



350W, 50V RF Power N-channel MOSFETs

Description

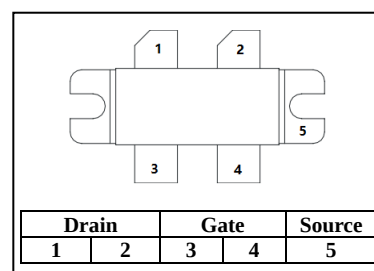
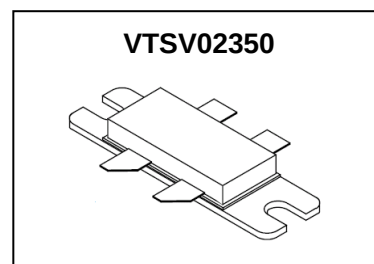
The VTSV02350 is a 350-watt, gold metallized N-channel MOSFETs, designed for HF/VHF/UHF commercial and industrial applications at frequencies up to 200 MHz.

- Typical Performance (In Demo Fixture): $V_{DD} = 50$ Volts, $I_{DQ} = 500$ mA, CW.

Frequency	Gp (dB)	P_{OUT} (W)	η_D (%)
175 MHz	17	350	60

Features

- Gold metallization
- Common source configuration, push pull
- Excellent thermal stability, low HCI drift
- Low $R_{DS(on)}$
- Pb-free, RoHS-compliant



Drain		Gate		Source
1	2	3	4	5

Figure 1. Pin Connection

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{(BR)DSS}$	130	V
Drain-Gate Voltage (RGS = 1M Ω)	V_{DGR}	130	V
Gate-Source Voltage	V_{GS}	-20 to +20	V
Drain Current	I_D	40	A
Power Dissipation	P_{DISS}	500	W
Storage Temperature Range	T_{stg}	-65 to 150	$^{\circ}C$
Case Operating Temperature	T_c	150	$^{\circ}C$
Operating Junction Temperature	T_j	200	$^{\circ}C$

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Junction-Case Thermal Resistance	R_{thJC}	0.36	$^{\circ}C/W$

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model (per JESD22--A114)	Class 2

Table 4. Electrical Characteristics ($T_{CASE} = 25^{\circ}C$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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DC Characteristics

Drain-Source Voltage $V_{GS}=0, I_{DS}=100mA$	$V_{(BR)DSS}$	130			V
Zero Gate Voltage Drain Leakage Current	I_{DSS}			100	μA



($V_{DS} = 50V$, $V_{GS} = 0V$)					
Gate-Source Leakage Current ($V_{GS} = 20V$, $V_{DS} = 0V$)	I_{GSS}			250	nA
Gate Quiescent Voltage ($V_{DS} = 10V$, $I_D = 250mA$)	$V_{GS(Q)}$	1.5		4.0	V
Drain-Source Voltage (On state) ($V_{GS} = 10V$, $I_D = 10A$)	$V_{DS(ON)}$			3.0	V
Forward Transconductance ($V_{DS} = 10V$, $I_D = 5A$)	g_{FS}	5			mho
Common Source Input Capacitance ($V_{GS} = 0V$, $V_{DS} = 50V$, $f = 1MHz$)	C_{ISS}		420		pF
Common Source Output Capacitance ($V_{GS} = 0V$, $V_{DS} = 50V$, $f = 1MHz$)	C_{OSS}		244		pF
Common Source Feedback Capacitance ($V_{GS} = 0V$, $V_{DS} = 50V$, $f = 1MHz$)	C_{RSS}		19		pF

Functional Tests (In Demo Test Fixture, 50 ohm system) $V_{DD} = 50Vdc$, $I_{DQ} = 500mA$, $f = 175MHz$, CW Signal Measurements.

