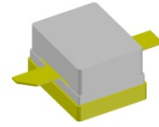


Product Features

- DC ~ 6000MHz
- 70W CW Psat @ 50V, 2450MHz
- 71% Drain Efficiency @ 50V, 2450MHz
- Excellent Ruggedness
- Excellent Thermal Stability
- Internally Matched

Applications

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



Package Type : RF01501KR3

Description

The 55W CW RF Power Transistor is designed for Industrial, Scientific, Medical (ISM) and Plasma Lighting applications at 2450MHz. 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 ($V_{DS}=+50V$, $T_c=25^{\circ}C$, 50Ω)

Frequency [MHz]	Signal Type	Pin [W]	Power Gain [dB]	Drain Efficiency [%]	Pout [W]
2400.0	CW	2.9	14.2	74.8	76.2
2450.0		3.0	13.9	72.6	74.1
2500.0		3.6	13.4	75.2	78.5

Absolute Maximum Ratings

Rating	Symbol	Value	Unit	Condition
Drain to Source Voltage	V_{DSS}	150	V	$T_c=25^{\circ}C$
Gate to Source Voltage	V_{GS}	-10, +2	V	$T_c=25^{\circ}C$
Operating Voltage	V_{DD}	52	V_{DC}	-
Maximum Forward Gate Current	I_{GMAX}	7	mA	$T_c=25^{\circ}C$
Maximum Drain Current ^{*1}	I_{DMAX}	3	A	$T_c=25^{\circ}C$
Power Dissipation	P_{DISS}	33	W	$T_c=85^{\circ}C$
Storage Temperature	T_{STG}	-65, +150	$^{\circ}C$	-
Case Operating Temperature	T_C	-40, +150	$^{\circ}C$	-
Operating Junction Temperature ^{*2}	T_J	225	$^{\circ}C$	-
Soldering Temperature ^{*3}	T_S	245	$^{\circ}C$	-

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	$R_{\theta JC}$	4.23 ^{*1}	$^{\circ}C/W$	$T_c=85^{\circ}C$

Note

*1 Measured for the ET43055P at dissipation power is 33W

Electrical Characteristics (Tc=25°C unless otherwise noted)

Characteristics	Conditions	Symbol	Min	Typ	Max	Unit
DC Characteristics ^{*1}						
Gate Threshold Voltage	V _{DS} = 10V	V _{GS(TH)}	-3.8	-3.0	-2.3	V _{DC}
	I _D = 7.2mA					
Gate Quiescent Voltage	V _{DS} = 50V	V _{GS(Q)}	-	-3.1	-	V _{DC}
	I _D = 50mA					
Saturated Drain Current ^{*2}	V _{DS} = 6V	I _{DS}	5.8	7.0	-	A
	V _{GS} = 2V					
Drain-Source Breakdown Voltage	V _{GS} = -8V	V _{BR}	150	-	-	V
	I _D = 7.2mA					
Gate Leakage Current	V _{GS} = -8V	I _{GLKG}	-1.6	-	-	mA
	V _{DS} = 120V					
Drain Leakage Current	V _{GS} = -8V	I _{DLKG}	-	-	2.9	mA
	V _{DS} = 120V					
RF Characteristics (Fc = 2450MHz unless otherwise noted)						
Saturated Output Power ^{*3}	V _{DS} = 50V	P _{SAT}	55	70	-	W
	I _{DQ} = 50mA					
CW Drain Efficiency ^{*3}	V _{DS} = 50V	η	68	71	-	%
	I _{DQ} = 50mA					
	P _{OUT} = P _{SAT} CW					
Output Mismatch Stress ^{*4, 5}	V _{DS} = 50V	VSWR	-	-	10:1	ψ
	I _{DQ} = 50mA					
	P _{OUT} = P _{SAT} Pulsed					

Note

*1 Measured on wafer prior to packaging.

*2 Scaled from PCM data.

*3 CW(Continuous Wave) signal operation condition.

