

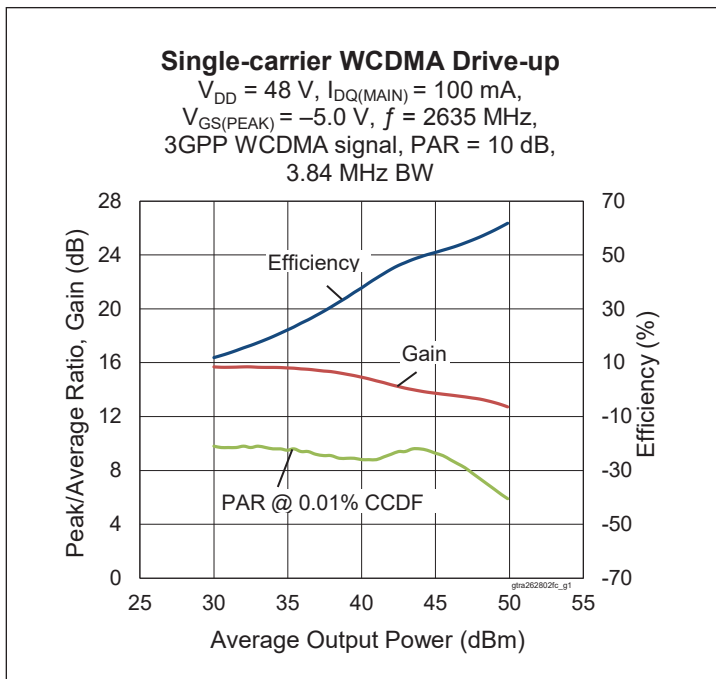
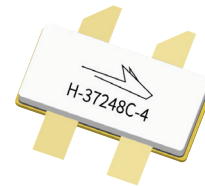
GTRA262802FC

Thermally-Enhanced High Power RF GaN on SiC HEMT 250 W, 48 V, 2490 – 2690 MHz

Description

The GTRA262802FC is a 250-watt (P_{3dB}) GaN on SiC high electron mobility transistor (HEMT) for use in multi-standard cellular power amplifier applications. It features input matching, high efficiency, and a thermally-enhanced package with earless flange.

GTRA262802FC
Package H-37248C-4



Features

- GaN on SiC HEMT technology
- Input matched
- Typical pulsed CW performance, 2605 MHz, 48 V, combined outputs, 16 μs pulse width, 10% duty cycle
 - Output power at $P_{3dB} = 250\text{ W}$
 - Efficiency = 62%
 - Gain = 14.4 dB
- Capable of handling 10:1 VSWR @48 V, 38 W (CW) output power
- Human Body Model Class 1A (per ANSI/ESDA/JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

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

$V_{DD} = 48\text{ V}$, $I_{DQ} = 100\text{ mA}$, $V_{GS(peak)} = V_{GS@I_{DQ}} = 200\text{ mA} - 2.05\text{ V}$, $P_{OUT} = 38\text{ W avg}$, $f = 2635\text{ MHz}$, 3GPP signal, 3.84 MHz channel bandwidth, 10 dB peak/average @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	13.5	14	—	dB
Drain Efficiency	η_D	49	54	—	%
Adjacent Channel Power Ratio	ACPR	—	-28	-24.5	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 (main)	$V_{GS} = -8\text{ V}$, $I_D = 10\text{ mA}$	$V_{(BR)DSS}$	150	—	—	V
(peak)	$V_{GS} = -8\text{ V}$, $I_D = 10\text{ mA}$	$V_{(BR)DSS}$	150	—	—	V
Drain-source Leakage Current	$V_{GS} = -8\text{ V}$, $V_{DS} = 10\text{ V}$	I_{DSS}	—	—	5	mA
Gate Threshold Voltage (main)	$V_{DS} = 10\text{ V}$, $I_D = 10.8\text{ mA}$	$V_{GS(th)}$	-3.5	-3	-2.5	V
(peak)	$V_{DS} = 10\text{ V}$, $I_D = 20\text{ mA}$	$V_{GS(th)}$	-3.5	-3	-2.5	V

Recommended Operating Conditions

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Operating Voltage		V_{DD}	0	—	50	V
Gate Quiescent Voltage	$V_{DS} = 48\text{ V}$, $I_D = 100\text{ mA}$	$V_{GS(Q)}$	—	-3.0	—	V

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DSS}	125	V
Gate-source Voltage	V_{GS}	-10 to +2	V
Operating Voltage	V_{DD}	55	V
Gate Current (main)	I_G	10.8	mA
(peak)	I_G	20	mA
Drain Current (main)	I_D	4.0	A
(peak)	I_D	7.5	A
Junction Temperature	T_J	225	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C

Operation above the maximum values listed here may cause permanent damage. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the component. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. For reliable continuous operation, the device should be operated within the operating voltage range (V_{DD}) specified above.