Output Power	P_{OUT}	350			W
Power Gain@ $P_{OUT}=350W$	G_p	15	17		dB
Drain Efficiency@ $P_{OUT}=350W$	η_D	55	60		%
Load Mismatch, $P_{OUT}=350W$, All Phase angles	Load Mismatch	5 : 1	7: 1		VSWR

Reference Circuit of Test Fixture Schematic

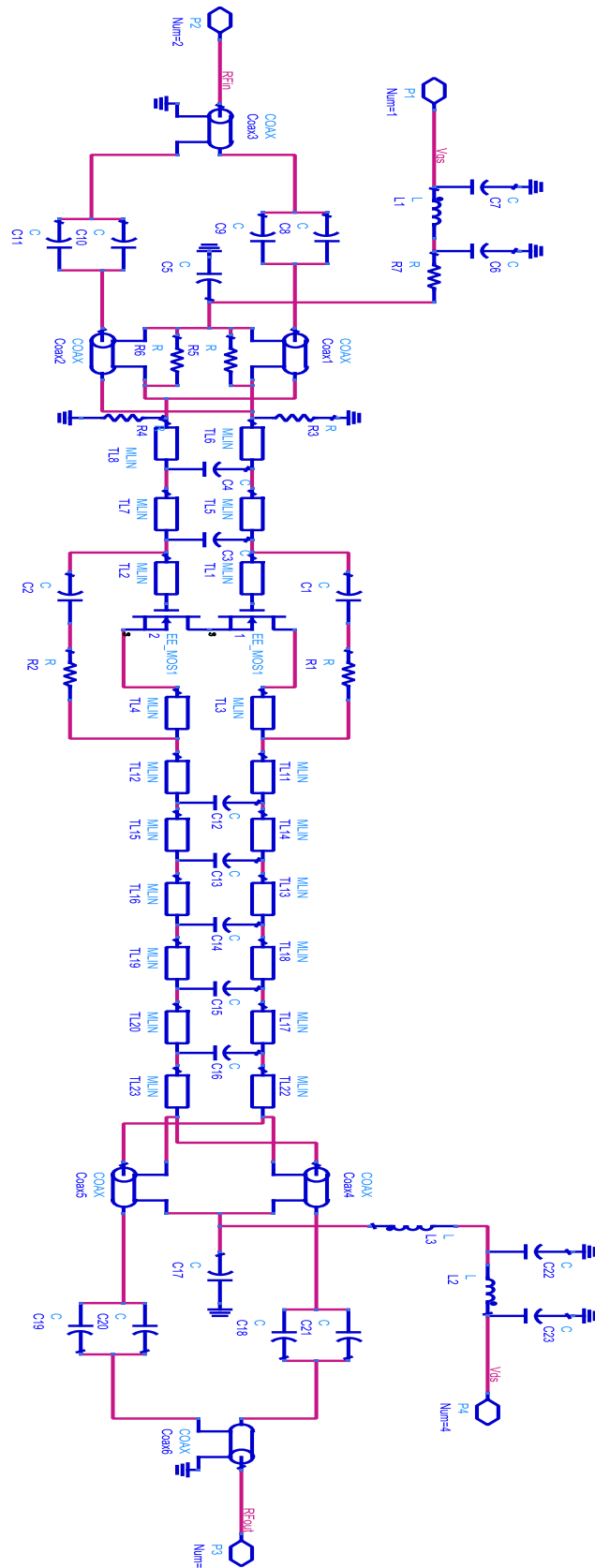


Figure 2. 175 MHz Test Circuit Schematic Reference



Table 5. Test Circuit Component Designations and Values

Component	Description
TL1,TL2,TL3,TL4	Length 3mm * width10 mm
TL5,TL7	Length 10mm * width10 mm
TL6,TL8	Length 8mm * width10 mm
TL11,TL12	Length 10.5mm * width10 mm
TL14,TL15, TL18,TL19	Length 2.3mm * width10 mm
TL13,TL16	Length 29mm * width10 mm
TL17,TL20	Length 1.3mm * width10 mm
TL22,TL23	Length 4mm * width10 mm
COAX1,COAX2	1: 4 Balun transformer, 25ohm, 2mm diameter, L=150mm, with ferrite core.
COAX3	50ohm, 2mm diameter, L=300mm, with ferrite core.
COAX4, COAX5	1: 4 Balun transformer, 25ohm, 3.6mm diameter, L=150mm
COAX6	50ohm, 2mm diameter, L=300mm
C1,C2,,C6,C9,C11,C18,C19	10000 pF ATC 200B ceramic chip capacitor
C8,C10,C20,C21	680 pF ATC 800B ceramic chip capacitor
C3,C4	75 pF ATC 800B ceramic chip capacitor
C5,C17	1200 pF ATC 700B ceramic chip capacitor
C12,C13	47 pF ATC 800B ceramic chip capacitor
C14,C15,C16	43 pF ATC 800B ceramic chip capacitor
C7	0.1 μ F / 500 V surface mount ceramic chip capacitor
C22,C23	0.01 μ F / 500 V surface mount ceramic chip capacitor
R1,R2	560 Ω 2 W, resistor two turn wire air-wound axial lead resistor
R3,R4,R7	470 Ω 1 W, surface mount chip resistor
R5,R6	360 Ω 0.5 W, carbon comp. axial lead resistor or equivalent
L1,L2,L3	470 nH chip Inductor
PCB	1.58mm thickness, FR4, 1 oz. copper both sides

