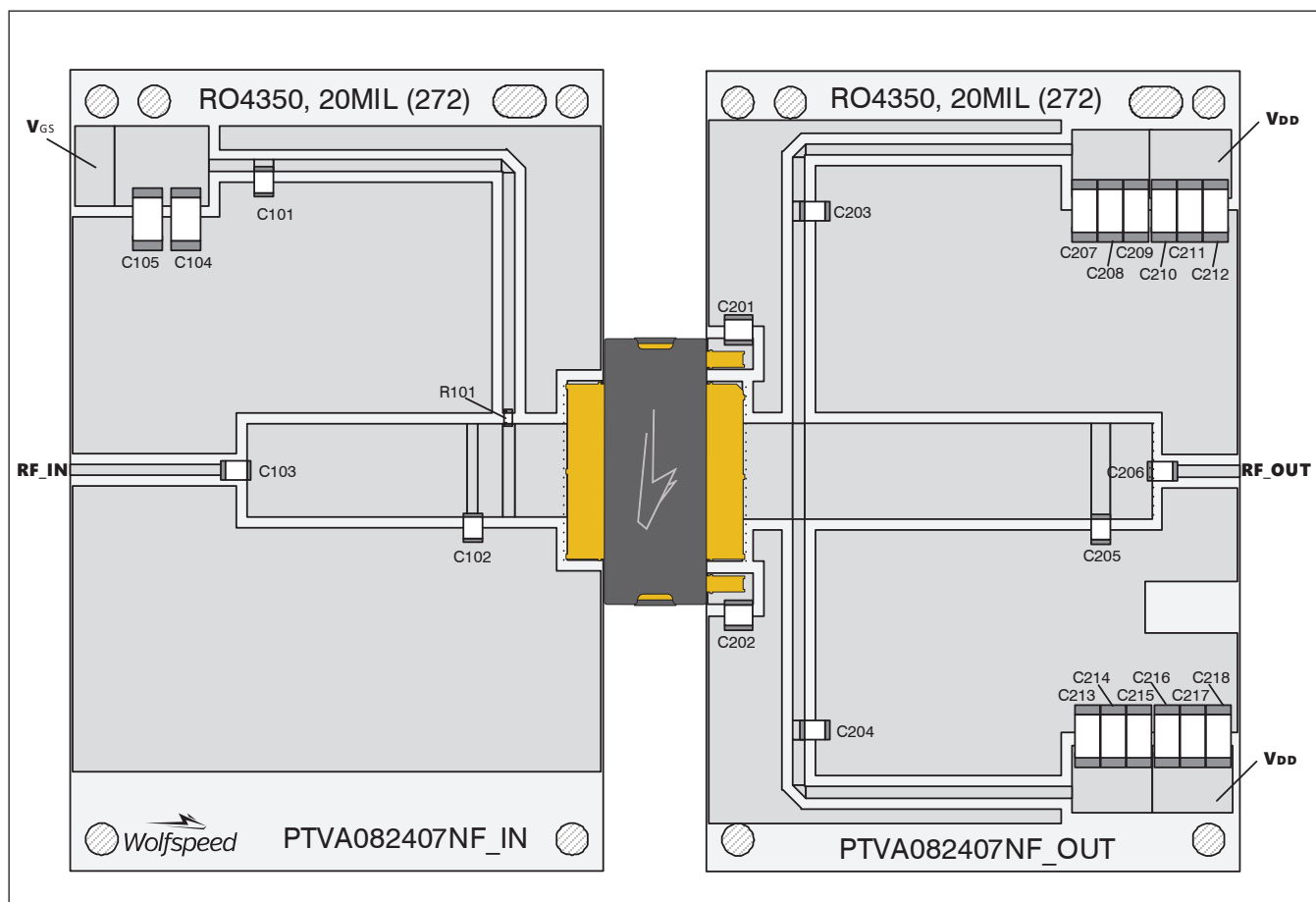


Load Pull Performance

Load Pull Performance – Pulsed CW signal: 10 μs , 10% duty cycle, 48 V, $I_{DQ} = 480 \text{ mA}$

		P_{1dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Z_s [Ω]	Z_l [Ω]	Gain [dB]	P_{1dB} [dBm]	P_{1dB} [W]	PAE [%]	Z_l [Ω]	Gain [dB]	P_{1dB} [dBm]	P_{1dB} [W]	PAE [%]
746	$0.95 - j2.58$	$1.54 - j0.17$	21.49	55.64	366.4	59.7	$2.53 + j2.11$	23.82	52.99	199.1	74.8
756	$1.08 - j2.75$	$1.75 - j0.19$	22.12	55.68	369.5	64.6	$2.89 + j2.26$	23.84	52.88	194.2	72.3