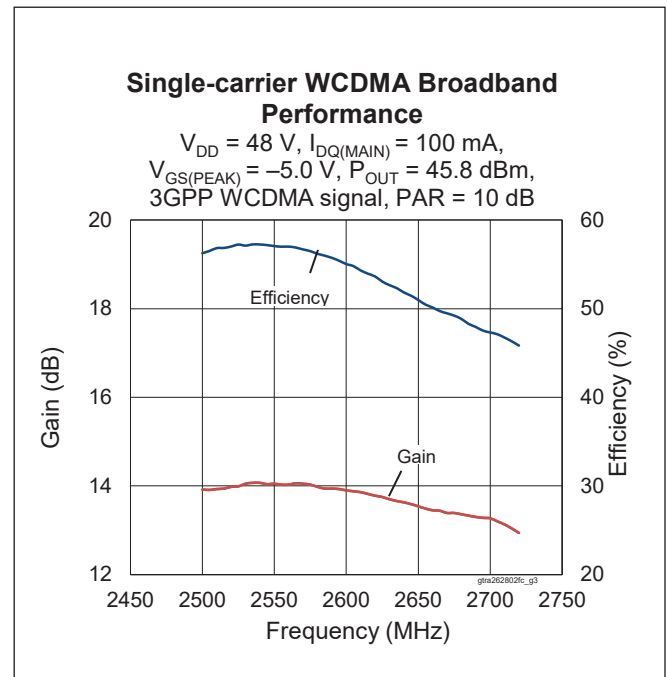
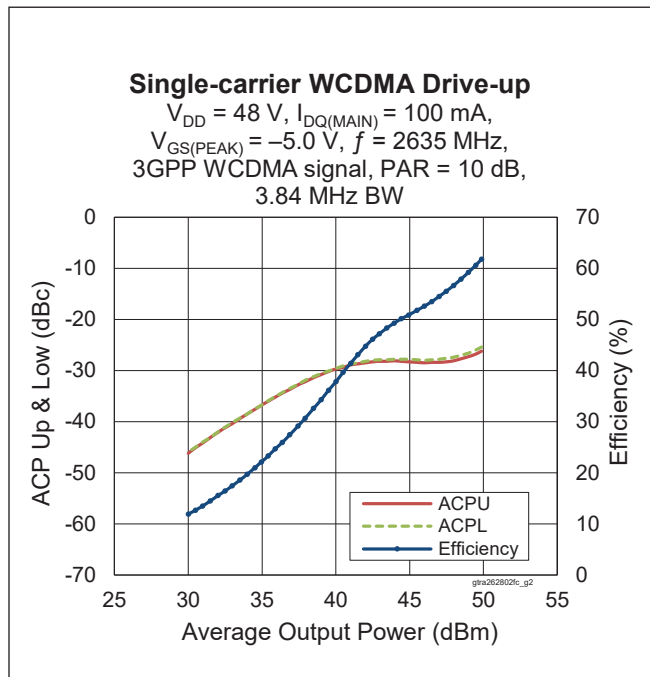
Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance (main, $T_{CASE} = 70\text{ °C}$, 38 W CW)	$R_{\theta JC}$	1.71	°C/W

Ordering Information

Type and Version	Order Code	Package Description	Shipping
GTRA262802FC V2 R0	GTRA262802FC-V2-R0	H-37248C-4	Tape & Reel, 50 pcs
GTRA262802FC V2 R2	GTRA262802FC-V2-R2	H-37248C-4	Tape & Reel, 250 pc

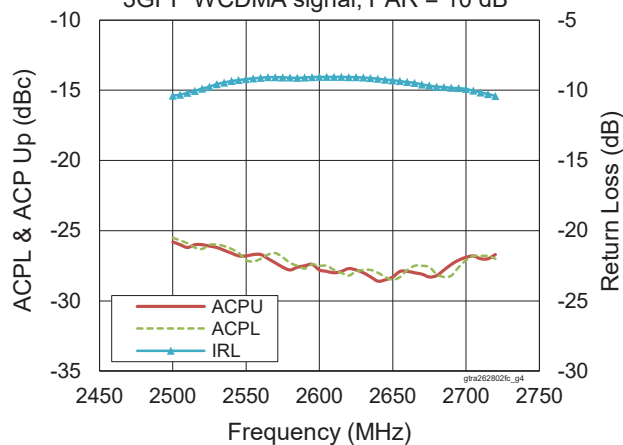
Typical Performance (data taken in a production test fixture)



Typical Performance (cont.)

