

LDMOS Devices Generate High Power for TDMA, CDMA and W-CDMA

This month's cover features new high power parts for the next generation of wireless base stations

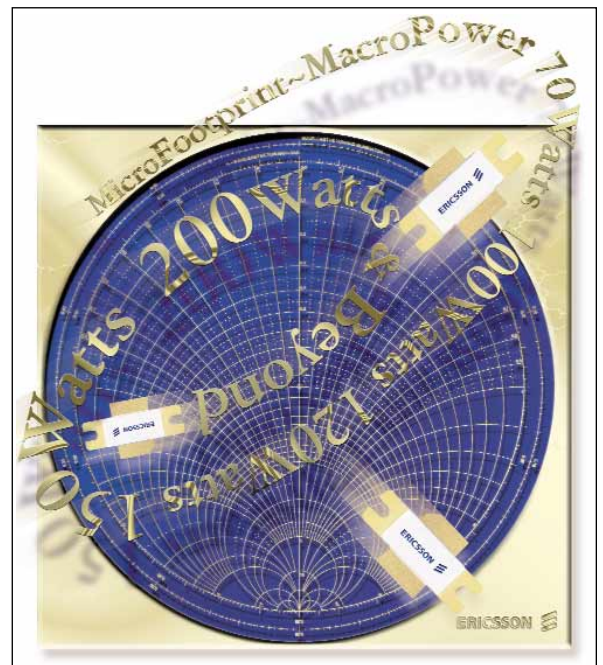
Using advanced LDMOS structures and technologies developed for the HIT[®] product line, Ericsson Microelectronics – RF Power Products is creating a new lineup of GOLDMOS[™] high power devices to meet the linearity and peak power requirements of CDMA and W-CDMA.

This article describes devices operating at 75, 90 and 150 watts power output (P_{1dB}). These products include an enhanced internal matching structure to keep the working impedances at reasonable levels while achieving high output power. This group of devices will reach production in the 3rd Quarter of 2000. Push-pull devices will follow late in the 4th Quarter of the year. These additions to the GOLDMOS family will achieve power output in excess of 200 watts.

75 watt device

The family of W-CDMA and CDMA products starts with a 75 watt-rated (P_{1dB}) device operating in the 2.1 to 2.2 GHz frequency range. Like other GOLDMOS products, it features nitride surface passivation and full gold metallization for longest lifetime and reliability. Internal matching achieves optimized performance over the specified range.

At an average power output of 8 watts, the W-CDMA adjacent channel power ratio (ACPR) is -45 dBc minimum. This parameter is measured at the rated supply voltage of 28 VDC, with a quiescent drain current of 1.30 amps. ACPR and efficiency versus power for this device are shown in Figure 1. Other key specifications for this device and its higher power family members are summarized in Table 1. Other specifications include forward transconductance (g_{fs}) of 5.2 Siemens, 65 VDC minimum drain-source break-

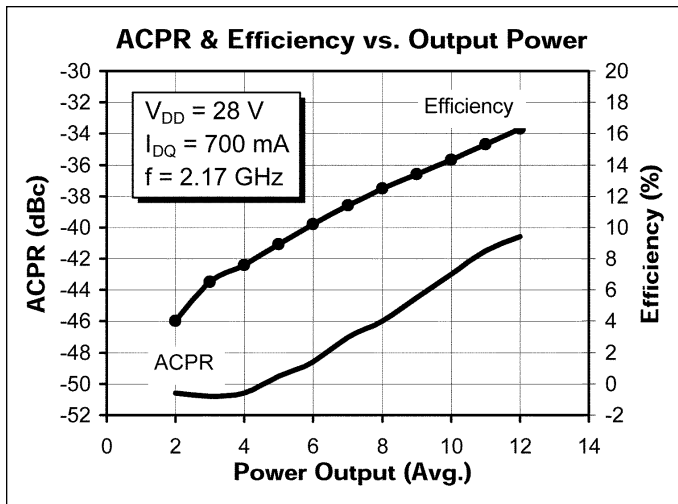


▲ Ericsson Microelectronics RF Power Products introduces new high power GOLDMOS[™] parts for high performance wireless technologies.

