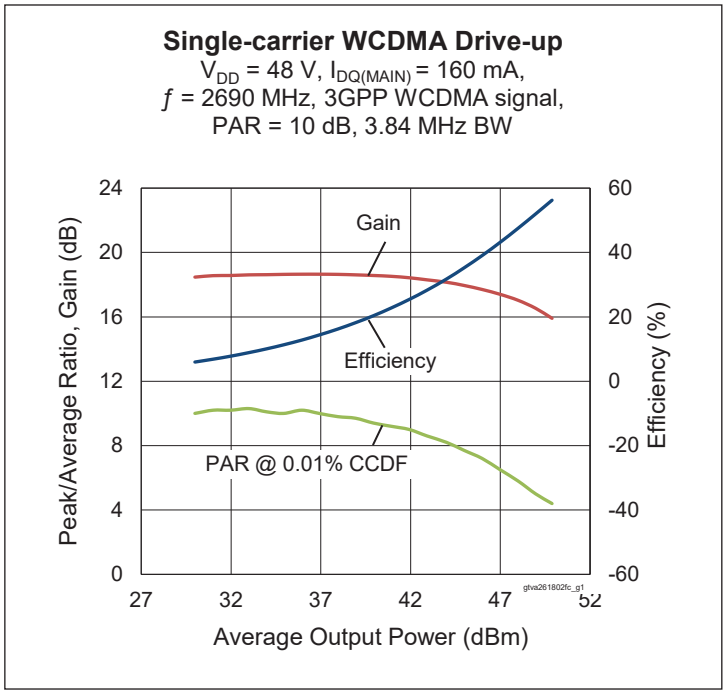
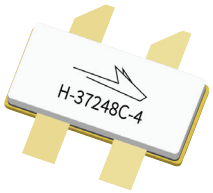
GTVA261802FC

Thermally-Enhanced High Power RF GaN on SiC HEMT
170 W, 48 V, 2620 – 2690 MHz

Description

The GTVA261802FC is a 170-watt GaN on SiC high electron mobility transistor for use in multi-standard cellular power amplifier applications. It features input matching, high efficiency, and a thermally-enhanced package with earless flange.





GTVA261802FC
Package H-37248C-4

Features

- GaN on SiC HEMT technology
- Input matched
- Typical Pulsed CW performance,combined outputs, 2690 MHz, 48 V, 10 µs pulse width, 10% duty cycle
  - Output power at P_{3dB} = 170 W
  - Drain Efficiency @ P_{3dB} = 65.5%
  - Gain @ P_{3dB} = 15 dB
- Capable of handling 10:1 VSWR @ 48 V, 180 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 production test fixture)
V_{DD} = 48 V, I_{DQ} = 160 mA, P_{OUT} = 50 W avg, f = 2690 MHz, 3GPP, channel bandwidth = 3.84 MHz, peak/average = 10 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	15.5	16.8	—	dB
Drain Efficiency	η^D	40	43	—	%
Adjacent Channel Power Ratio	ACPR	—	–27	–24.5	dBc
Output PAR @ 0.01% CCDF	OPAR	4.5	5.3	—	dB

All published data at T_{CASE} = 25°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} = –8 V, I_D = 10 mA	$V_{(BR)DSS}$	150	—	—	V
Drain-source Leakage Current	V_{GS} = –8 V, V_{DS} = 10 V	I_{DSS}	—	—	1.5	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 10 mA	$V_{GS(th)}$	–3.8	–3.0	–2.3	V

Recommended Operating Conditions

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Operating Voltage		V_{DD}	0	—	50	V
Gate Quiescent Voltage	V_{DS} = 48 V, I_D = 160 mA	$V_{GS(Q)}$	–3.60	–2.97	–2.30	V

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DSS}	125	V
Gate-source Voltage	V_{GS}	–10 to +2	V
Gate Current	I_G	10.8	mA
Drain Current	I_D	4	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; exceeing 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

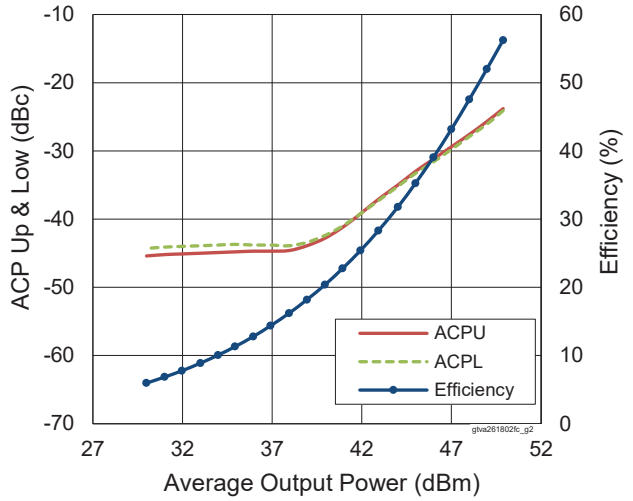
Parameter	Symbol	Value	Unit
Thermal Resistance (T_{CASE} = 70°c, 100 W CW)	$R_{\theta JC}$	1.06	°C/W

