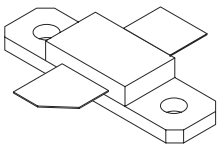
TriQuint SEMICONDUCTOR

PD27025F
25 W, 2.5GHz - 2.7GHz , N-Channel E-Mode, Lateral MOSFET

Introduction

The PD27025F is a high-voltage, gold-metalized, laterally diffused metal oxide semiconductor (LDMOS) RF power transistor suitable for 2.5GHz - 2.7GHz Class AB wireless base station amplifier applications.

This device is manufactured on an advanced LDMOS technology, offering state-of-the-art performance, reliability, and thermal resistance. Packaged in an industry-standard CuW package capable of deliver ing a minimum output power of 25 W, it is ideally suited for today's RF power amplifier applications.



PD27025F (flanged)

Figure 1. Available Packages

Features

- **Application Specific Performance, 2.7 GHz**
  - **Typical 2-Tone Performance**

    Average Load Power – 12.5 W
    η_D – 30%
    Power Gain – 11.5 dB
    IMD3: -30dBc @ -100kHz/ +100KHz
  - **Typical CW Performance**

    Average Load Power – 25 W
    η_D – 38%
    Power Gain – 11.0 dB

Table 1. Thermal Characteristics

Parameter	Sym	Value	Unit
Thermal Resistance, Junction to Case:	R_{JC}	2.1	°C/W

Table 2. Absolute Maximum Ratings*

Parameter	Sym	Value	Unit
Drain-source Voltage	V_{DSS}	65	Vdc
Gate-source Voltage	V_{GS}	–0.5, +15	Vdc
Drain Current—Continuous	I_D	4.25	Adc
Total Dissipation at T_C = 70 °C:	P_D	83.5	W
Derate Above 70 °C:	—	0.48	W/°C
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{STG}	–65, +150	°C

* Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Table 3. ESD Rating*

	Minimum (V)	Class
HBM	500	1B
MM	50	A
CDM	1500	4

* Although electrostatic discharge (ESD) protection circuitry has been designed into this device, proper precautions must be taken to avoid exposure to ESD and electrical overstress (EOS) during all handling, assembly, and test operations. PEAK Devices employs a human-body model (HBM), a machine model (MM), and a charged-device model (CDM) qualification requirement in order to determine ESD-susceptibility limits and protection design evaluation. ESD voltage thresholds are dependent on the circuit parameters used in each of the models, as defined by JEDEC's JESD22-A114B (HBM), JESD22-A115A (MM), and JESD22-C101A (CDM) standards.

Caution: MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

Electrical Characteristics

Recommended operating conditions apply unless otherwise specified: T_C = 30 °C.

Table 4. dc Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Off Characteristics					
Drain-source Breakdown Voltage (V_{GS} = 0, I_D = 150 uA)	$V_{(BR)DSS}$	65	—	—	Vdc
Gate-source Leakage Current (V_{GS} =15V, V_{DS} = 0 V)	I_{GSS}	—	—	1.0	μAdc
Zero Gate Voltage Drain Leakage Current (V_{DS} = 28 V, V_{GS} = 0 V)	I_{DSS}	—	—	100	mAdc
On Characteristics					
Forward Transconductance (V_{DS} = 10 V, I_D = 1.0 A)	G_m	1	3	—	S
Gate Threshold Voltage (V_{DS} = 10 V, I_D = 1 mA)	$V_{GS(TH)}$	—	3.5	—	Vdc
Gate Quiescent Voltage (V_{DS} = 28 V, I_{DQ} = 330 mA)	$V_{GS(Q)}$	3.0	4.0	5.0	Vdc
Drain-source On-voltage (V_{GS} = 10 V, I_D = 1.0 A)	$V_{DS(ON)}$	—	—	0.33	Vdc

Table 5. RF Characteristics

Rating	Symbol	Min	Typ	Max	Unit
Input capacitance * (including matching capacitor) (V_{DS}=28V, V_{GS}=0V, f = 1MHz)	C_{ISS}	-	74	-	pF
Output capacitance * (including matching capacitor) (V_{DS}= 28V, V_{GS}=0V, f = 1MHz)	C_{OSS}	-	352	-	pF
Feedback capacitance * (V_{DS}=28V, V_{GS}=0V, f = 1MHz)	C_{RSS}	-	1.6	-	pF

