Product Features

- 910 ~ 920MHz (ISM band)
- 330W CW Peak Power @ 50V
- 80% Drain Efficiency @ 50V
- Excellent Ruggedness
- Excellent Thermal Stability
- Internally Matched

Applications

- Industrial Heating and Drying
- Scientific
- Medical : Skin Treatment, Blood Therapy
- Plasma Generator



Package Type : NS-AS01

Description

The 300W CW RF Power Transistor is designed for Industrial, Scientific, Medical (ISM) and Plasma Generator applications at 915MHz. This device is suitable for use in CW, pulse and linear applications. This high efficiency rugged device is targeted to replace Industrial magnetrons and other vacuum tubes currently powering industrial heating, drying, plasma lighting and medical systems.

Typical CW Peak Power Performance (V_{DS}=+50V, Tc=25°C, 50Ω)

Frequency [MHz]	Signal Type	Pin [W]	Power Gain [dB]	Drain Efficiency [%]	Pout [W]
910	CW	6.6	17.1	80.01	343
915		5.3	18	80.21	339
920		5.6	17.7	81.58	336

Absolute Maximum Ratings

Rating	Symbol	Value	Unit	Condition
Drain to Source Voltage	V_{DSS}	150	V	Tc=25°C
Gate to Source Voltage	V_{GS}	-10, +2	V	Tc=25°C
Operating Voltage	V_{DD}	52	V_{DC}	-
Maximum Forward Gate Current	I_{GMAX}	41.8	mA	Tc=25°C
Maximum Drain Current*1	I_{DMAX}	18	A	Tc=25°C
Power Dissipation	P_{DISS}	165	W	Tc=85°C
Storage Temperature	T_{STG}	-65, +150	°C	-
Case Operating Temperature	T_C	-40, +150	°C	-
Operating Junction Temperature*2	T_J	225	°C	-
Soldering Temperature*3	T_S	245	°C	-

Note
*1 Current Limit for long term, reliable operation.
*2 Continuous use at maximum temperature will affect MTTF.
*3 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	$R_{\theta JC}$	0.85 *1	°C/W	Tc=85°C

Note
*1 Measured for the IE09330PC at dissipation power is 165W

Electrical Characteristics (Tc=25℃ unless otherwise noted)

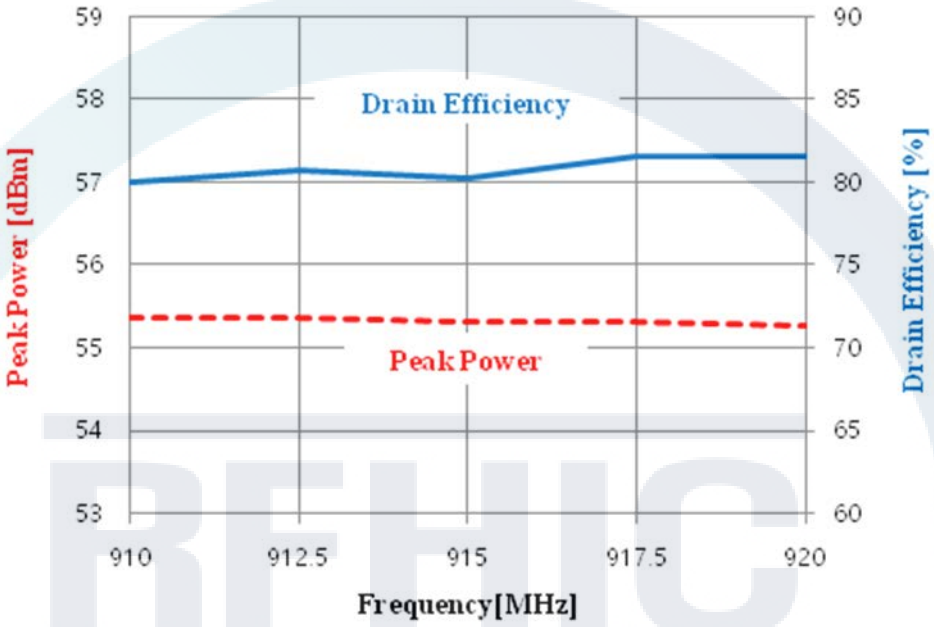
Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
DC Characteristics[*1]						
Gate Threshold Voltage	**V_{DS} = 10V** **I_D = 41.8mA**	$V_{GS(TH)}$	-3.8	-3.0	-2.3	V_{DC}
Gate Quiescent Voltage	**V_{DS} = 50V** **I_D = 50mA**	$V_{GS(Q)}$	-	-3.2	-	V_{DC}
Saturated Drain Current[*2]	**V_{DS} = 6V** **V_{GS} = 2V**	I_{DS}	34.8	41.8	-	A
Drain-Source Breakdown Voltage	**V_{GS} = -8V** **I_D = 41.8mA**	V_{BR}	150	-	-	V
Gate Leakage Current	**V_{GS} = -8V** **V_{DS} = 120V**	I_{GLKG}	-9.2	-	-	mA
Drain Leakage Current	**V_{GS} = -8V** **V_{DS} = 120V**	I_{DLKG}	-	-	16.7	mA
RF Characteristics (Fc = 915MHz unless otherwise noted)						
Saturated Output Power[*3]	**V_{DS} = 50V** **I_{DQ} = 150mA**	P_{SAT}	300	330	-	W
CW Drain Efficiency[*3]	**V_{DS} = 50V** **I_{DQ} = 150mA** **P_{OUT} = P_{SAT} CW**	η	77	80	-	%

