UltraRF

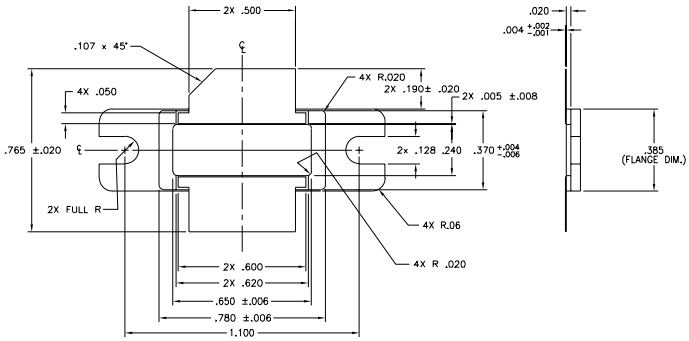
UPF2445

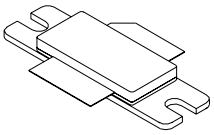
45W, 2.4GHz, 26.5V Broadband RF Power N-Channel Enhancement-Mode Lateral DMOS

Description

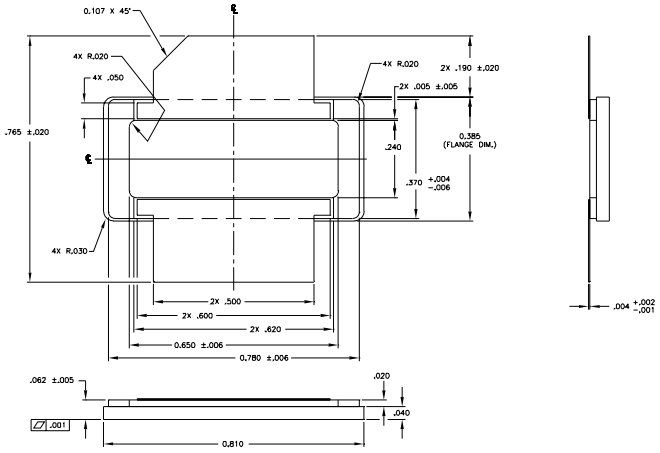
This device is designed for base station applications operating at or near 2.4GHz. Rated with a minimum output power of 45W, it is ideal for CDMA, TDMA, GSM, FM, Single or Multi-Carrier Power Amplifiers in Class A or AB operation.

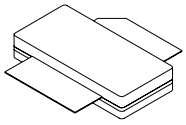
- Industry standard package.
- Low intermodulation distortion of –30dBc at 45W (PEP).
- Gold Metalization, Gold Bond Wires, Gold-Plated Packages.





Package Type 440117





Package Type 440133

Maximum Ratings

Rating	Symbol	Value	Unit
Drain to Source Voltage, gate connected to source	V_{DSS}	65	Volts
Gate to Source Voltage	BV_{GS}	+/- 20	Volts
Total Device Dissipation @ Tcase = 70°C Derate above 70°C	P_D	100 0.8	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}	1.3	°C/W

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

Rating	Symbol	Min	Typ	Max	Unit
Drain to Source Voltage, gate connected to source (V_{GS}=0, I_{DS}=1mA)	BV_{DSS}	65	-	-	Volts
Drain to Source Leakage current (V_{DS}=28V, V_{GS}=0)	I_{DSS}	-	-	2.0	mA
Gate to Source Leakage current (V_{GS}=20V, V_{DS}=0)	I_{GSS}	-	-	2.0	µA
Threshold Voltage (V_{DS}=10V, I_{DS}=1mA)	V_{TH}	2.0	3.0	5.0	Volts
Gate Quiescent Voltage (V_{DS}=26 V, I_{DS}=450mA)	V_{GS}(on)	3.0	4.0	6.0	Volts
Drain to Source On Voltage (V_{GS}=10V, I_{DS}=1A)	V_{DS}(on)	-	0.14	-	Volts
Forward Transconductance (V_{DS}=10V, I_D=5A)	G_M	2.2	3.0	-	S

