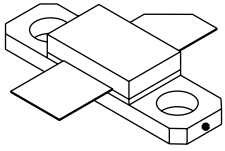
UltraRF
A CREE Company

UPF18045-159

45W, 1.88 GHz, 26V Broadband RF Power N-Channel Enhancement-Mode Lateral MOSFET

Designed for DCS base station applications in the frequency band 1.805 to 1.880 GHz. Rated with a typical output power of 50 W PEP (for high peak-to-average signals), this device is well suited in Class AB operation for EDGE and CDMA applications.

- ALL GOLD metal system for highest reliability
- Industry standard package
- Internally matched for repeatable manufacturing
- High gain, high efficiency and high linearity
- Optimized for applications with high peak-to-average ratios



Package Type - 440159

Typical Output Powers for Various Applications

EDGE:	**36 Watts**	**11 dB**
IS95 CDMA:	**9 Watts**	**11 dB**
W-CDMA:	**7 Watts**	**11 dB**

- **Typical EDGE Performance:**
  (ETSI 300-910 GSM 05.05 v. 5.5.1)
  Average Load Power – 20 W
  EVM 2.5%
  PAE – 28 %
  Power Gain – 11.5 dB
  ACPR1 (30 kHz BW offset ± 400 kHz normalized to total power in a 30 kHz BW): -57 dBc
  ACPR2 (30 kHz BW offset ± 600 kHz normalized to total power in a 30 kHz BW): -66 dBc

Maximum Ratings

Rating	Symbol	Value	Unit
Drain to Source Voltage, Gate connected to Source	BV_{DSS}	65	Volts
Gate to Source Voltage	GV_{GSS}	+15 to -0.5	Volts
Total Device Dissipation @ TC = 70°C Derate above 70°C	P_D	100 0.7	Watts W/°C
Storage Temperature Range	T_{STG}	-65 to +150	°C
Operating Junction Temperature	T_J	200	°C

Thermal Characteristics

Characteristics	Symbol	Maximum	Unit
Thermal Resistance, Junction to Case	Θ_{JC}	1.5	°C/W

Electrical DC Characteristics *(T_C=25°C unless otherwise specified)*

Rating	Symbol	Min	Typ	Max	Unit
Drain to Source Breakdown Voltage, (V_{GS}=0, I_D=1mA)	BV_{DSS}	65	-	-	Volts
Drain to Source Leakage current (V_{DS}=28V, V_{GS}=0)	I_{DSS}	-	-	1.5	mA
Gate to Source Leakage current (V_{GS}=20V, V_{DS}=0)	I_{GSS}	-	-	2.0	µA
Threshold Voltage (V_{DS}=10V, I_D=1mA)	$V_{GS}(th)$	-	3.5	-	Volts
Gate Quiescent Voltage (V_{DS}=26 V, I_{DS}=250mA)	$V_{GS}(Q)$	3.0	4.0	6.0	Volts
Drain to Source On Voltage (V_{GS}=10V, I_D=1A)	$V_{DS}(on)$	-	0.28		Volts
Forward Transconductance (V_{DS}=10V, I_D=5A)	G_m	2.2	2.7	-	S

AC Characteristics *(T_C=25°C unless otherwise specified)*

Rating	Symbol	Min	Typ	Max	Unit
Output Capacitance* (V_{DS}=26V, V_{GS}=0V, freq= 1MHz)	C_{OSS}	-	40	-	pF
Feedback Capacitance* (V_{DS}=26V, V_{GS}=0V, freq= 1MHz)	C_{RSS}	-	2.0	-	pF

* for reference only, part is internally matched on input and output.

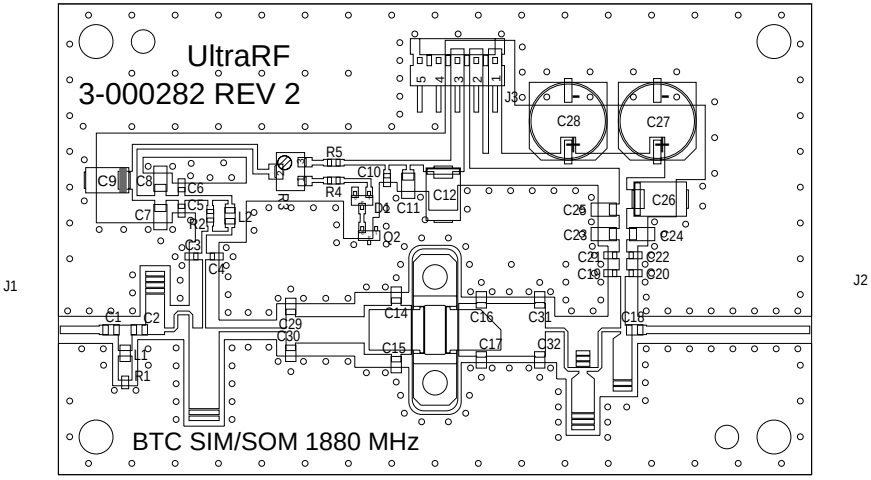
RF and Functional Tests *(T_C=25°C unless otherwise specified, UltraRF Broadband Fixture)*