Note
*1 Measured on wafer prior to packaging.
*2 Scaled from PCM data.
*3 CW(Continuous Wave) signal operation condition.

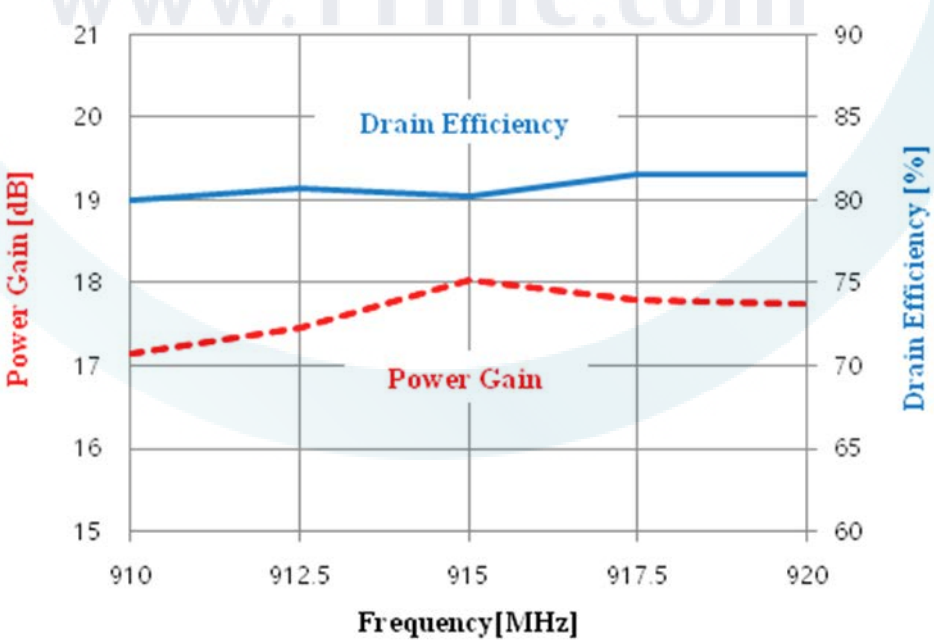
Typical CW Performance Charts

* **Bias condition** (I_{DQ}=150mA @ V_{DS}=50V, Tc=25℃)

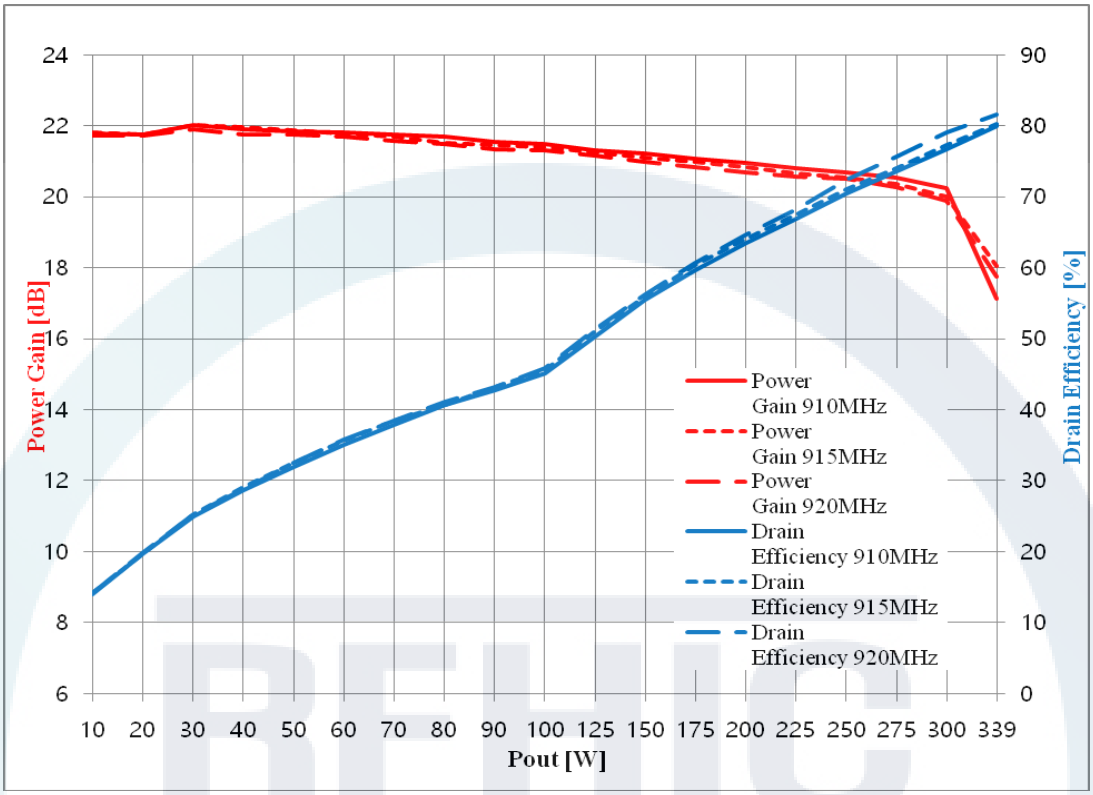
Peak Power, Drain Efficiency vs. Frequency



