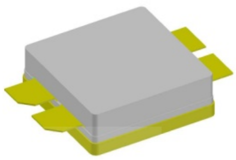
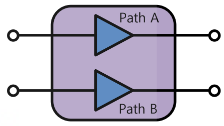
IE26195WD



Package Type : RF12001DKR3



Product Features

- 2575~2635MHz
- 195W Saturated Power @ 48V
- 75% Drain Efficiency @ Psat
- 53% Drain Efficiency @ 45dBm
- Internally Matched
- Asymmetrical Doherty GaN HEMT

Applications

- WiMAX, LTE, WCDMA, GSM
- Multi-Band, Multi-Mode
- Multi-Carrier
- High Efficiency, Doherty Amplifier

Typical Single-Carrier LTE Performance

(V_{DS}= +48V, T_C=25℃, 50Ω)

Frequency [MHz]	Peak Power	Average Power[*1]			
	Power [W]	Power [W]	Gain [dB]	Drain Efficiency [%]	ACLR [dBc]
2580.0	218.8	32	14.3	53.3	-26.4
2605.0	204.6	32	14.4	53.6	-26.3
2630.0	183.7	32	14.4	53.6	-26.3

Note

*1 Measured in the IE26195WD Doherty test board amplifier circuit, under LTE 10MHz, PAR 7.5dB @0.01% probability on CCDF

Absolute Maximum Ratings

Rating	Symbol	Value	Unit	Condition
Drain to Source Voltage	V_{DSS}	150	V	Tc=25℃
Gate to Source Voltage	V_{GS}	-10, +2	V	Tc=25℃
Operating Voltage	V_{DD}	52	V_{DC}	-
Storage Temperature	T_{STG}	-65, +150	℃	-
Case Operating Temperature	T_C	-40, +150	℃	30 seconds
Operating Junction Temperature[*1]	T_J	225	℃	-
Soldering Temperature[*2]	T_S	245	℃	-

Note

*1 Continuous use at maximum temperature will affect MTTF.

*2 Refer to the Application Note(AN-002) on soldering - "Solder Condition for RFHIC's GaN Device"

Thermal Characteristics

Rating	Symbol	Value	Unit	Condition
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.90 [*1]	℃/W	Tc=85℃

Note

*1 Measured for the IE26195WD at dissipation power is 48.3W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
DC Characteristics - Path A (Carrier)[*1]						
Maximum Forward Gate Current	Tc= 25℃	I_{GMAX}	-	-	12.0	mA
Maximum Drain Current[*2]	Tc= 25℃	I_{DMAX}	-	-	4.5	A
Power Dissipation	Tc= 85℃	P_{DMAX}	-	-	48.3	W
Gate Threshold Voltage	V_{DS} = 10V I_D = 10.8mA	$V_{GS(TH)}$	-3.8	-3.0	-2.3	V_{DC}
Gate Quiescent Voltage	V_{DS} = 48V I_D = 350mA	$V_{GS(Q)}$	-	-2.8	-	V_{DC}
Drain-Source Breakdown Voltage	V_{GS} = -8V I_D = 10.8mA	V_{BR}	150	-	-	V
Saturated Drain Current[*3]	V_{DS} = 6V V_{GS} = 2V	I_{DS}	9.0	10.8	-	A
Gate Leakage Current	V_{GS} = -8V V_{DS} = 120V	I_{GLKG}	-2.4	-	-	mA
Drain Leakage Current	V_{GS} = -8V V_{DS} = 120V	I_{DLKG}	-	-	4.3	mA
DC Characteristics - Path B (Peaking)[*1]						
Maximum Forward Gate Current	Tc= 25℃	I_{GMAX}	-	-	16.0	mA
Maximum Drain Current[*2]	Tc= 25℃	I_{DMAX}	-	-	6.0	A
Power Dissipation	Tc= 85℃	P_{DMAX}	-	-	57.4	W
Gate Threshold Voltage	V_{DS} = 10V I_D = 14.4mA	$V_{GS(TH)}$	-3.8	-3.0	-2.3	V_{DC}
Gate Quiescent Voltage	V_{DS} = 48V I_D = 50mA	$V_{GS(Q)}$	-	-2.8	-	V_{DC}
Drain-Source Breakdown Voltage	V_{GS} = -8V I_D = 14.4mA	V_{BR}	150	-	-	V
Saturated Drain Current[*3]	V_{DS} = 6V V_{GS} = 2V	I_{DS}	12.0	14.4	-	A
Gate Leakage Current	V_{GS} = -8V V_{DS} = 120V	I_{GLKG}	-3.2	-	-	mA
Drain Leakage Current	V_{GS} = -8V V_{DS} = 120V	I_{DLKG}	-	-	5.8	mA

Note

*1 Measured on wafer prior to packaging.