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

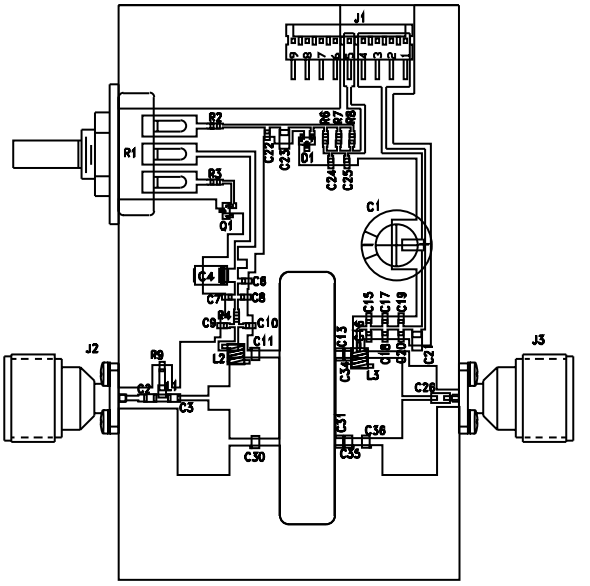
Rating	Symbol	Min	Typ	Max	Unit
Output capacitance (V_{DS}= 26V, V_{GS}=0V, freq= 1MHz)	Coss	-	62	-	pF
Feedback capacitance (V_{DS}=26V, V_{GS}=0V, freq= 1MHz)	Crss	-	2.8	-	pF

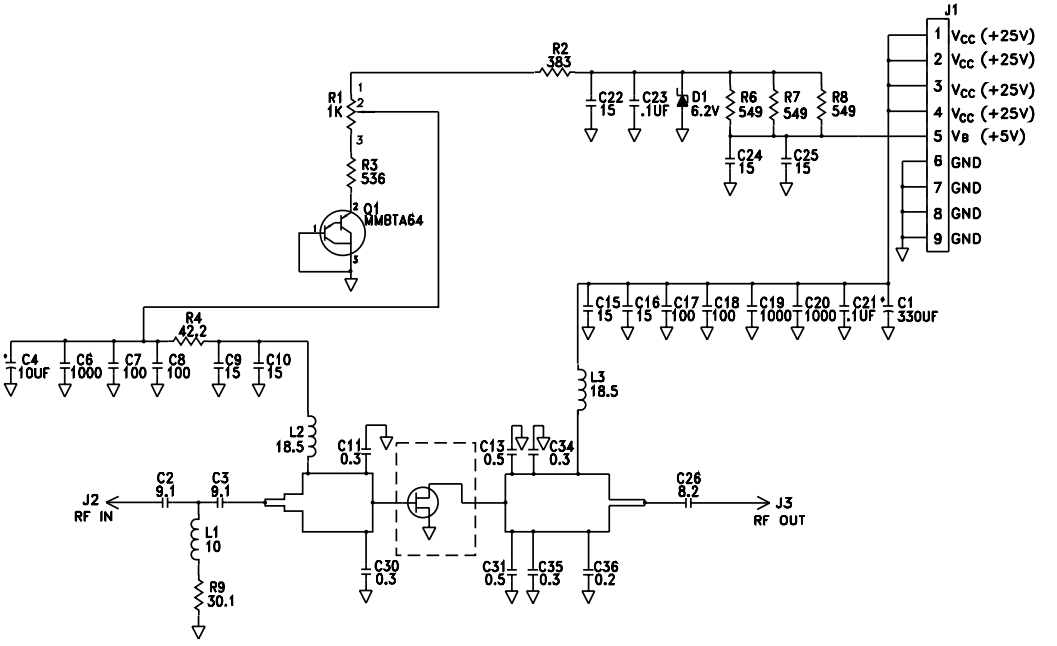
RF and Functional Tests *(T_C=25°C unless otherwise specified, UltraRF Broadband Fixture)*

Rating	Symbol	Min	Typ	Max	Unit
Linear Power Gain, Single Tone (V_{DS}=26.5V, I_{DQ}=480mA, P_{OUT}=10W, f=2390 MHz)	G_{plin}	7.0	8.5	-	dB
Compressed Power Gain, Single Tone (V_{DS}=26.5V, I_{DQ}=480mA, P_{OUT}=45W, f=2390 MHz)	G_{ps}	6.0	7.5	-	dB
Drain Efficiency, Single Tone (V_{DS}=26.5V, I_{DQ}=480mA, P_{OUT}=45W, f=2390 MHz)	η	25	33	-	%
Intermodulation Distortion, Two Tone (V_{DS}=26.5V, I_{DQ}=480mA, P_{OUT}=45W PEP f1=2390 MHz, f2=2390.1MHz)	IMD	-	-32	-30	dBc
Load Mismatch Tolerance (V_{DS}=26.5V, I_{DQ}=480mA, P_{OUT}=45W, f=2390 MHz)	VSWR	10:1	-	-	