		P_{3dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Z_s [Ω]	Z_l [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	PAE [%]	Z_l [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	PAE [%]
746	$0.95 - j2.58$	$1.69 - j0.47$	19.64	56.51	447.9	64.0	$2.97 + j1.55$	21.69	54.30	269.2	77.4
756	$1.08 - j2.75$	$1.80 + j0.29$	20.14	56.44	440.3	67.2	$2.49 + j0.80$	21.36	55.12	325.3	73.5

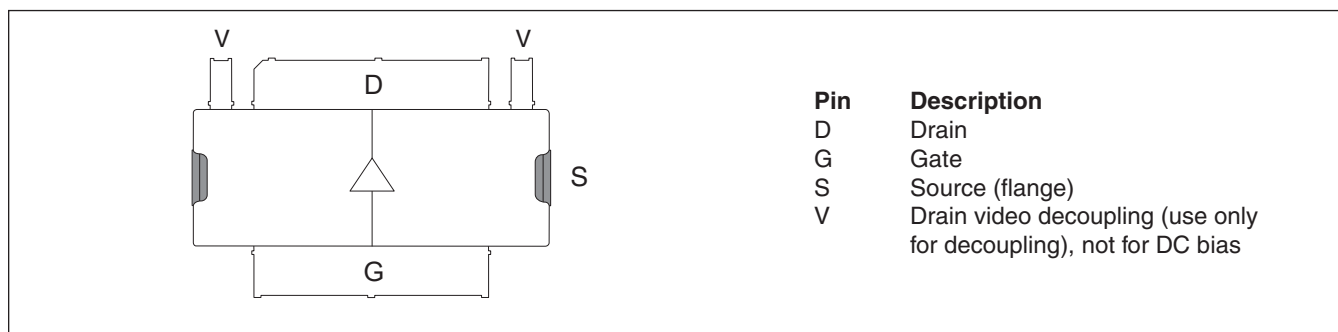
Reference Circuit, 746 – 821 MHz*Reference circuit assembly diagram (not to scale)*

Reference Circuit (cont.)**Reference Circuit Assembly**

DUT	PTVA082407NF V1
Test Fixture Part No.	LTN/PTVA082407NF V1
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$, $f = 746 - 821$ MHz
Find Gerber files for this test fixture on the Wolfspeed Web site at www.wolfspeed.com/RF	

Components Information

Component	Description	Manufacturer	P/N
Input			
C101, C103	Capacitor, 56 pF	ATC	ATC100B560KW500XT
C102	Capacitor, 10 pF	ATC	ATC100B100KW500XT
C104, C105	Capacitor, 100V, 10 μ F	TDK Corporation	C5750X7S2A106M230KB
R101	Resistor, 10 ohms	Panasonic Electronic Components	ERJ-8GEYJ100V
Output			
C201, C202	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
C203, C204, C206	Capacitor, 56 pF	ATC	ATC100B560KW500XT
C205	Capacitor, 6.8 pF	ATC	ATC100B6R8CW500XB
C207, C208, C209, C210, C211, C212, C213, 214, C215, C216, C217, C218	Capacitor, 100 V, 10 μ F	TDK Corporation	C5750X7S2A106M230KB

Pinout Diagram (top view)