*2 Current Limit for long term, reliable operation

*3 Scaled from PCM data.

Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
RF Characteristics (Fc=2605MHz unless otherwise noted)						
Saturated Output Power[*1,4]	**V_{DS} = 48V** **I_{DQ} = 350mA**	P_{SAT}	-	195	-	W
Modulated Gain[*2]	**V_{DS} = 48V** **I_{DQ} = 350mA** **P_{OUT} = 45dBm**	G_{BR}	13.0	14.0	-	dB
LTE Linearity[*2]	**V_{DS} = 48V** **I_{DQ} = 350mA** **P_{OUT} = 45dBm**	ACLR	-	-26.0	-24.0	dBc
Modulated Drain Efficiency[*2]	**V_{DS} = 48V** **I_{DQ} = 350mA** **P_{OUT} = 45dBm**	η	50.0	53.0	-	%
Output Mismatch Stress[*1, 3]	**V_{DS} = 48V** **I_{DQ} = 350mA** **P_{OUT} = P_{SAT} Pulsed**	VSWR	-	-	10:1	ψ

Note

*1 Pulse width 100µsec, Duty Cycle 10%.

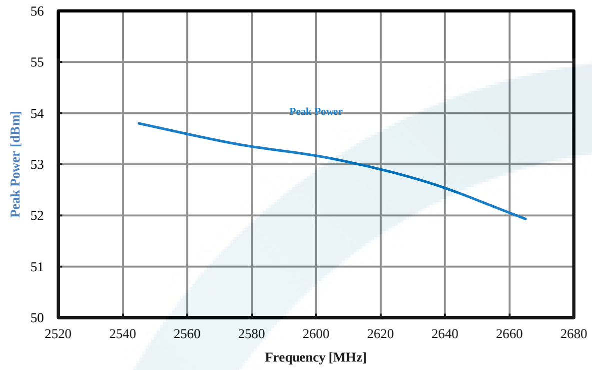
*2 Measured in the IE26195WD Doherty test board amplifier circuit, under LTE 10MHz, PAR7.5dB @0.01% probability on CCDF.

*3 Measured in the IE26195WD Doherty test board amplifier circuit. No damage at all phase angles.

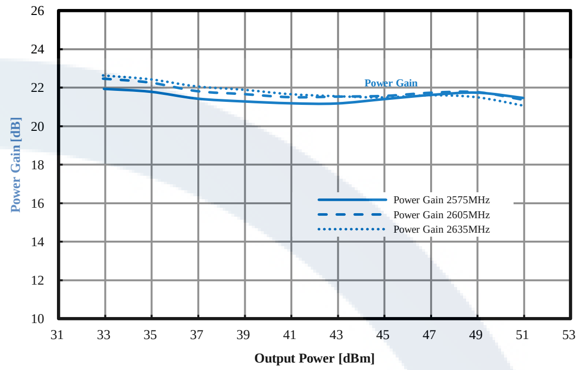
*4 Psat is defined as ΔPout/ΔPin<0.1, where ΔPin is increased input power, ΔPout is increased output power.

Typical Pulsed Signal Performance (Tc=25℃, Measured in the IE26195WD test board amplifier circuit)

Peak Power, Drain Efficiency vs. Frequency



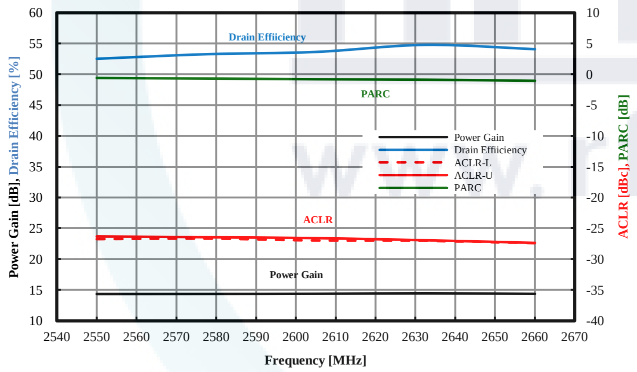
Pulsed Power Gain, Drain Efficiency vs. Output Power