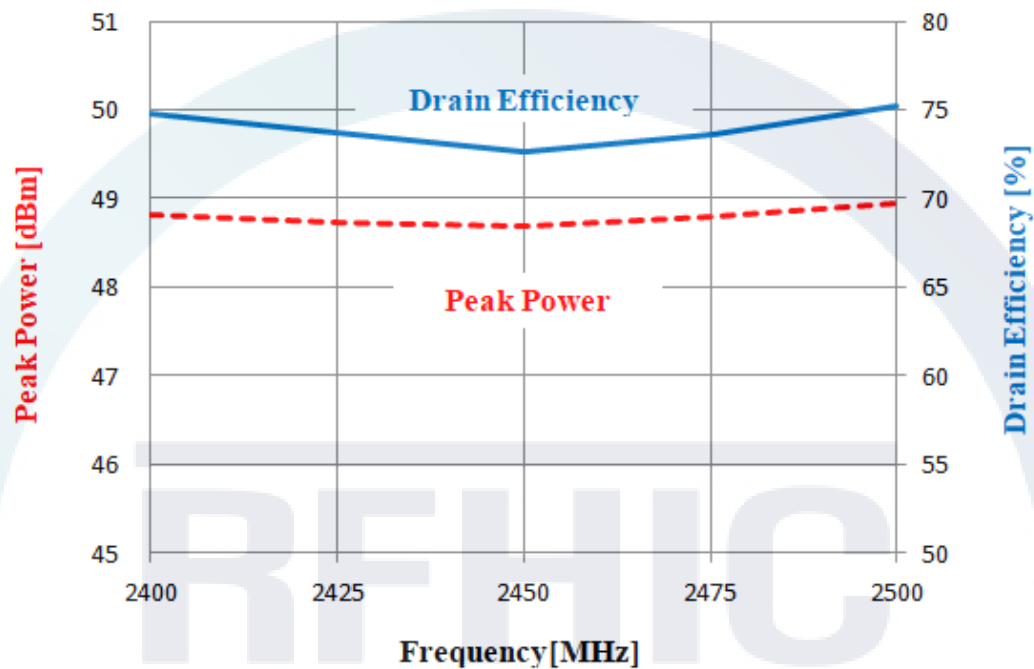
*4 Pulse width 100usec, Duty Cycle 10%.

*5 Measured in the ET43055P-2450MHz test board amplifier circuit, No damage at all phase angles.

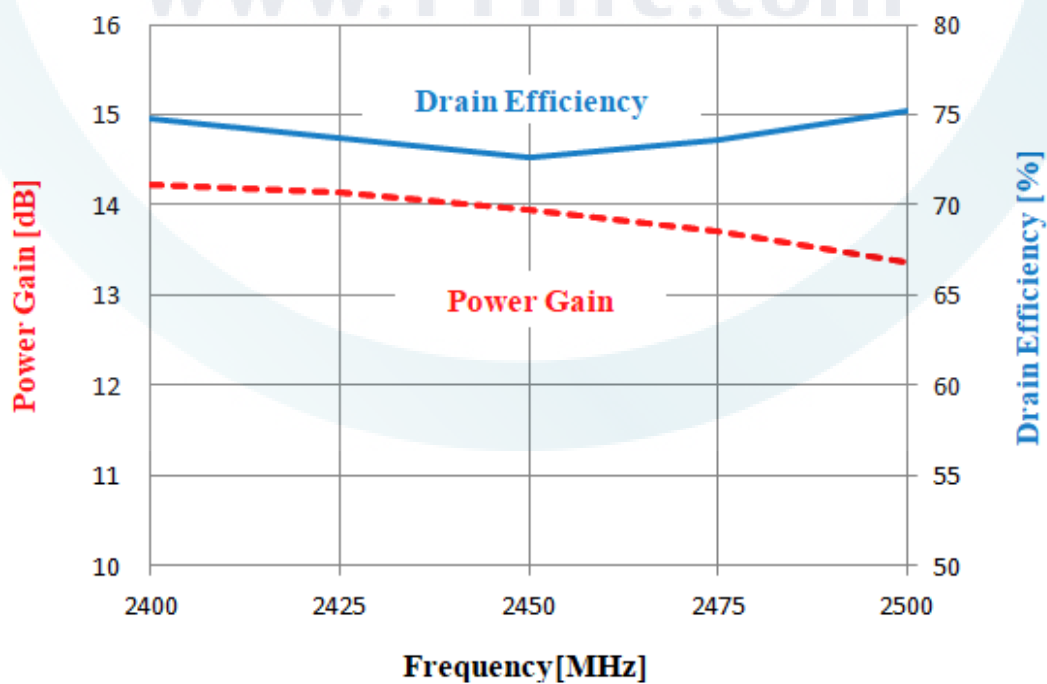
Typical CW Performance Charts

* Bias condition ($I_{DQ}=50\text{mA}$ @ $V_{DS}=50\text{V}$, $T_c=25^\circ\text{C}$)