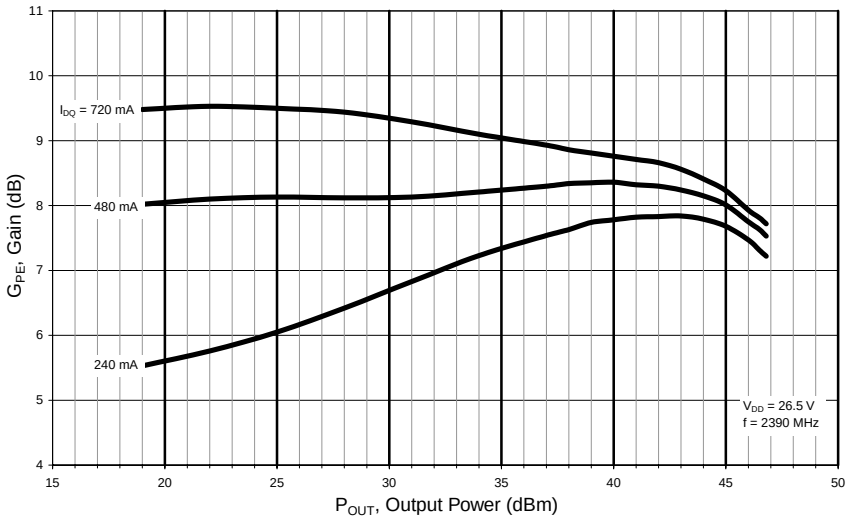
CAUTION - MOS Devices are susceptible to damage from ElectroStatic Discharge (ESD). Appropriate precautions in handling, packaging and testing MOS devices must be observed.