TYPICAL CHARACTERISTICS

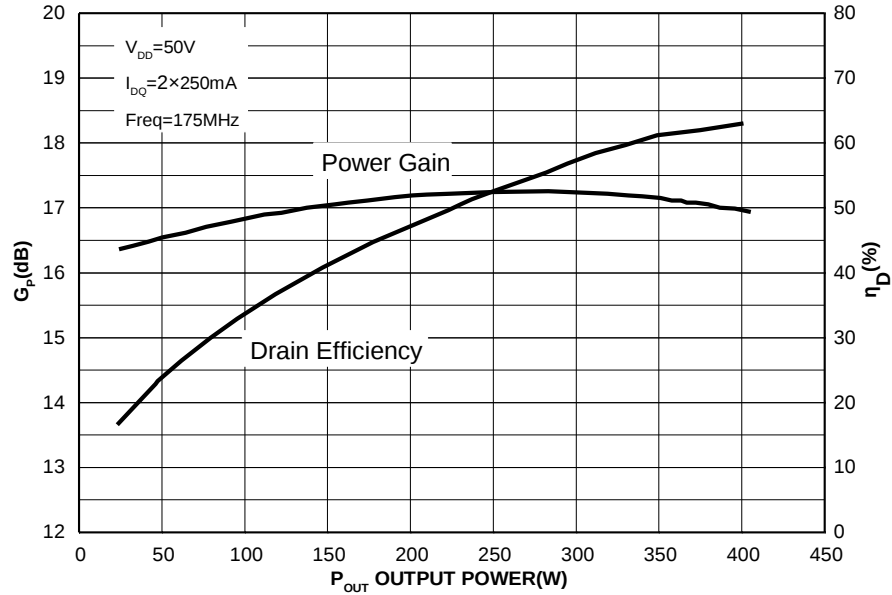
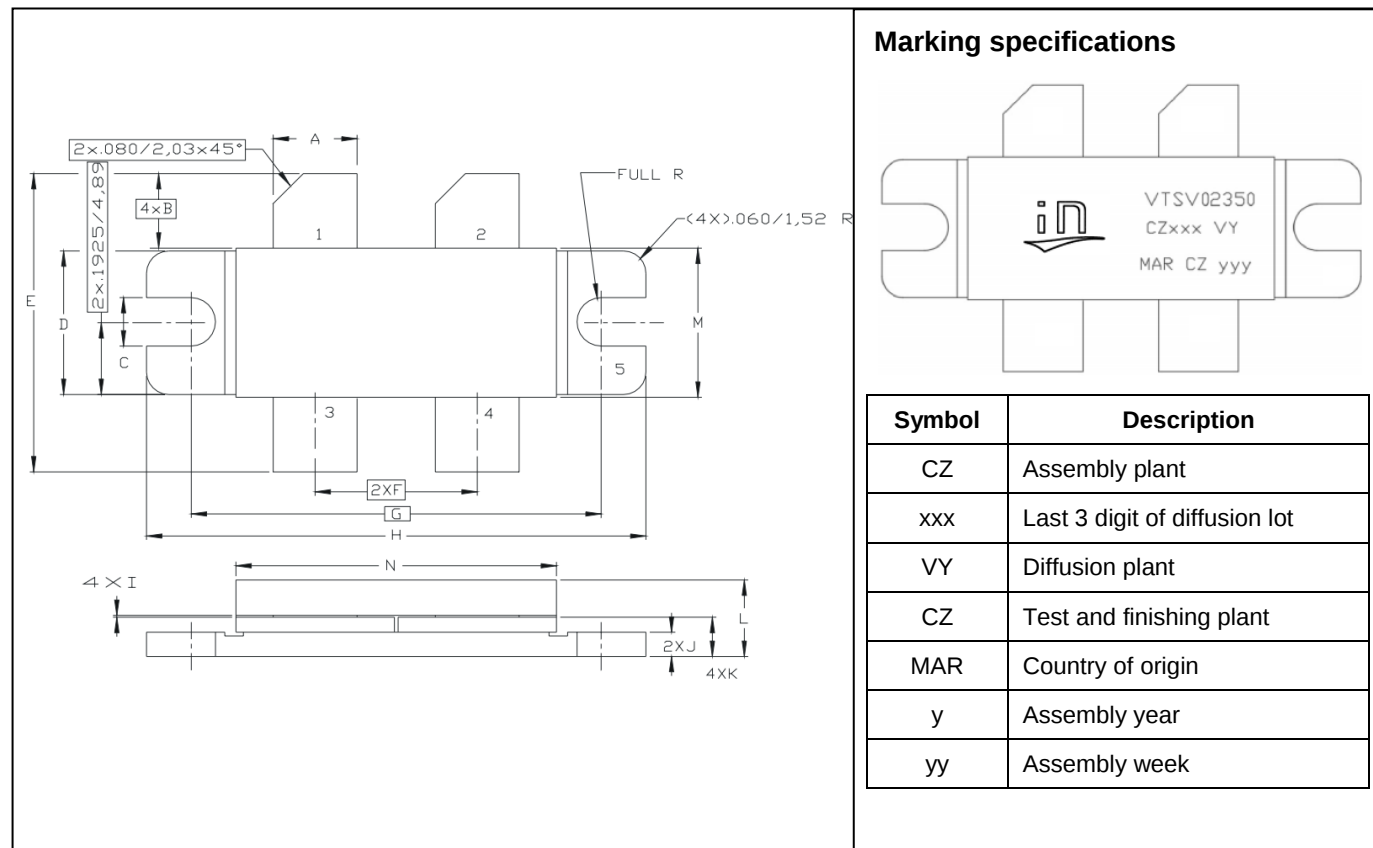


Figure 3. Power gain and drain efficiency as function of output power



Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads(1、2—Drain,3、4—Gate,5—Source)



UNIT	A	B	C	D	E	F	G	H	I	J	K	L	M	N
mm	5.84	5.08	3.28	9.91	20.82	11.18	27.94	34.16	0.15	1.78	2.84	5.84	10.34	22.1
	5.59		3.02	9.65	19.81	10.92		33.91	0.10	1.52	2.59	4.83	10.03	21.59
inches	0.230	0.200	0.129	0.390	0.820	0.440	1.100	1.345	0.006	0.070	0.112	0.230	0.407	0.870
	0.220		0.119	0.380	0.780	0.430		1.335	0.004	0.060	0.102	0.190	0.395	0.850

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-VD1					28/11/2016



Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2016/11/28	Rev 1.0	Create Production Datasheet
2017/09/25	Rev 1.1	Production Datasheet
		Add marking specification

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