Ordering Information

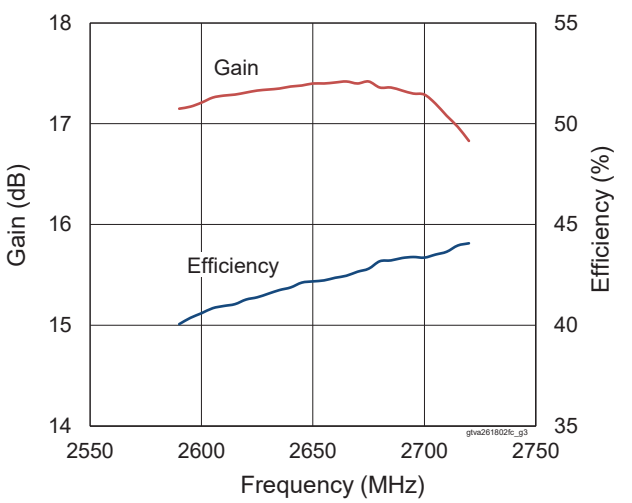
Type and Version	Order Code	Package Description	Shipping
GTVA261802FC V1 R0	GTVA261802FC-V1-R0	H-37248C-4, earless flange	Tape & Reel, 50 pcs
GTVA261802FC V1 R2	GTVA261802FC-V1-R2	H-37248C-4, earless flange	Tape & Reel, 250 pcs

Typical Performance (data taken in test fixture)

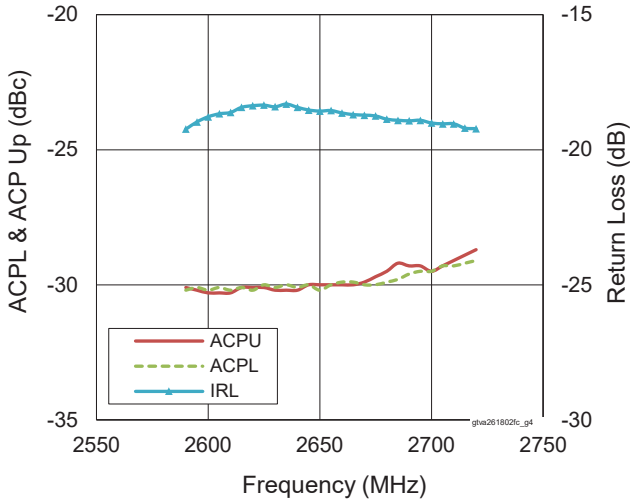
Single-carrier WCDMA Drive-up
V_{DD} = 48 V, $I_{DQ(MAIN)}$ = 160 mA,
f = 2690 MHz, 3GPP WCDMA signal,
PAR = 10 dB, BW = 3.84 MHz



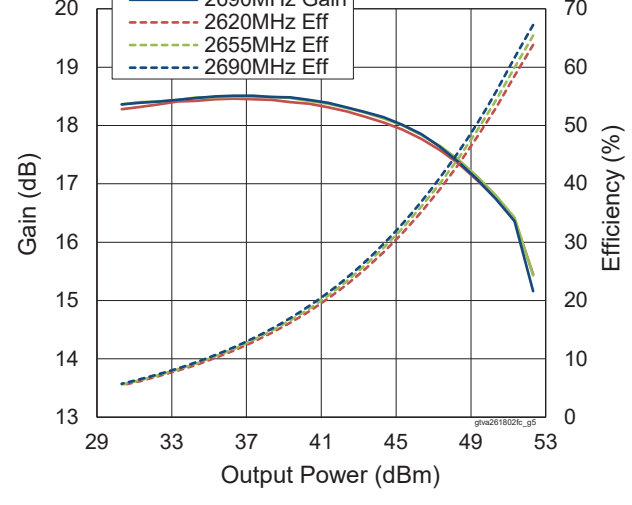
Single-carrier WCDMA Broadband Performance
V_{DD} = 48 V, $I_{DQ(MAIN)}$ = 160 mA,
P_{OUT} = 47 dBm, 3GPP WCDMA signal,
PAR = 10 dB