Fixture Drawings

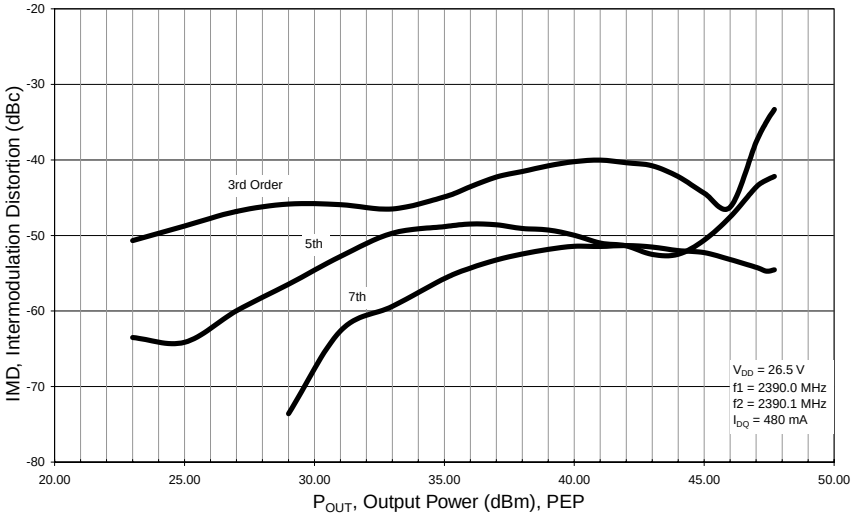


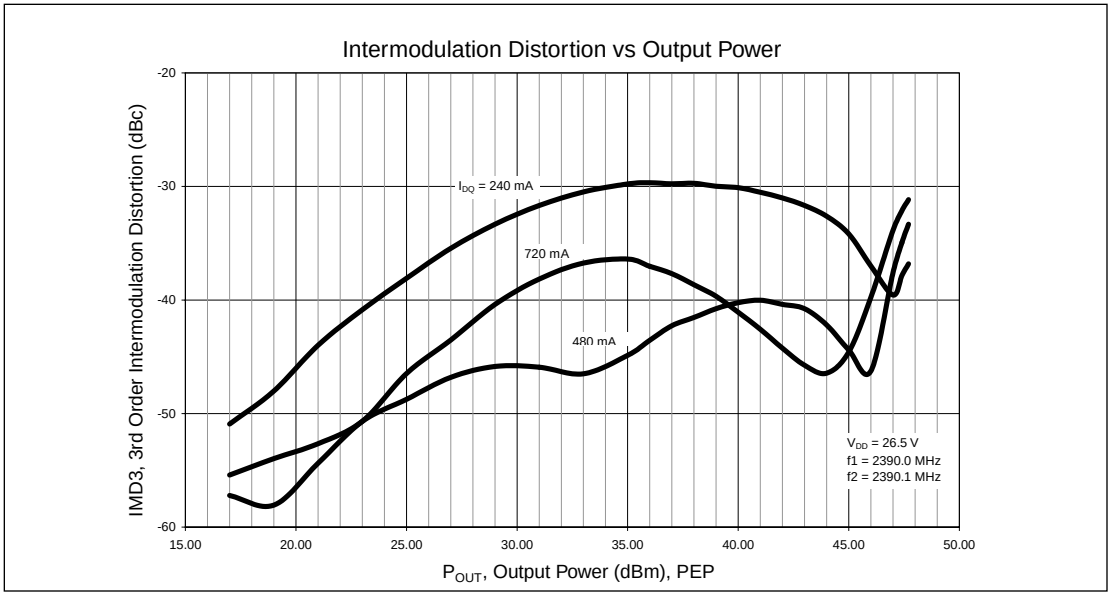


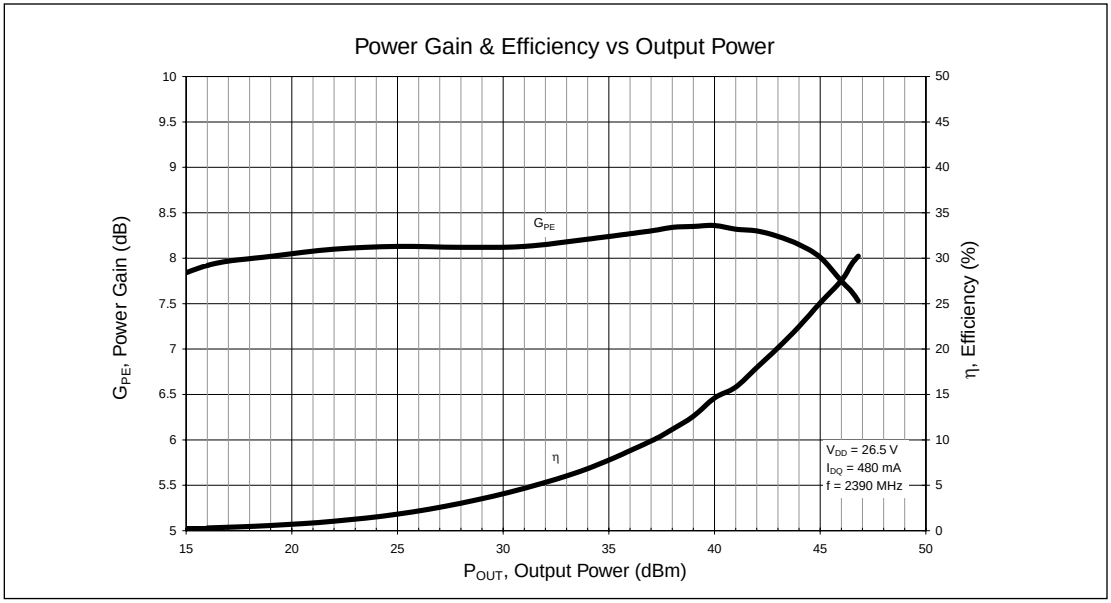
Power Gain vs Output Power



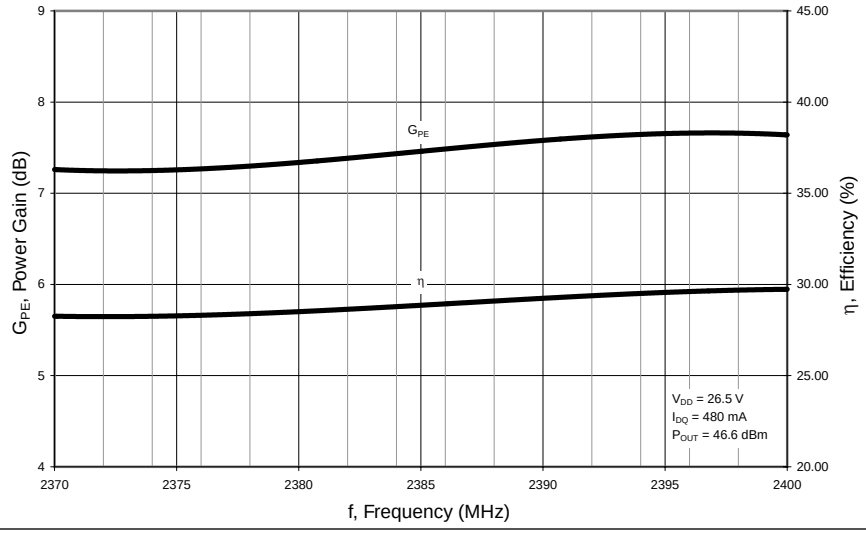
Intermodulation Distortion vs Output Power




Intermodulation Distortion vs Output Power
IMD3, 3rd Order Intermodulation Distortion (dBc)
-20
-30
-40
-50
-60
I_{DQ} = 240 mA
720 mA
480 mA
V_{DD} = 26.5 V
f1 = 2390.0 MHz
f2 = 2390.1 MHz
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
