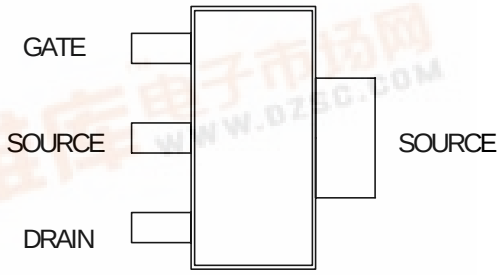
Low Noise, High Linearity Packaged PHEMT

FEATURES

- **+27 dBm Typical Power at 1800 MHz**
- **15 dB Typical Power Gain at 1800 MHz**
- **1.0 dB Typical Noise Figure**
- **+42 dBm Typical Intercept Point**
- **Color-coded by I_{DSS} range**



(TOP VIEW)

DESCRIPTION AND APPLICATIONS

The LP1500SOT223 is a packaged Aluminum Gallium Arsenide / Indium Gallium Arsenide (AlGaAs/InGaAs) Pseudomorphic High Electron Mobility Transistor (PHEMT), utilizing an Electron-Beam direct-write 0.25 µm by 1500 µm Schottky barrier gate. The recessed "mushroom" gate structure minimizes parasitic gate-source and gate resistances. The epitaxial structure and processing have been optimized for reliable high-power applications. The LP1500 also features Si_3N_4 passivation and is available in a die form or in a flanged ceramic package (P100) for high-power applications, or in the SOT-89 plastic package.

Typical applications include PCS/Cellular low-voltage high-efficiency output amplifiers, and general purpose power amplifiers. The LP 1500 may be procured in a variety of grades, depending upon specific user requirements. Standard lot screening is patterned after MIL-STD-19500, JANC grade.

PERFORMANCE SPECIFICATIONS (T_A = 25°C)

SYMBOLS	PARAMETERS		MIN	TYP	MAX	UNITS
I_{DSS}	Saturated Drain-Source Current V_{DS} = 2V V_{GS} = 0V	LP1500-SOT223-1 BLUE LP1500-SOT223-2 GREEN LP1500-SOT223-3 RED	375 451 527	420 490 560	450 526 600	mA
P_{1dB}	Output Power at 1dB Gain Compression V_{DS} = 3.3V, I_{DS} = 33% I_{DSS}	*f* = 1800 Mhz	25.0	27.0		dBm
G_{1dB}	Power Gain at 1dB Gain Compression V_{DS} = 3.3V, I_{DS} = 33% I_{DSS}	*f* = 1800 MHz	13.5	15.0		dB
NF	Noise Figure V_{DS} = 3.3V, I_{DS} = 33% I_{DSS}, *f* = 1.8 GHz			1.0		dB
IP3	Output Intercept Point V_{DS} = 3.3V, I_{DS} = 33% I_{DSS}, *f* = 1.8 GHz			42		dBm
I_{MAX}	Maximum Drain-Source Current	V_{DS} = 2V V_{GS} = +1V		925		mA
G_M	Transconductance	V_{DS} = 2V V_{GS} = 0V	300	400		mS
V_P	Pinch-Off Voltage	V_{DS} = 2V I_{DS} = 5mA	-0.25	-1.2	-2.0	V
I_{GSO}	Gate-Source Leakage Current	V_{GS} = -3V		10	75	µA
BV_{GS}	Gate-Source Breakdown Voltage	I_{GS} = 8mA	-8	-10		V
BV_{GD}	Gate-Drain Breakdown Voltage	I_{GD} = 8mA	-8	-11		V

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Filtronic LP1500SOT223

Solid State

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ABSOLUTE MAXIMUM RATINGS (25°C)		
SYMBOL	**PARAMETER**	**RATING[1]**
V_{DS}	Drain-Source Voltage	4V
V_{GS}	Gate-Source Voltage	-3V
I_{DS}	Drain-Source Current	I_{DSS}
I_G	Gate Current	50 mA
P_{IN}	RF Input Power	350 mW
T_{CH}	Channel Temperature	175°C
T_{STG}	Storage Temperature	-65/175°C
P_T	Power Dissipation	1.7W[3,4]

RECOMMENDED CONTINUOUS OPERATING LIMITS		
SYMBOL	**PARAMETER**	**RATING[2]**
V_{DS}	Drain-Source Voltage	3.5V
V_{GS}	Gate-Source Voltage	-1V
I_{DS}	Drain-Source Current	0.5 x I_{DSS}
I_G	Gate Current	15 mA
P_{IN}	RF Input Power	250 mW
T_{CH}	Channel Temperature	150°C
T_{STG}	Storage Temperature	-20/50°C
P_T	Power Dissipation	1.4 W[3,4]
G_{XdB}	Gain Compression	8 dB

NOTES:

1. Operating conditions that exceed the Absolute Maximum Ratings could result in permanent damage to the device.
2. Recommended Continuous Operating Limits should be observed for reliable device operation.
3. Power Dissipation defined as: $P_T \equiv (P_{DC} + P_{IN}) - P_{OUT}$, where: P_{DC} = DC bias power, P_{OUT} = RF output power, and P_{IN} = RF input power. ***Provide for adequate heatsinking at the large source lead.***
4. Power Dissipation to be de-rated as follows above 25°C:
   - Absolute Maximum: $P_T = 1.7W - (10mW/°C) \times T_{HS}$
   - Recommended Continuous Operating: $P_T = 1.4W - (10mW/°C) \times T_{HS}$
   - where T_{HS} = heatsink or ambient temperature.
5. Specifications subject to change without notice.

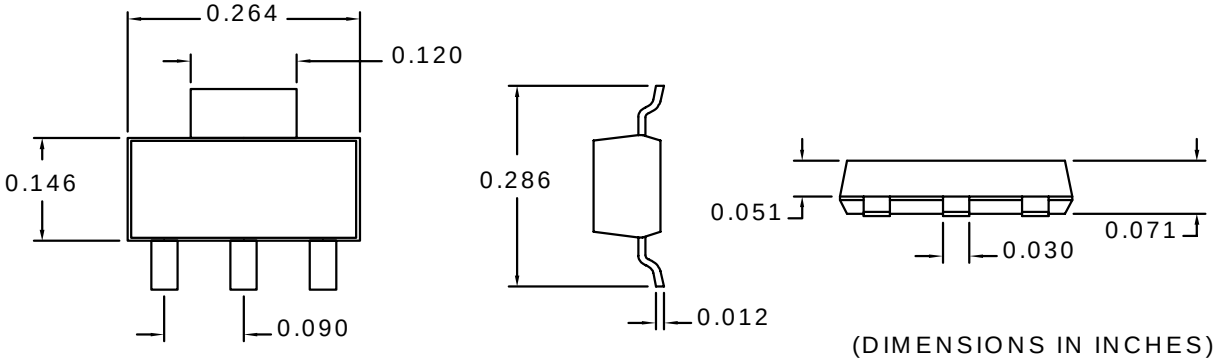
HANDLING PRECAUTIONS:

Care should be exercised during handling to avoid damage to the devices. Proper Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. These devices should be treated as Class 1A (0-500V), and further information on ESD control measures can be found in MIL-STD-1686 and MIL-HDBK-263.

APPLICATIONS NOTES AND DESIGN DATA:

Applications Notes are available from your local FSS Sales Representative, or directly from the factory. Complete design data, including S-parameters, Noise data, and Large-Signal models, is available on 3.5" diskette, or may be down-loaded from our Web Page.

PACKAGE OUTLINE:



(DIMENSIONS IN INCHES)

DSS-026 WF