Power Gain, Drain Efficiency vs. Frequency

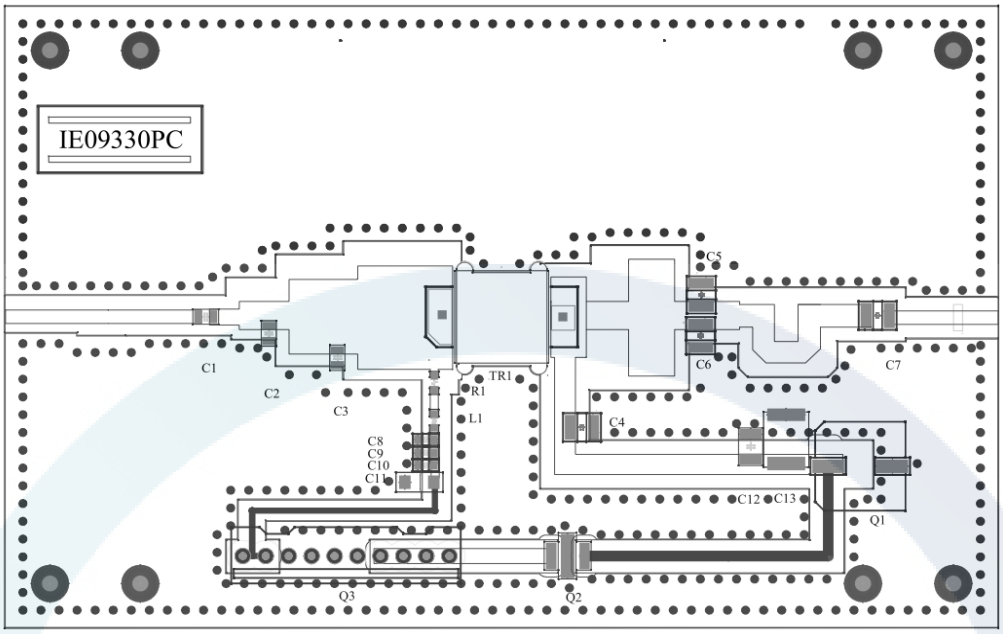


Power Gain, Drain Efficiency vs. Output Power



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Application Circuit



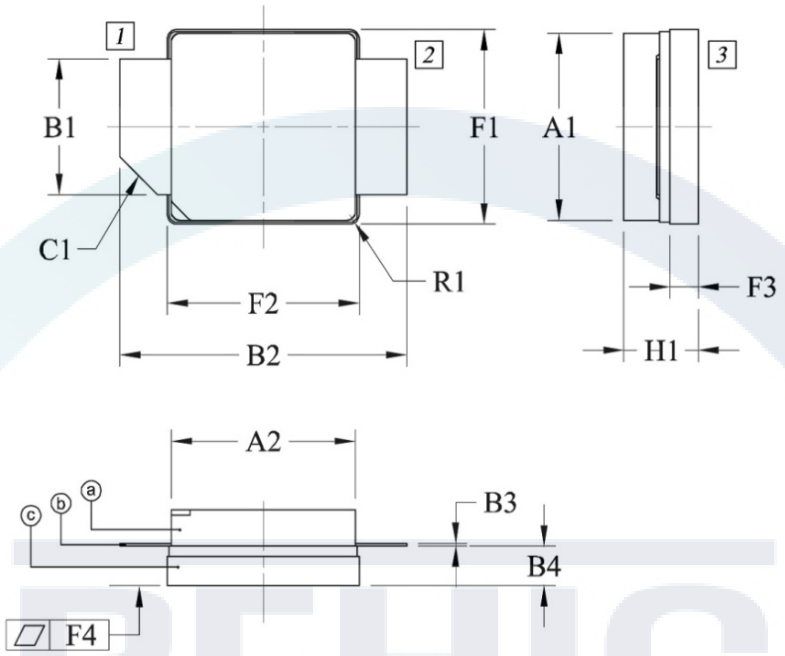
Part List

Part	Description	Part Number	Manufacturer
L1	18nH Chip Inductor	LL1608-FSL18NJ	TOKO
R1	10 Ohm Chip Resistor, 2012	MCR10EZHJ100	ROHM
C1	100pF High Q Capacitor	201 CHA 101 JSLE	TEMEX
C2	3.9pF High Q Capacitor	201 CHA 3R9 CSLE	TEMEX
C3	6.8pF High Q Capacitor	201 CHA 6R8 CSLE	TEMEX
C4, C12	100pF High Q Capacitor	501 CHB 101 JSLE	TEMEX
C5	4.7pF High Q Capacitor	501 CHB 4R7 CSLE	TEMEX
C6	2.7pF High Q Capacitor	501 CHB 2R7 CSLE	TEMEX
C7	15pF High Q Capacitor	501 CHB 150 JSLE	TEMEX
C8	100pF Chip Capacitor	GRM1885C1H101JA01D	MURATA
C9	1nF Chip Capacitor	GRM188R71H102KA01D	MURATA
C10	100nF Chip Capacitor	GRM188R71H104KA93D	MURATA
C11	10uF, 16V MLCC	C3216X7R1C106K	TDK
C13	10uF, 100V MLCC	CKG57NX7R2A106MT	TDK
Q1	33uF Aluminum Capacitor	BDS100VC33MJ10TP	SAMYOUNG
Q2	EMI FILTER	CTH32R102S20A-TM	MARUWA
Q3	DC Connector	22-04-1101	MOLEX
PCB	εr=3.5 ± 0.05, 0.030” (0.762mm)	RF-35TC	TACONIC.