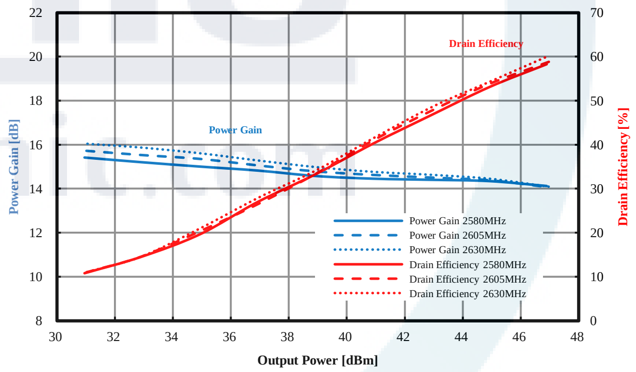
V_{DS} = 48V, $I_{DQ(C)}$ = 350mA, $V_{GS(P)}$=-5V, Pulse Width = 100μsec, Duty Cycle = 10%

Typical LTE Signal Performance (Tc=25℃, Measured in the IE26195WD test board amplifier circuit)

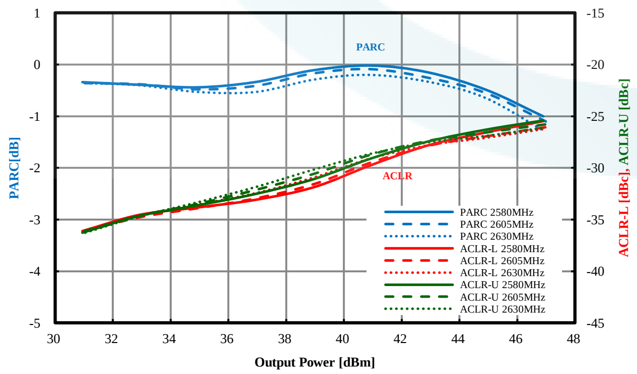
LTE Power Gain, Drain Efficiency, ACLR, PARC vs. Frequency



Power Gain, Drain Efficiency vs. Output Power



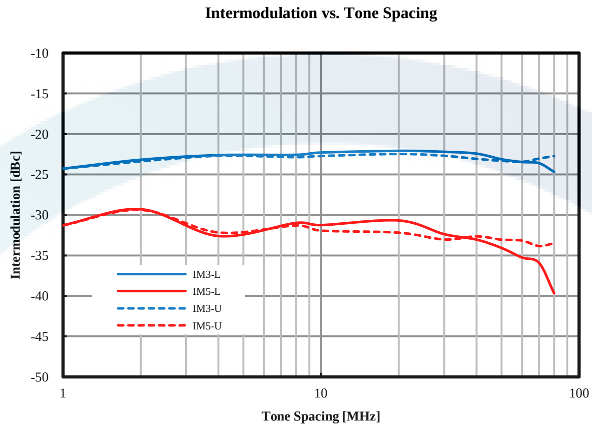
PARC, ACLR vs. Output Power



P_{AVG} = 45dBm, V_{DS} = 48V, $I_{DQ(C)}$ = 350mA, $V_{GS(P)}$ = -5V
LTE 10MHz BW, PAPR=7.5dB @ 0.01% Probability on CCDF

Typical 2-tone Intermodulation Imbalance Performance

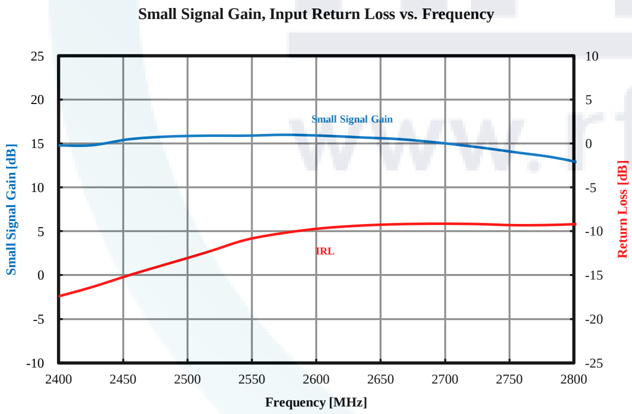
(Tc=25℃, Measured in the IE26195WD Doherty test board amplifier circuit)