Package Outline Specifications

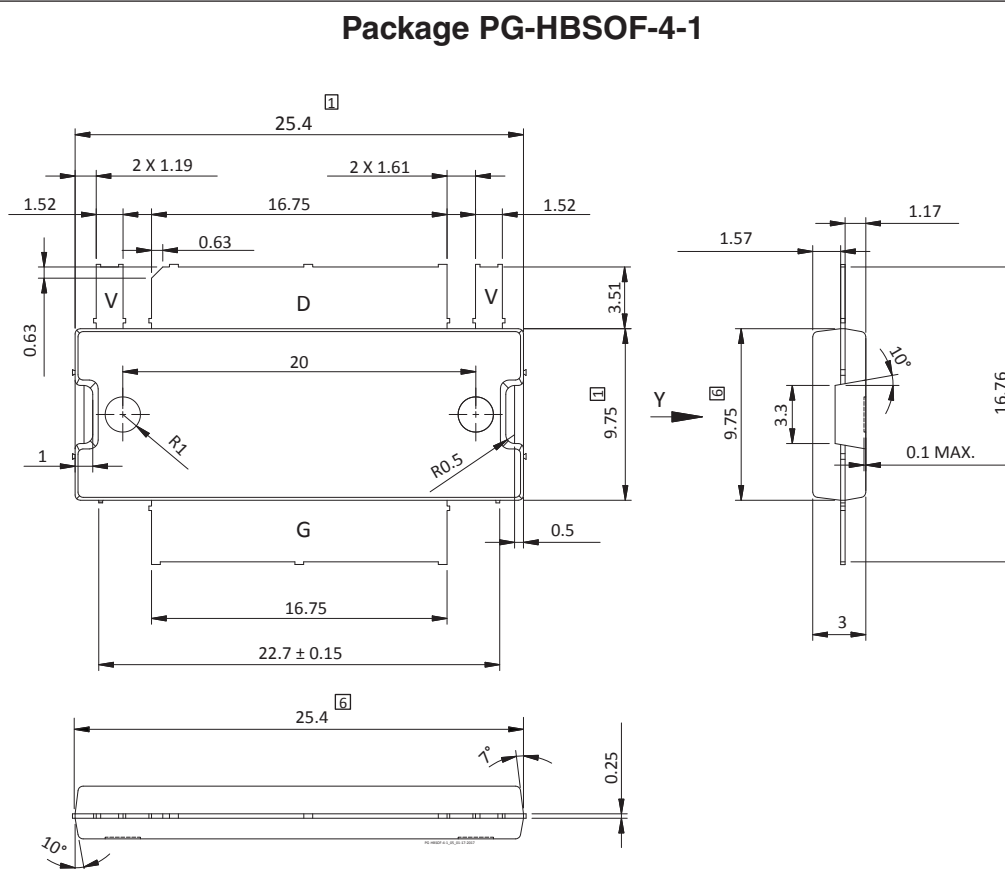


Diagram Notes—unless otherwise specified:

1. Mold/dam bar/metal protrusion of 0.30 mm max per side not included.
2. Metal protrusions are connected to source and shall not exceed 0.10 mm max.
3. Fillets and radii: all radii are 0.3 mm max.
4. Interpret dimensions and tolerances per ISO 8015.
5. Dimensions are mm.
6. Does not include mold/dam bar and metal protrusion.
7. Exposed metal surface is tin-plated, may not be covered by mold compound.
8. All tolerances ± 0.1 mm unless specified otherwise.
9. All metal surfaces are tin-plated, except area of cut.
10. Lead thickness: 0.25 mm.
11. Gold plating thickness: 0.25 micron max.
12. Pins: D = drain; G = gate; S = source; V = Drain video decoupling (use only for decoupling), not for DC bias.

Package Outline Specifications

Package PG-HBSOF-4-1

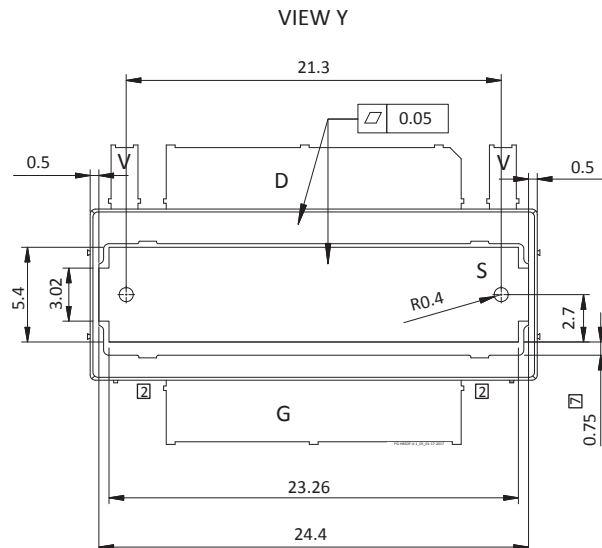


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Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2016-03-17	Advance	All	Data Sheet reflects advance specification for product development
02	2016-09-15	Production	All	Data Sheet reflects released product specification
02.1	2016-11-23	Production	2	Revised conditions in DC Characteristics table
02.2	2016-12-01	Production	1	Updated Features list
02.3	2016-12-07	Production	1	Revised typo in Features
02.4	2017-02-07	Production	2	Updated operating voltage and junction temperature
02.5	2017-07-18	Production	1, 9	Revised typo
03	2018-06-21	Production	All 5, 6	Converted to Wolfspeed Data Sheet Revised reference circuit and component list

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Notes

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