P_{OUT}, Output Power (dBm), PEP


Power Gain & Efficiency vs Output Power
G_{PE}, Power Gain (dB)
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
G_{PE}
η
V_{DD} = 26.5 V
I_{DQ} = 480 mA
f = 2390 MHz
50
45
40
35
30
25
20
15
10
5
0
η, Efficiency (%)
15
20
25
30
35
40
45
50
P_{OUT}, Output Power (dBm)

Power Gain and Efficiency vs Frequency



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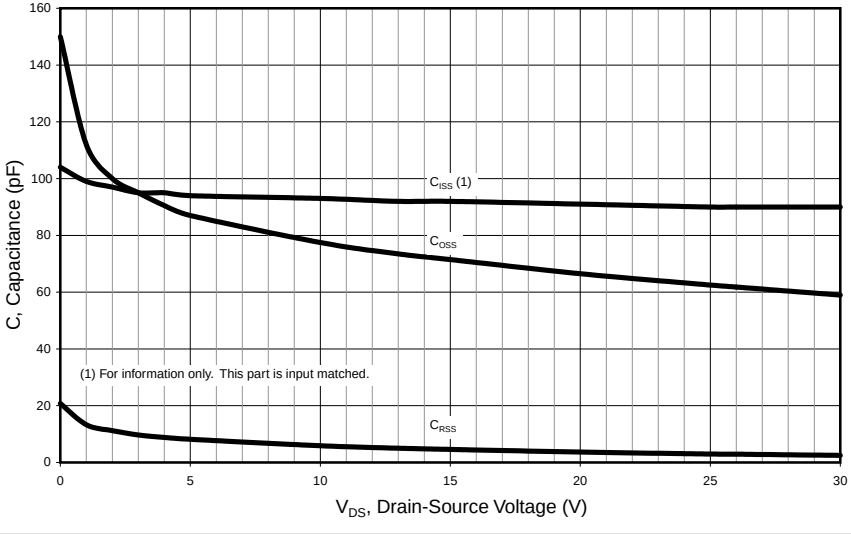
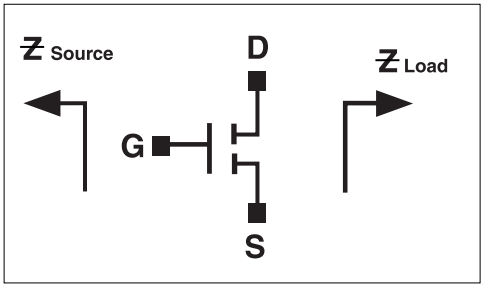
Capacitance vs Drain Voltage