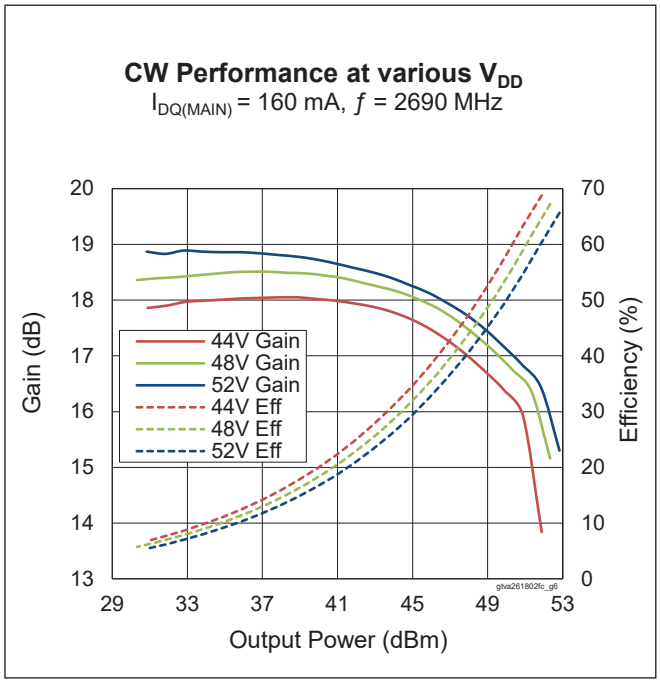
Single-carrier WCDMA Broadband Performance
V_{DD} = 48 V, $I_{DQ(MAIN)}$ = 160 mA,
P_{OUT} = 47 dBm, 3GPP WCDMA signal,
PAR = 10 dB

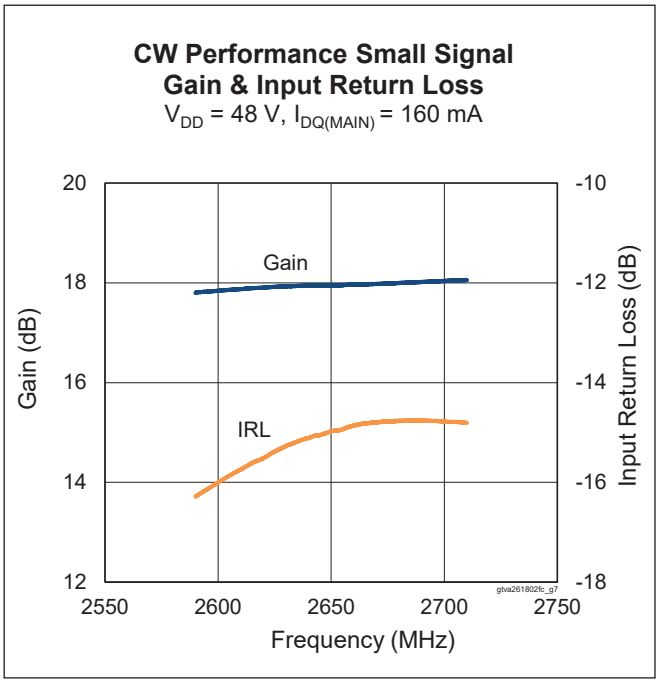


CW Performance
V_{DD} = 48 V, $I_{DQ(MAIN)}$ = 160 mA



Typical Performance (cont.)