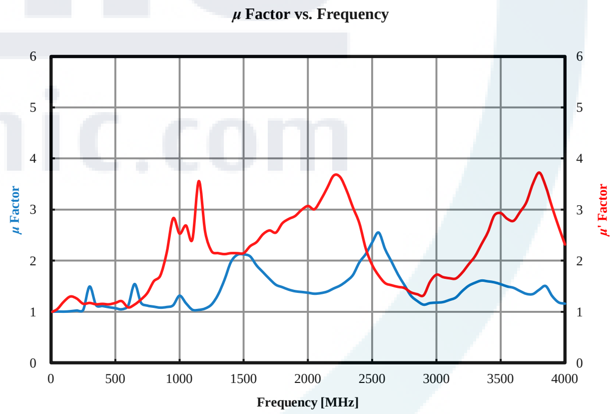


2-tone Power = 50.9dBm, V_{DS} = 48V, $I_{DQ(C)}$ = 350mA, $V_{GS(P)}$ = -5V

Typical Small Signal Performance

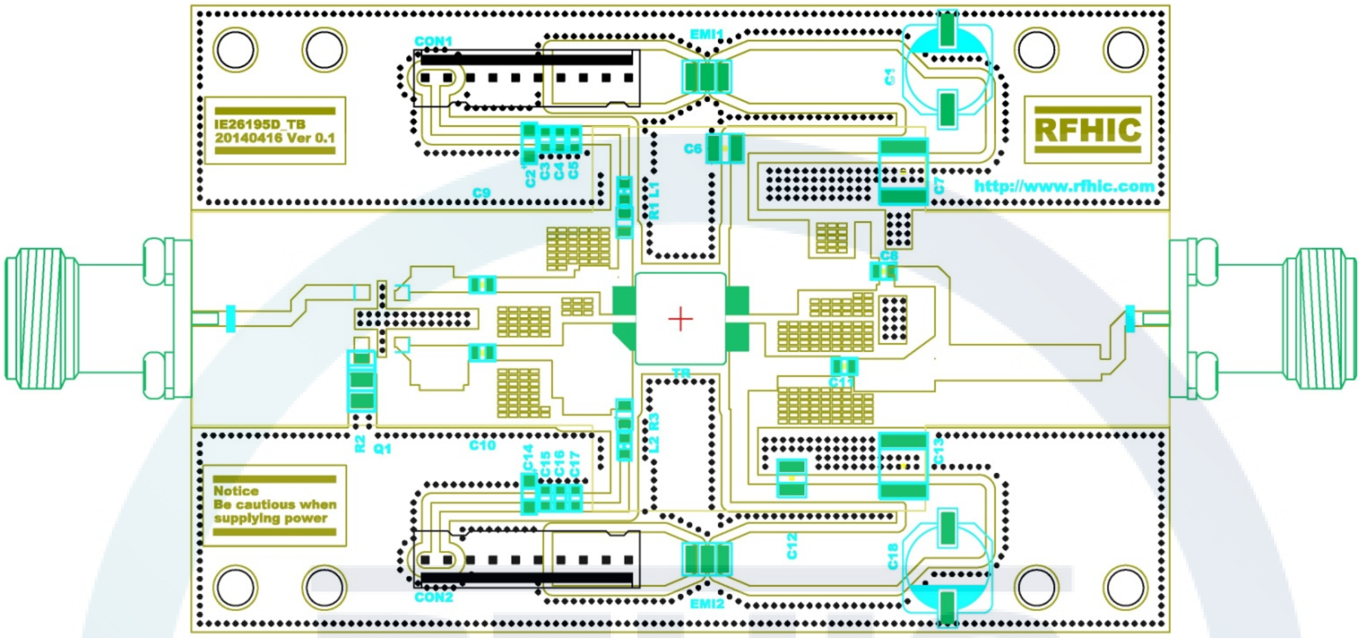
(Tc=25℃, Measured in the IE26195WD Doherty test board amplifier circuit)