TR1	300W GaN Transistor	IE09300PC	RFHIC

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Package Dimensions (Type: NS-AS01)

* Unit: mm[inch] | Tolerance ±0.15 [.006]

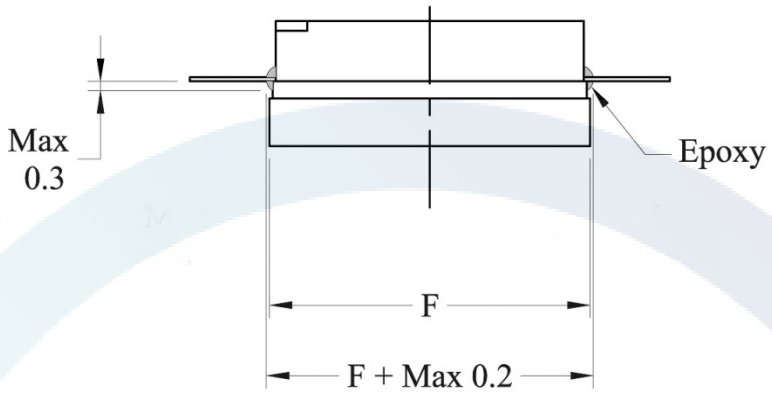


Pin Description	
Pin No	Function
1	Gate
2	Drain
3	Source

ⓐ- Lid
ⓑ- Lead Frame
ⓒ- Flange

Dim.	INCH			MILLIMETER		
	MIN	TYP	MAX	MIN	TYP	MAX
A1	.380	.384	.390	9.65	9.75	9.90
A2	.380	.384	.390	9.65	9.75	9.90
B1	.274	.280	.285	6.97	7.10	7.23
B2	.579	.598	.618	14.70	15.20	15.70
B3	.004	.005	.007	0.10	0.13	0.18
B4	.080	.085	.090	2.03	2.15	2.28
C1 (Chamfer)	.075	.079	.083	1.90	2.00	2.10
F1	.395	.400	.405	10.03	10.16	10.29
F2	.395	.400	.405	10.03	10.16	10.29
F3	.054	.059	.064	1.37	1.50	1.63
F4	-	.001	-	-	0.03	-
H1	.148	.159	.167	3.75	4.05	4.25
L1	-	-	-	-	-	-
L2	-	-	-	-	-	-
R1 (Radius)	.016	.020	.024	0.40	0.50	0.60

Sealing Epoxy Tolerance (Type : NS-AS01)



Note
Unit : mm
F is maximum size of flange

RFHIC
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Revision History

Part Number	Release Date	Version	Description	Data Sheet Status
IE09300PC	Aug, 2017	0.1	Initial Release of DataSheet	Preliminary

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