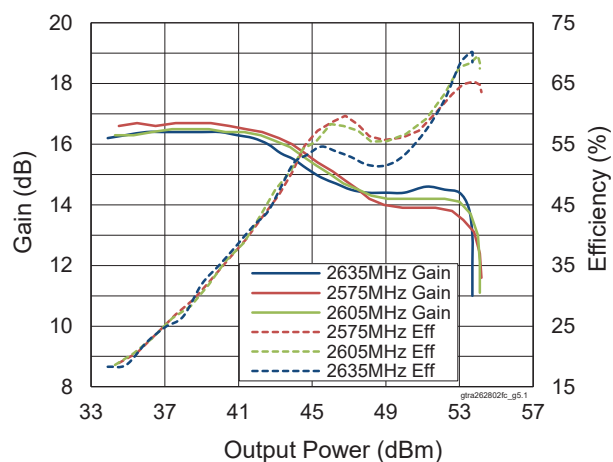
Single-carrier WCDMA Broadband Performance

$V_{DD} = 48\text{ V}$, $I_{DQ(MAIN)} = 100\text{ mA}$,
 $V_{GS(PEAK)} = -5.0\text{ V}$, $P_{OUT} = 45.8\text{ dBm}$,
 3GPP WCDMA signal, PAR = 10 dB

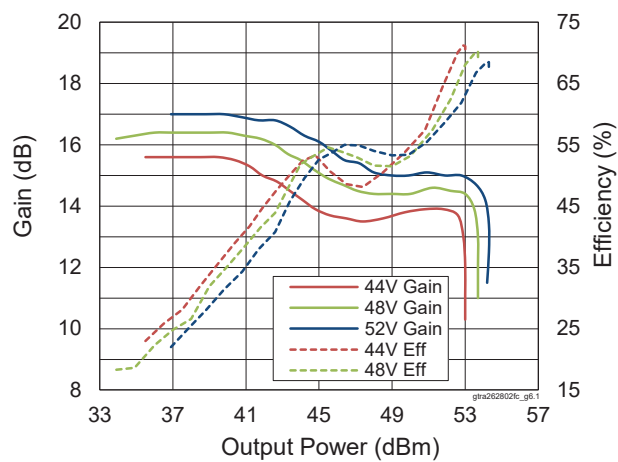


Pulse CW Performance

$V_{DD} = 48\text{ V}$, $I_{DQ(MAIN)} = 100\text{ mA}$,
 $V_{GS(PEAK)} = -5.0\text{ V}$

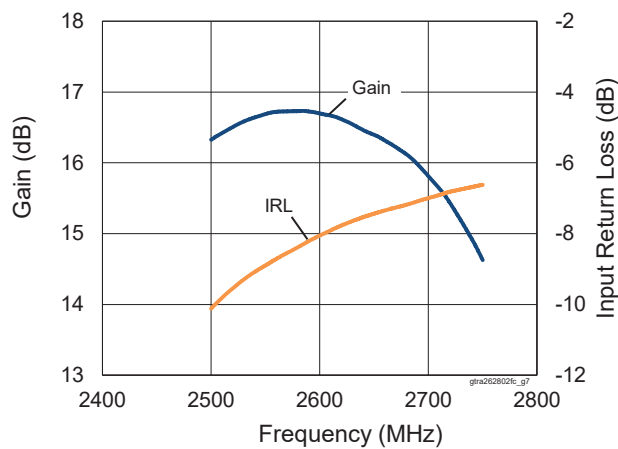
Pulse CW Performance at various V_{DD}

$I_{DQ(MAIN)} = 100\text{ mA}$, $V_{GS(PEAK)} = -5\text{ V}$,
 $f = 2635\text{ MHz}$



CW Performance Small Signal Gain & Input Return Loss

$V_{DD} = 48\text{ V}$, $I_{DQ(MAIN)} = 100\text{ mA}$,
 $V_{GS(PEAK)} = -5.0\text{ V}$