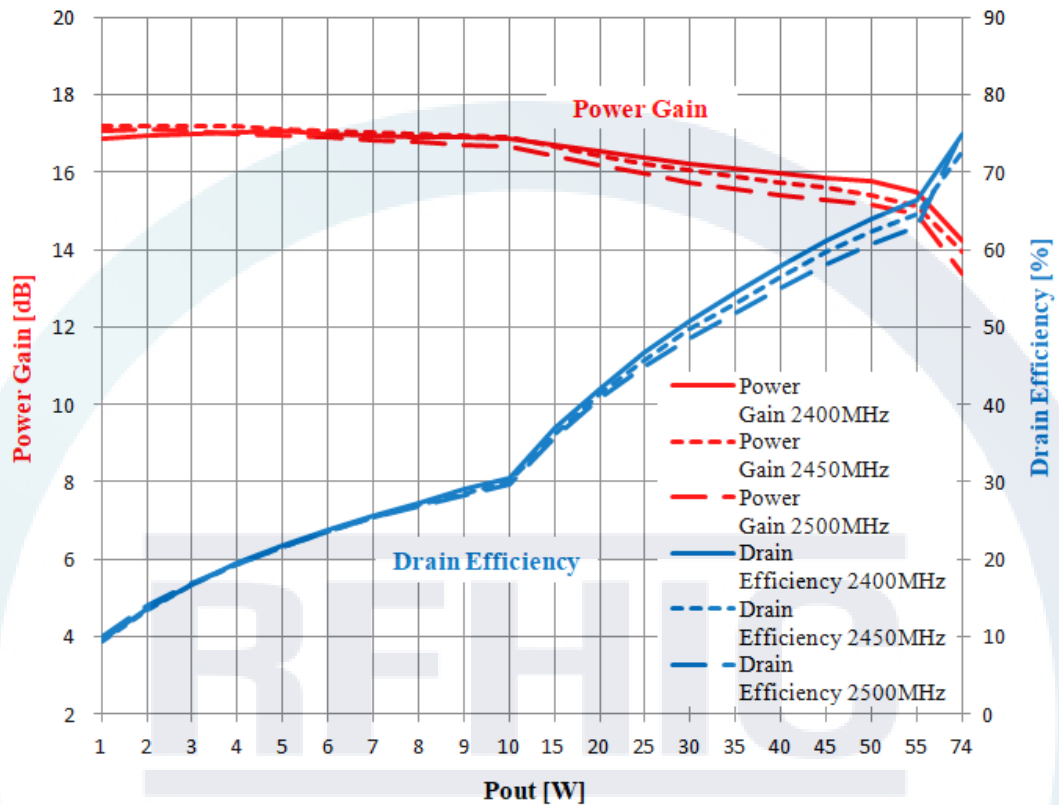
Peak Power, Drain Efficiency vs. Frequency