Rating	Symbol	Min	Typ	Max	Unit
Single-Tone Small Signal Gain, P_{OUT}=0.1W V_{DD}=26V, I_{DQ}=375mA	G_L	10.5	12.0		dB
Single-Tone Power Gain, P_{OUT}=45W V_{DD}=26V, I_{DQ}=375mA	G_P	11.0	12.0	-	dB
Single-Tone Drain Efficiency, P_{OUT}=45W f=1840 MHz, V_{DD}=26V, I_{DQ}=375mA	η_D	35	39		%
Two-Tone Common Source Amplifier Power Gain V_{DD}=26V, I_{DQ}=375mA, P_{OUT}=40W PEP f_1 =1842.5 MHz and f_1 =1842.6 MHz	G_{TT}	11.0	12.5	-	dB
Two Tone Intermodulation Distortion V_{DD}=26V, I_{DQ}=375mA, P_{OUT}=40W PEP f_1 =1842.5 MHz and f_1 =1842.6 MHz	I_{MD}	-29	-32		dBc
Two Tone Drain Efficiency V_{DD}=26V, I_{DQ}=375mA, P_{OUT}=40W PEP f_1 =1842.5 MHz and f_1 =1842.6 MHz	η_{D2T}	27	28	-	%
Input Return Loss V_{DD}=26V, P_{OUT}=30W PEP, I_{DQ}=375mA f_1=1805 MHz and 1880 MHz, Tone Spacing = 100kHz	IRL	-	-8		dB
Load Mismatch Tolerance V_{DS}=26V, I_{DQ}=375mA, P_{OUT}=60W, f=1880 MHz	VSWR	10:1	-	-	

Suggested Matching Impedances

Load Impedance for Linear Operation (f=1840 MHz)	1.9 – j1.9
Source Impedance for Linear Operation (f=1840 MHz)	5.4 – j2.5

Note: These impedances have been derived from load pull data and by de-embedding the test fixture which was tuned for flat gain and near-optimum third-order IMD performance at rated output power. Designers are cautioned that measurement of optimum source and load impedances is sensitive to minor differences in test setups. Optimum source and load impedances also differ slightly depending on the application.

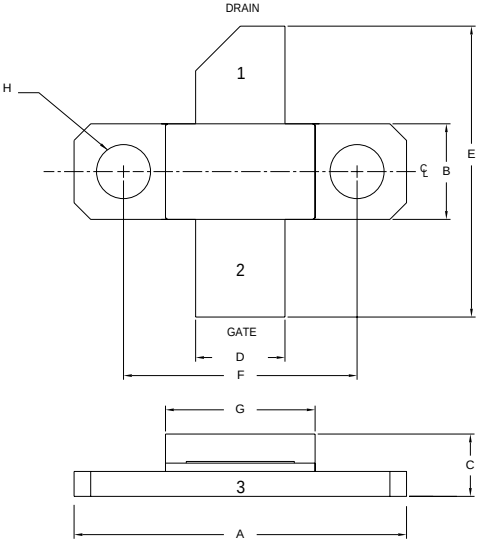


COMPONENT SIDE

Parts List for RF Test Fixture 3-000282-2

(Tuned for 1805-1880 MHz, Best 2-Tone IMDs, P_{OUT} = 20 Watts average)

Designator	Description	Qty
C12, C26	CAP, 2.2uf SMT TANTALUM	2
C27, C28	CAP, 47UF, 50V, ELECTR SMT	2
C8, C11, C24, C25	CAP 0.1UF 1206 50V	4
C5, C6, C21, C22	CAP, 470PF, 0603	4
C7, C23	CAP, 2200PF, 1206, 100V	2
C3, C4, C10, C19, C20	CAP .1UF 1206 SMT MONO 50V	5
C9	CAP, 10uf 16V TANTALUM	1
C1, C2	CAP, 8.2PF, 0805, 100V	2
C18	CAP, 2.2 pF, 0805, 100V	1
C16, C17	CAP, 2.7 PF, 0805, 100V	2
C14, C15	CAP, 1.0 PF, 0805, 100V	3
C29, C30, C31, C32	CAP, 1.5 PF, 0805, 100V	1
L1, L2	IND, 10nH, 0603 SMT	2
R1	RES, 1/16W, 0603, 1%, 10.0 OHMS	1
R2	RES, 1/16W, 0603, 1%, 100 OHM	1
R3	TRIMPOT, 500 OHMS, SMT 11T	1
R4	RES, 1/16W, 0603, 1%, 249 OHMS	1
R5	RES, 1/16W, 0603, 1%, 205 OHMS	1
Q1	UPF 18045 (LDMOS)	1
Q2	TRANS,PNP DARL, MMBTA64,SMT	1
D1	DIODE, SCHOTTKY, MBD701	1
PCB	3-000251, REV 2	1
BASEPLATE	4-000992, REV 1	1
J1, J2	CONN,SMA, STR, PANEL JACK	2
J3	HEADER RT> PLZ .1 CEN LK 5POS	1



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	.795	.805	20.19	20.45
B	.225	.235	5.72	5.97
C	.143	.157	3.63	3.99
D	.210	.220	5.33	5.59
E	.67	.73	17.02	18.54
F	.557	.567	14.15	14.40
G	.355	.365	9.02	9.27
H	.125	.135	3.18	3.43

PIN 1. DRAIN
PIN 2. GATE
PIN 3. SOURCE