Load Pull Performance

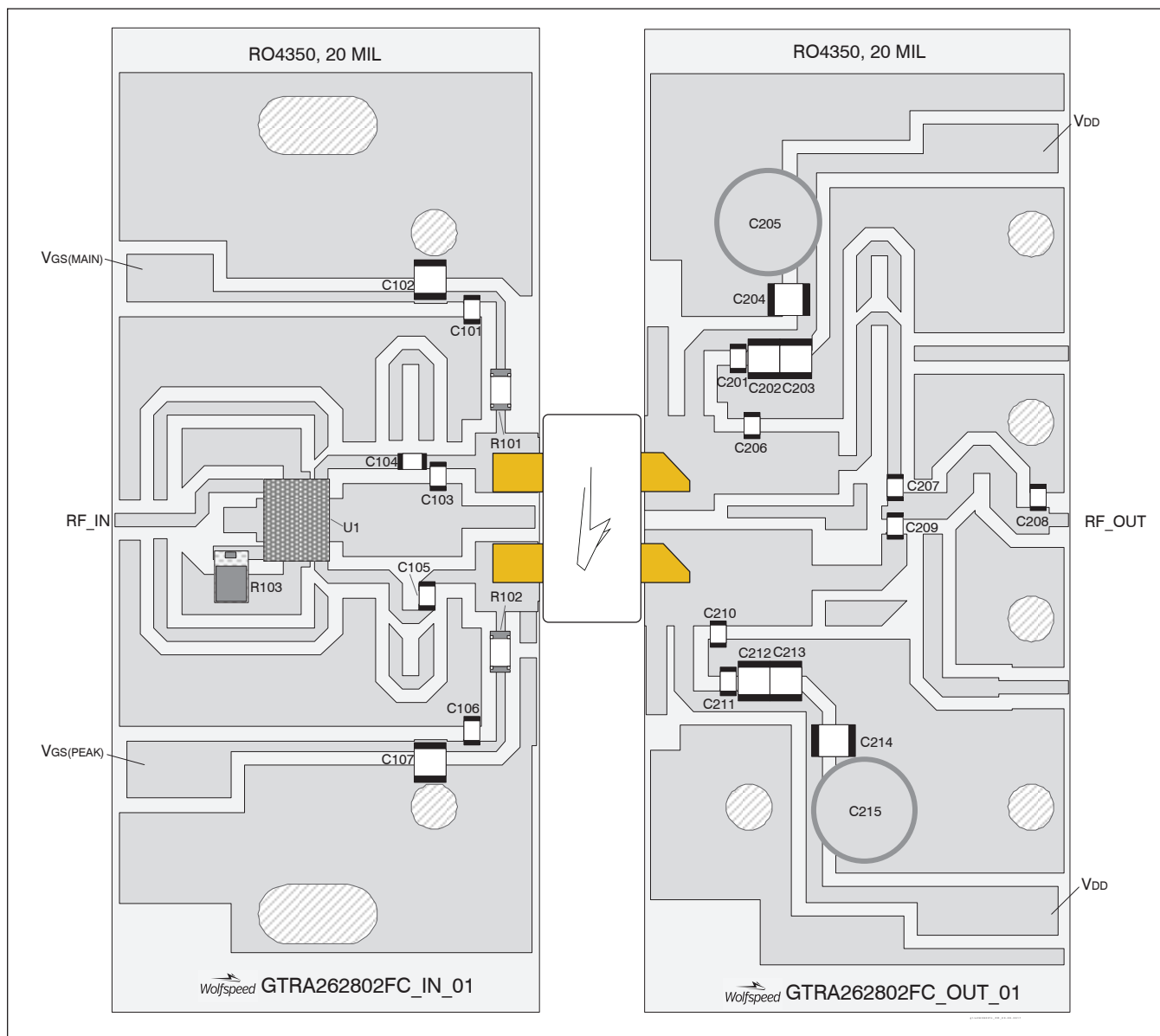
Main Side Load Pull Performance – Pulsed CW signal: 16 μ s, 10% duty cycle, 48 V, I_{DQ} = 100 mA, Class AB

		P_{3dB}									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z_s [Ω]	Z_L [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	η_D [%]	Z_L [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	η_D [%]
2550	24.62-j26.07	6.32-j4.58	16.28	51.00	125.89	64.9	4.21-j0.93	18.05	49.13	81.75	77.8
2620	27.89-j15.25	7.12-j4.87	16.15	50.91	123.31	66.4	4.75-j1.63	17.64	49.67	92.60	77.2
2690	37.33-j8.37	7.07-j5.42	15.71	50.81	120.50	64.8	4.46-j1.56	17.52	49.04	80.09	76.5

Peak Side Load Pull Performance – Pulsed CW signal: 16 μ s, 10% duty cycle, 48 V, I_{DQ} = 200 mA, Class AB