Power Gain, Drain Efficiency vs. Frequency

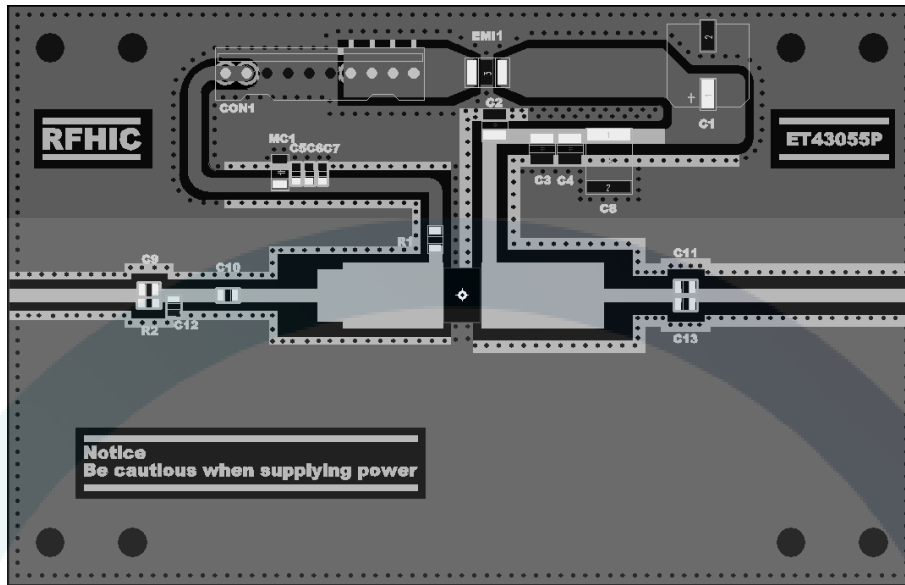


Power Gain, Drain Efficiency vs. Output Power



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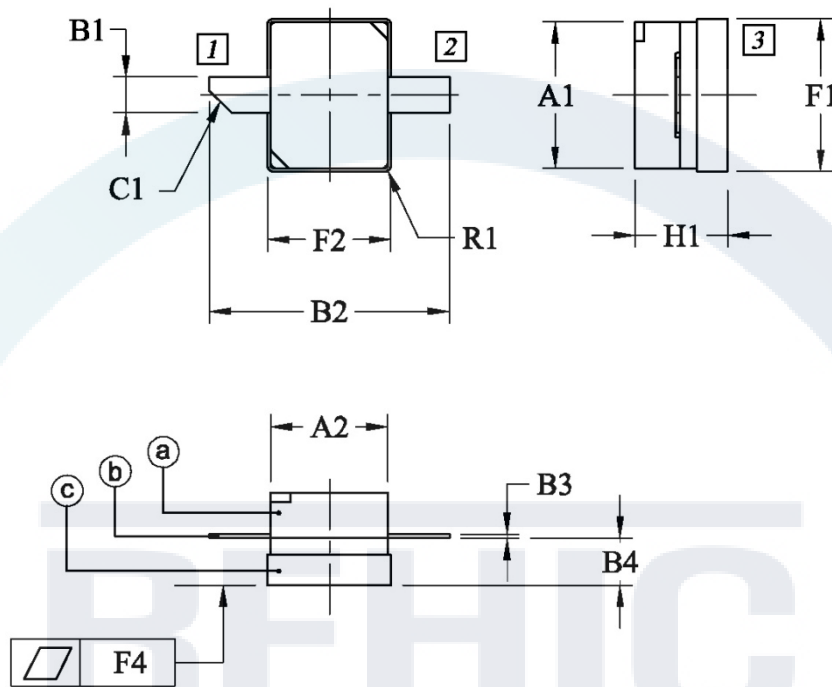
Application Circuit



Part List

Part	Description	Part Number	Manufacturer
R1	51 Ohm Chip Resistor, 2012	MCR10EZHJ510	ROHM
R2	10 Ohm Chip Resistor, 1608	MCR03EZPJ100	ROHM
C1	33uF Aluminum Capacitor	BDS100VC33MJ10TP	SAMYOUNG
C2	2.2uF, 100V MLCC	GRM32ER72A225KA35L	MURATA
C3	10pF High Q Capacitor	501CHB100JSLE	TEMEX
C4	100pF High Q Capacitor	501CHB101JSLE	TEMEX
C5	1nF Chip Capacitor	GRM188R71H102KA01D	MURATA
C6	100pF Chip Capacitor	GRM1885C1H101JA01D	MURATA
C7	10pF Chip Capacitor	GRM1885C1H100JA01D	MURATA
C8	10uF, 100V MLCC	RS80R2A106M	MARUWA
C9, C10	10pF High Q Capacitor	201CHB100JSLE	TEMEX
C11, C13	0.7pF High Q Capacitor	201CHB0R7BSLE	TEMEX
C12	1.0pF High Q Capacitor	201CHA1R0BSLE	TEMEX
MC1	10uF, 16V MLCC	C3216X7R1C106K	TDK
EMI1	EMI FILTER	CTH32R102S20A-TM	MARUWA
CON1	DC Connector	22-04-1101	MOLEX
PCB	$\epsilon_r=3.5 \pm 0.05$, 0.030" (0.762mm)	RF-35TC	TACONIC.
TR1	55W GaN Transistor	ET43055P	RFHIC

Package Dimensions (Type : RF01501KR3)

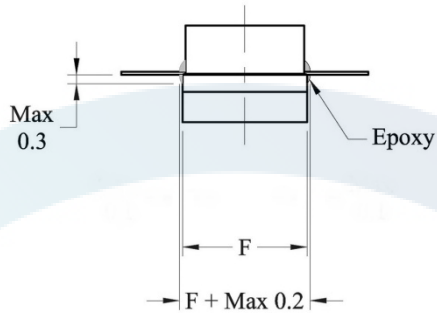
* Unit: mm[inch] | Tolerance ± 0.15 [.006]

Pin Description		Dim.	INCH			MILLIMETER		
Pin No	Function		MIN	TYP	MAX	MIN	TYP	MAX
1	Gate	A1	.188	.193	.198	4.77	4.90	5.03
2	Drain	A2	.148	.154	.159	3.77	3.90	4.03
3	Source	B1	.042	.047	.052	1.07	1.20	1.33
		B2	.295	.315	.335	7.50	8.00	8.50
		B3	.003	.005	.007	0.08	0.13	0.18
		B4	.057	.062	.067	1.445	1.570	1.695
		C1 (Chamfer)	.024	.030	.035	0.62	0.75	0.88
		F1	.196	.201	.206	4.97	5.10	5.23
		F2	.156	.161	.167	3.97	4.10	4.23
		F3	-	-	-	-	-	-
		F4	-	.001	-	-	0.03	-
		H1	.104	.126	.148	2.65	3.20	3.75
		L1	-	-	-	-	-	-
		L2	-	-	-	-	-	-
		R1 (Radius)	.004	.008	.012	0.10	0.20	0.30

①- Lid

②- Lead Frame

③- Flange

Sealing Epoxy Tolerance (Type : RF01501KR3)**Note**

Unit : mm

F is maximum size of flange

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Revision History

Part Number	Release Date	Version	Description	Data Sheet Status
ET43055P	June, 2017	0.1	Initial Release of DataSheet	Preliminary
ET43055P	October, 2017	1.0	Revision : Update Test Data	Final



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