Load Pull Performance

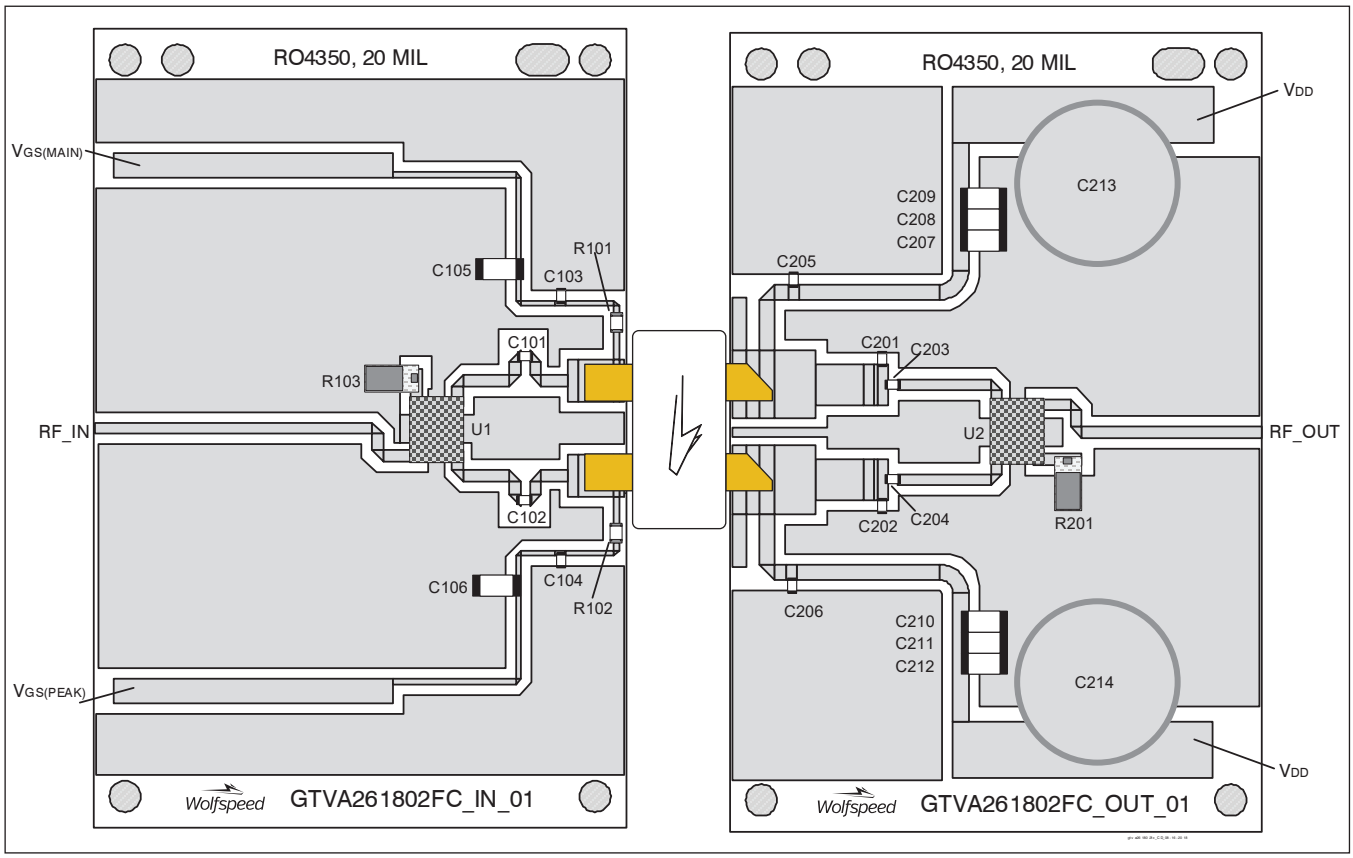
Each Side Load Pull Performance – Pulsed CW signal: 10 µs, 10% duty cycle, 48 V, I_{DQ} = 80 mA, class AB

		P_{3dB}									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Zs [W]	Z_L [W]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	ηD [%]	Z_L [W]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	ηD [%]
2620	32.6-j23.3	7.02-j0.46	16	50.35	108.4	69.2	3.6+j1.73	16.4	48.60	72.4	77.7
2690	41.87-j10.33	5.38-j0.83	15.9	50.21	105	65.1	5.38-j0.83	15.8	48.60	72.4	77.6

Peak Side Load Pull Performance – Pulsed CW signal: 10 µs, 10% duty cycle, 48 V, I_{DQ} = 80 mA, class AB

		P_{3dB}									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Zs [W]	Z_L [W]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	ηD [%]	Z_L [W]	Gain [dB]	P_{3dB} [dBm]	P_{3dB} [W]	ηD [%]
2620	32.6-j23.3	7.02-j0.46	16	50.35	108.4	69.2	3.6+j1.73	16.4	48.60	72.4	77.7
2690	41.87-j10.33	5.38-j0.83	15.9	50.21	105	65.1	5.38-j0.83	15.8	48.60	72.4	77.6

Reference Circuit, 2620 – 2690 MHz



Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)