		P_{3dB}									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z_s [Ω]	Z_L [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	η_D [%]	Z_L [Ω]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	η_D [%]
2550	7.71-j18.49	4.94-j4.23	15.03	53.81	240.38	64.0	2.92-j1.60	16.74	52.20	165.84	73.7
2620	11.70-j15.12	4.83-j4.21	15.31	53.31	214.29	61.0	2.98-j1.60	16.84	51.97	157.29	71.7
2690	14.78-j11.61	4.83-j4.33	15.18	53.45	221.31	60.8	3.13-j1.73	16.72	52.14	163.64	71.6

See next page for Reference Circuit

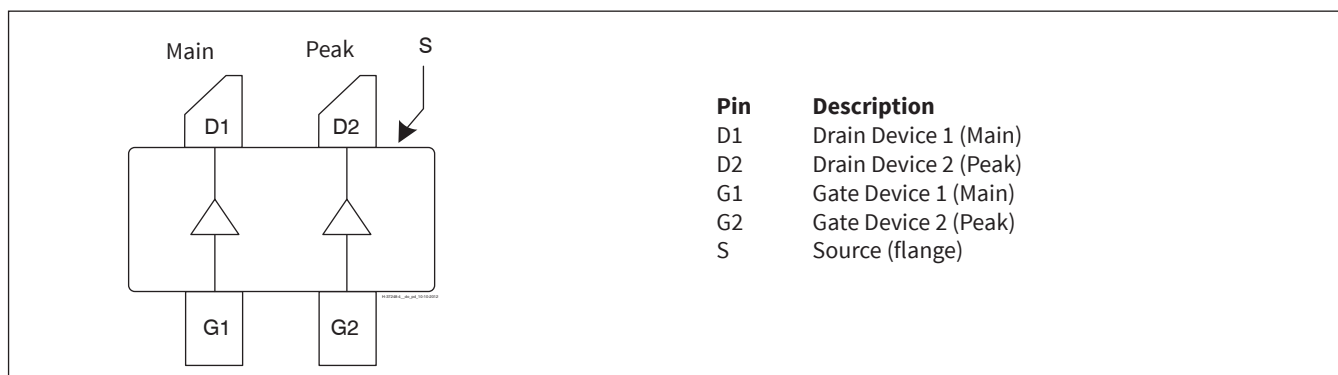
Reference Circuit, 2575 – 2635 MHz*Reference circuit assembly diagram (not to scale)*

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

DUT	GTRA262802FC V2
Test Fixture Part No.	LTA/GTRA262802FC V2
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$, $f = 2575 - 2635$ MHz
Find Gerber files for this test fixture on the Wolfspeed Web site at http://www.wolfspeed.com/RF	

Components Information

Component	Description	Manufacturer	P/N
Input			
C101, C104, C105, C106	Capacitor, 10 pF	ATC	ATC600F100JT250XT
C102, C107	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
C103	Capacitor, 0.5 pF	ATC	ATC600F0R5BT250XT
R101, R102	Resistor, 20 ohms	Panasonic Electronic Components	ERJ-8GEYJ200V
R103	Resistor, 50 ohms	Richardson	C8A50Z4A
U1	Hybrid coupler	Anaren	X3C26P1-03S
Output			
C201, C207, C209, C211	Capacitor, 10 pF	ATC	ATC600F100JT250XT
C202, C203, C204, C212, C213, C214	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
C205, C215	Capacitor, 470 μ F	Cornell Dubilier Electronics (CDE)	SEK471M050ST
C206	Capacitor, 0.8 pF	ATC	ATC600F0R8BT250XT
C208	Capacitor, 0.2 pF	ATC	ATC600F0R2BT250XT
C210	Capacitor, 0.5 pF	ATC	ATC600F0R5BT250XT

Pinout Diagram (top view)

Lead connections for GTRA262802FC V2



1. Interpret dimensions and tolerances per ASME Y14.5M-1994
2. Primary dimensions are mm, alternate dimensions are inches
3. All tolerances ± 0.127 [0.005]
4. Pins: D1, D2 – drain, G1, G2 – gate, S – source (flange)
5. Lead thickness: 0.13 ± 0.05 [0.005 ± 0.002]
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch]

Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2016-05-26	Advance	All	Data Sheet reflects advance specification for product development
02	2017-03-22	Production	All	Data Sheet reflects released product specification
02.1	2017-09-19	Production	2	Updated operating voltage
03	2018-07-24	Production	All	Revised to V2. Converted to Wolfspeed data sheet.
03.1	2020-03-31	Production	1, 2 5	Updated condition for typical CW performance, Updated max operating voltage Revised pulsed conditions for loadpull performance
03.2	2020-05-17	Production	2	Added operating voltage to max ratings table

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Notes

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