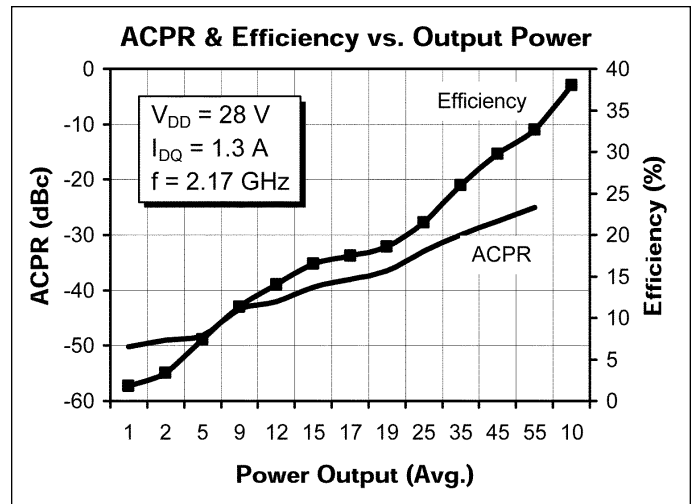
down voltage and a gate turn-on threshold of 3.0 volts minimum, 5.0 volts maximum. The gate-source voltage maximum rating is ±20 VDC.

Power (P_{1dB})	Type	Availability
75 watts	Single	Q3 2000
90 watts	Single	Q3 2000
150 watts	Single	Q3 2000
200 watts	Push-Pull	Q4 2000

▲ Timetable for release of W-CDMA products.



▲ Figure 1. ACPR versus power output for the 75 watt LDMOS FET for W-CDMA applications.



▲ Figure 2. ACPR versus power output for the new 90 watt W-CDMA device.

90 watt device

The next larger member of the new family is specified for 90 watts P_{1dB} . At 9 watts output with a 28 VDC supply voltage and 1.6 amp quiescent drain current, this part also provides W-CDMA ACPR performance of -45 dBc minimum. ACPR and efficiency performance versus power output for this device is shown in Figure 2. At full rated output, a typical efficiency of 35 percent is achieved. Breakdown and threshold voltage specifications are the same the 75 watt device.

150 watt device

The largest member of this GOLDMOS group provides 150 watts P_{1dB} . At 19 watts output under CDMA conditions (40 Walsh codes) and 2.2 amp quiescent drain current, this device offers -45 dBc ACPR at ± 885 kHz. This larger device has a gate threshold of 4.0 to 6.0 volts and g_{fs} of 10 Siemens.

Packaging

These three MOSFETs are packaged in the Ericsson 20248 flanged package with overall flange dimensions of

9.78×34.04 mm (0.385×1.340 inches). Maximum heat dissipation is from 280 to 350 watts. All devices are constructed with the back side common-source to simplify the electro-thermal design of an amplifier circuit. The package accommodates internal matching networks that transform the low die impedances (low R value and approximately 30 to 50 pF gate and drain capacitance) to practical levels for straightforward circuit design. All Ericsson devices are marked with lot numbers to provide complete traceability for quality control. ■

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Or circle Reader Service #200

Device Power	75 watts	90 watts	150 watts
Frequency Range	2.1-2.2 GHz	2.1-2.2 GHz	1.93-1.99 GHz
Gain (typical)	11.0	10.5 dB	10 dB
Power Output (typical)	75 watts	90 watts	150 watts
ACP or ACPR	-45 dBc	-45 dBc	-45 dBc
Operating Voltage	28 VDC	28 VDC	28 VDC
Load Mismatch Tolerance	10:1	10:1	10:1
Thermal Resistance	0.6 °C/W	0.6 °C/W	0.5 °C/W

▲ Table 1. Summary of key specifications for the three new LDMOS FETs from Ericsson Microelectronics.