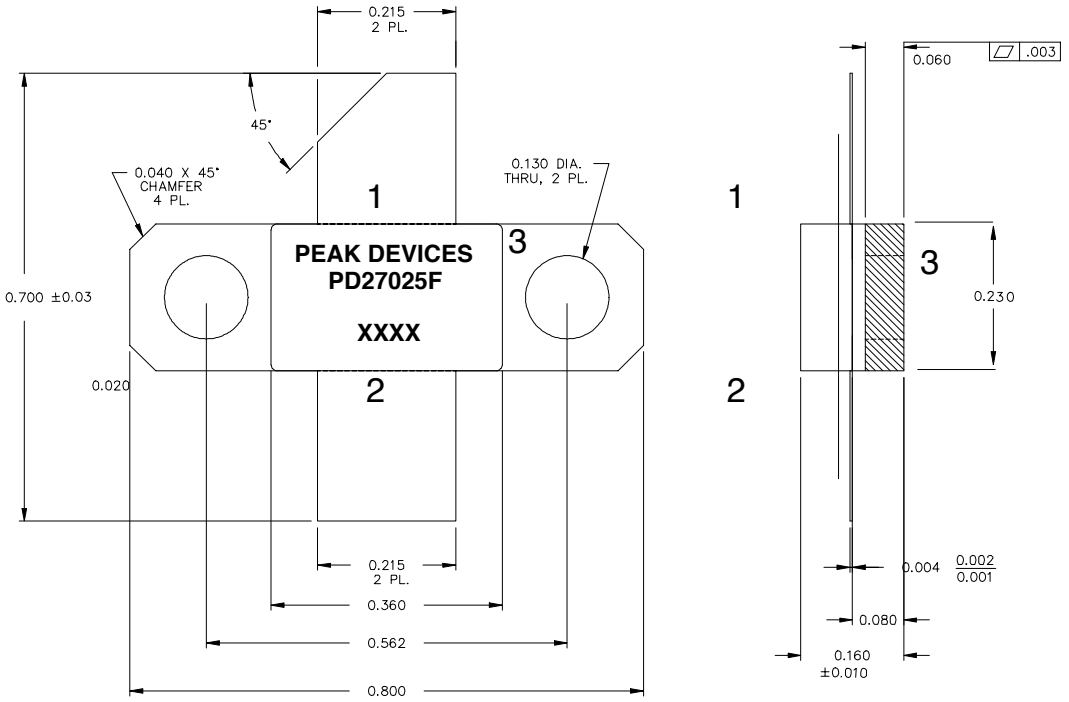
* Part is internally matched on input and output.

RF and Functional Tests (In Broadband Fixture, Tc=25° C unless otherwise specified)

Rating	Symbol	Min	Typ	Max	Unit
CW Low Power Gain, Pout=8W V_{DD}=28V, I_{DQ}=330mA, f=2700MHz	G_L	12.5	-	-	dB
CW Power Gain, P_{out} = 25 W V_{DD}=28V, I_{DQ}=330mA, f=2700MHz	G_P	12	-	-	dB
CW Drain Efficiency, P_{out} = 25 W, V_{DD}=28V, I_{DQ}=330mA, f=2700MHz	η_D	35	40	-	%
Two-Tone Common-Source Amplifier Power Gain V_{DD}=28V, I_{DQ}=330mA, P_{out} = 25 W PEP f_1 =2700 MHz and f_2=2700.1 MHz	G_{TT}	12.5	-	-	dB
Two-Tone Intermodulation Distortion V_{DD}=28V, I_{DQ}=330mA, P_{out} = 25 W PEP f_1 =2700 MHz and f_2=2700.1 MHz	I_{MD}	-	-30	- 28	dBc
Two-Tone Drain Efficiency V_{DD}=28V, I_{DQ}=330mA, P_{out} = 25 W PEP f_1 =2700 MHz and f_2=7500.1 MHz	η_{D2T}	26	30	-	%
Input Return Loss V_{DD} =28V, P_{out} = 25 W PEP, I_{DQ}=330mA f_1 =2500 MHz and 2700 MHz, Tone Spacing = 100kHz	IRL	-	-	-9	dB
Load Mismatch Tolerance V_{DS}=28V, I_{DQ}= 330 mA, Pout=25W, f=2500 MHz	VSWR	10:1	-	-	Ψ

Package Dimensions

All dimensions are in inches. Tolerances are ±0.005 in. unless specified.



PINS:
1. DRAIN
2. GATE
3. SOURCE

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