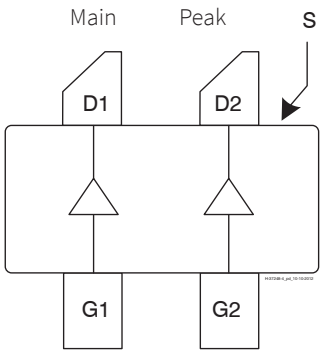
Reference Circuit Assembly

DUT	GTVA261802FC V1
Test Fixture Part No.	LTN/GTVA261802FC V1
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, ε_r = 3.66, f = 2620 – 2690 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, C102, C103, C104	Capacitor, 12 pF	ATC	ATC600F120JT250X
C105, C106	Capacitor, 100V, 4.7 µF	TDK Corporation	C4532X7S2A475M230KB
R101, R102	Resistor, 10 ohms	Panasonic Electronic Components	ERJ-8GEYJ100V
R103	Resistor, 50 ohms	Richardson	C16A50Z4
U1	Hybrid coupler	Anaren	X3C26P1-03S
Output			
C201, C202	Capacitor, 0.5 pF	ATC	ATC600F0R5JT250X
C203, C204, C205, C206	Capacitor, 12 pF	ATC	ATC600F120JT250X
C207, C208, C209, C210, C211, C212	Capacitor, 100 V, 4.7 µF	TDK Corporation	C4532X7S2A475M230KB
C213, C214	Capacitor, 470 µF	Cornell Dubilier Electronics (CDE)	SEK471M050ST
R201	Resistor, 50 ohms	Richardson	C16A50Z4
U2	Hybrid coupler	Anaren	X3C26P1-03S

Pinout Diagram (top view)



Pin	Description
D1	Drain Device 1 (Main)
D2	Drain Device 2 (Peak)
G1	Gate Device 1(Main)
G2	Gate Device 2 (Peak)
S	Source (flange)

Package Outline Specifications

Package H-37248C-4

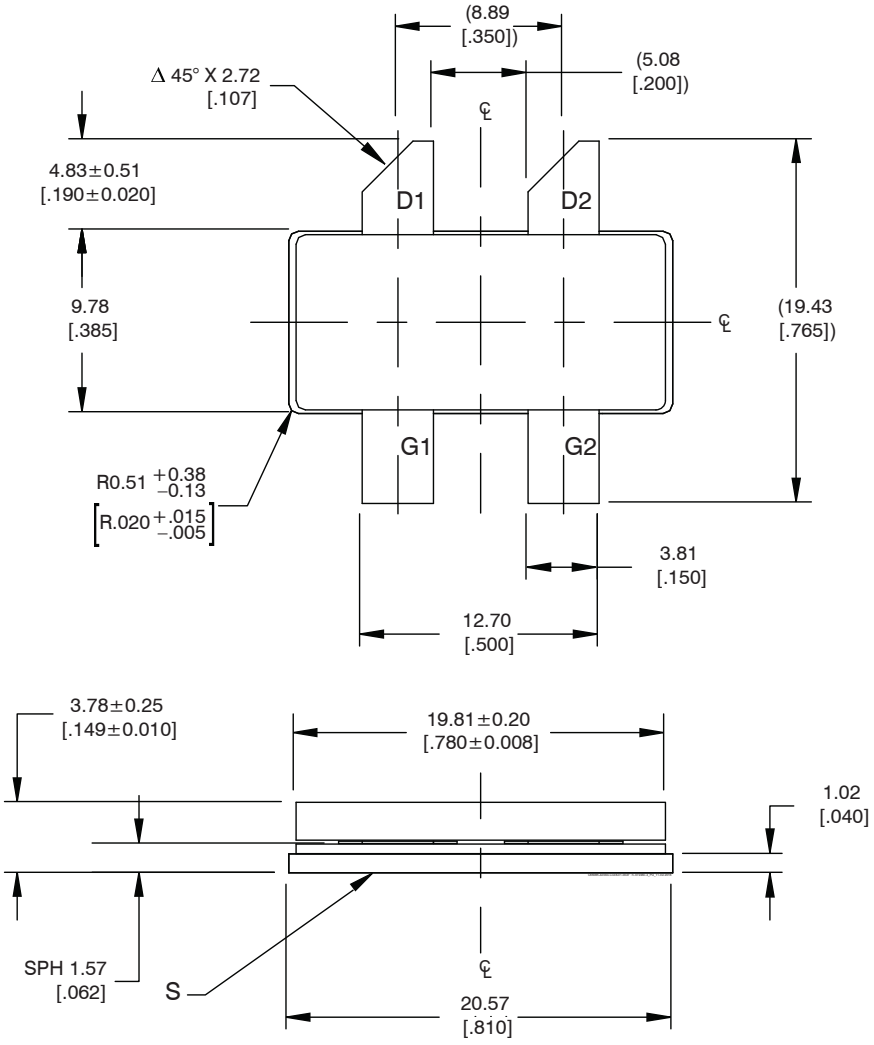


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994
2. Primary dimensions are mm, alternate dimensions are inches
3. All tolerances ± 0.127 [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	2017-07-21	Advance	All	Data Sheet reflects advance specification for product development
02	2018-09-25	Production	All	Data Sheet reflects released product specification

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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