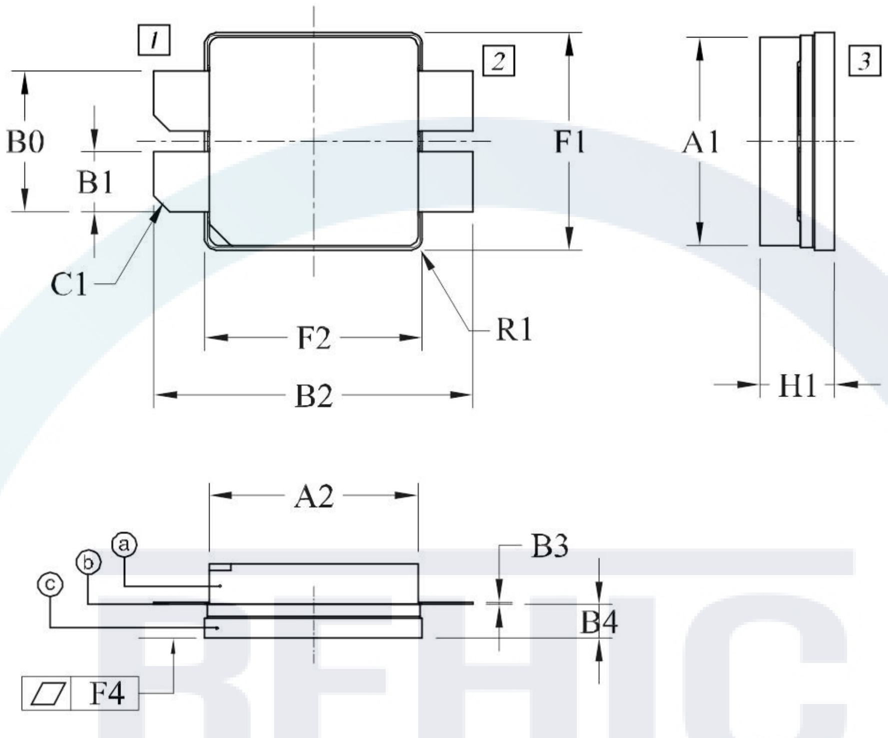
P_{IN} = 0dBm, V_{DS} = 48V, I_{DQ} = 350mA, $V_{GS(P)}$ = -5V

Test Board Component Layout



Part	Description	Part Number	Manufacturer
R1,R3	20 ohm Chip Resistor	MCR10EZHJ200	ROHM
R2	50 ohm Power Resistor	45-0040S	DICONEX
L1,L2	9.5nH Wire Wound Inductor	LQW18AN9N5D00	MURATA
C1,C18	33uF Aluminum Capacitor	BDS100VC33MJ10TP	SAMYOUNG
C2,C14	10uF Polymer Capacitor	TCJA106M016R0200	AVX
C3,C15	10nF Chip Capacitor	GRM188R71H103KA01D	MURATA
C4,C16	1nF Chip Capacitor	GRM188R71H102KA01D	MURATA
C5,C17	10pF Chip Capacitor	GRM1885C1H100JA01D	MURATA
C6	8.2pF High Q Capacitor	501CHB8R2CSLE	TEMEX
C7,C13	10uF MLCC	CKG57NX7R2A106MT	TDK
C8	5.6pF High Q Capacitor	201CHA5R6CSLE	TEMEX
C9,C11	8.2pF High Q Capacitor	201CHA8R2CSLE	TEMEX
C10	15pF High Q Capacitor	201CHA150JSLE	TEMEX
C12	47pF High Q Capacitor	501CHB470JSLE	TEMEX
EMI1,EMI2	EMI FILTER	CTH32R102S20A-TM	MARUWA
CON1,CON2	DC Connector	5045-10	MOLEX
PCB	εr=3.48 ± 0.05, 0.030” (0.762mm)	RO4350B	ROGERS Corp.
TR1	195W GaN Dual Transistor	IE26195WD	RFHIC

Package Dimensions (Type:RF12001DKR3)



Pin Description	
Pin No	**Function**
1	Gate
2	Drain
3	Source

ⓐ- Lid
ⓑ- Lead Frame
ⓒ- Flange

Dim.	INCH			MILLIMETER		
	MIN	TYP	MAX	MIN	TYP	MAX
A1	.379	.384	.389	9.63	9.76	9.89
A2	.379	.384	.389	9.63	9.76	9.89
B0	.253	.258	.263	6.43	6.56	6.69
B1	.104	.109	.115	2.65	2.78	2.91
B2	.567	.587	.606	14.40	14.90	15.40
B3	.003	.005	.007	0.08	0.13	0.18
B4	.057	.062	.067	1.44	1.57	1.70
C1 (Chamfer)	.024	.030	.035	0.62	0.75	0.88
F1	.395	.400	.405	10.03	10.16	10.29
F2	.395	.400	.405	10.03	10.16	10.29
F4	-	.001	-	-	0.03	-
H1	.115	.137	.158	2.92	3.47	4.02
R1 (Radius)	.016	.020	.024	0.40	0.50	0.60

Revision History

Part Number	Release Date	Version	Description	Data Sheet Status
IE26195WD	March, 2016	1.0	Modified Electrical Characteristics	-