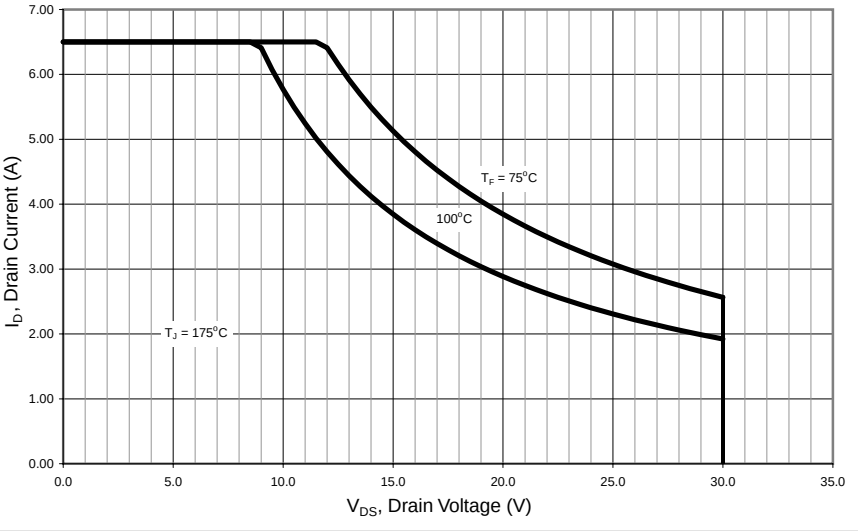


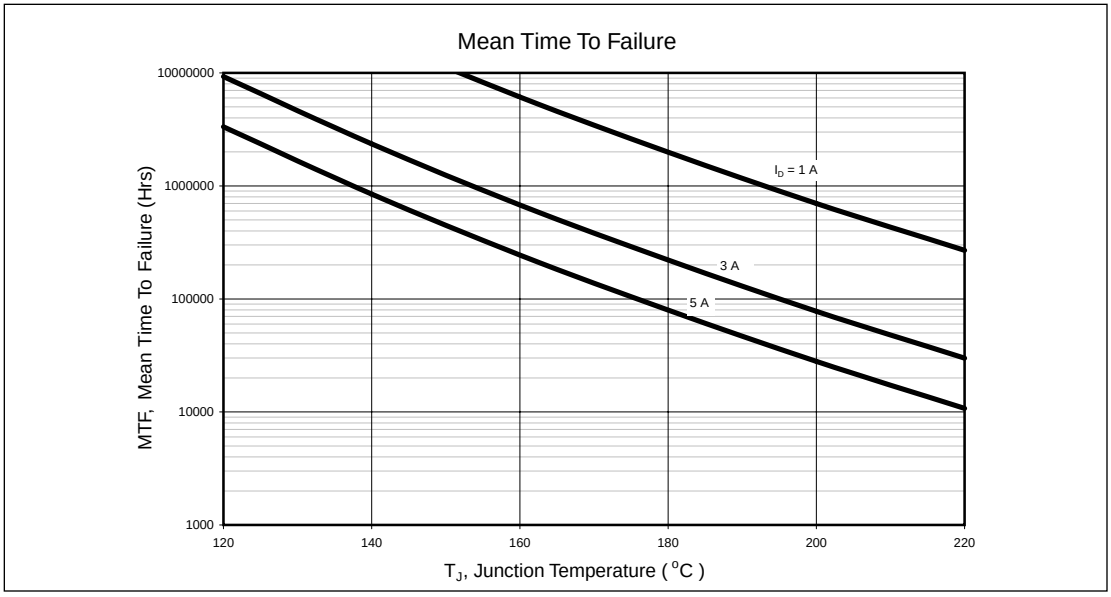


V_{DD} = 26.5V
I_{DQ} = 480mA

Frequency (MHz)	Z Source	Z Load
2330	1.71 - j4,76	0.31 - j1.55
2340	1.70 - j4,73	0.31 - j1.53
2350	1.69 - j4,69	0.31 - j1.51
2360	1.68 - j4.66	0.31 - j1.49
2370	1.67 - j4.63	0.30 - j1.47
2380	1.67 - j4.63	0.30 - j1.45
2390	1.67 - j4.60	0.30 - j1.44
2400	1.66 - j4.57	0.30 - j1.42
2410	1.65 - j4.54	0.30 - j1.40
2420	1.64 - j4.48	0.30 - j1.38
2430	1.63 - j4.45	0.30 - j1.36

DC Safe Operating Area




Mean Time To Failure
MTF, Mean Time To Failure (Hrs)
10000000
1000000
100000
10000
1000
120
140
160
180
200
220
I_D = 1 A
3 A
5 A
T_J, Junction Temperature (°C)