



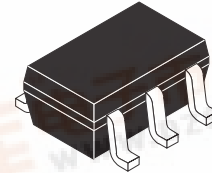
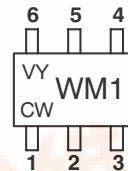
TSDF02830YR

Vishay Semiconductors

Dual - MOSMIC[®] - two AGC Amplifiers for TV-Tuner Prestage with 5 V Supply Voltage

Comments

MOSMIC - MOS Monolithic Integrated Circuit



16980



Electrostatic sensitive device.
Observe precautions for handling.

Features

- Easy Gate 1 switch-off with PNP switching transistors inside PLL
- Two differently optimized amplifiers in a single package
- Integrated gate protection diodes
- Low noise figure, high gain
- Typical forward transadmittance of 31 mS resp 28 mS
- Partly internal self biasing-network on chip
- Superior cross modulation at gain reduction
- High AGC-range with soft slope
- Main AGC control range from 3 V to 0.5 V
- Supply voltage 5 V (3 V to 7 V)
- SMD package, reverse pinning

Mechanical Data

Weight: 6 mg

Case: SOT 363R

V - Vishay

Y - Year, is variable for digit from 0 to 9
(e.g. 0 = 2000, 1 = 2001)

CW - Calendar Week, is variable for number from 01 to 52

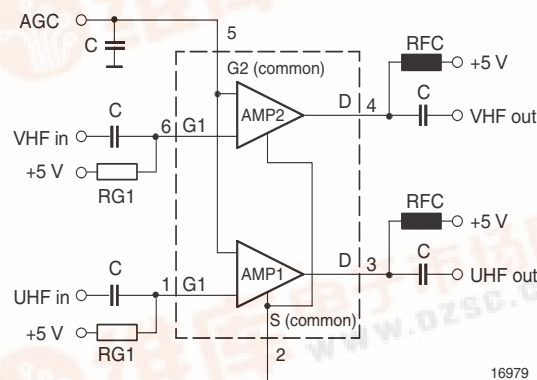
Number of Calendar Week is always indicating place of pin 1

Pinning:

1 = Gate 1 (amplifier 1), 2 = Source,
3 = Drain (amplifier 1), 4 = Drain (amplifier 2),
5 = Gate 2, 6 = Gate 1 (amplifier 2)

Applications

Low noise gain controlled VHF and UHF input stages, such as in digital and analog TV tuners.



16979



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Parts Table

Part	Marking	Package
TSDF02830YR	WM1	SOT363R

Absolute Maximum Ratings

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Amplifier 1

Following data are valid for operating amplifier 1 (pin 1, 3, 2, 5) which is optimized for UHF applications

Parameter	Test condition	Symbol	Value	Unit
Drain - source voltage		V_{DS}	8	V
Drain current		I_D	25	mA
Gate 1/Gate 2 - source peak current		$\pm I_{G1/G2SM}$	10	mA
Gate 1 - source voltage		$+V_{G1SM}$	6	V
		$-V_{G1SM}$	1.5	V
Gate 2 - source voltage		$\pm V_{G2SM}$	6	V
Total power dissipation	$T_{amb} \leq 60\text{ }^{\circ}\text{C}$	P_{tot}	200	mW
Channel temperature		T_{Ch}	150	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	- 55 to + 150	$^{\circ}\text{C}$
Channel ambient	on glass fibre printed board (25 x 20 x 1.5) mm ³ plated with 35 μm Cu	R_{thChA}	450	K/W

Amplifier 2

Following data are valid for operating amplifier 2 (pin 6, 4, 2, 5) which is optimized for VHF applications

Parameter	Test condition	Symbol	Value	Unit
Drain - source voltage		V_{DS}	8	V
Drain current		I_D	30	mA
Gate 1/Gate 2 - source peak current		$\pm I_{G1/G2SM}$	10	mA
Gate 1 - source voltage		$+V_{G1SM}$	6	V
		$-V_{G1SM}$	1.5	V
Gate 2 - source voltage		$\pm V_{G2SM}$	6	V
Total power dissipation	$T_{amb} \leq 60\text{ }^{\circ}\text{C}$	P_{tot}	200	mW
Channel temperature		T_{Ch}	150	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	- 55 to + 150	$^{\circ}\text{C}$
Channel ambient	on glass fibre printed board (25 x 20 x 1.5) mm ³ plated with 35 μm Cu	R_{thChA}	450	K/W

Electrical DC Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Amplifier 1

Following data are valid for operating amplifier 1 (pin 1, 3, 2, 5) which is optimized for UHF applications

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Drain - source breakdown voltage	$I_D = 10\text{ }\mu\text{A}$, $V_{G1S} = V_{G2S} = 0$	$V_{(BR)DSS}$	12			V
Gate 1 - source breakdown voltage	$+I_{G1S} = 10\text{ mA}$, $V_{G2S} = V_{DS} = 0$	$+V_{(BR)G1SS}$	7		10	V
Gate 2 - source breakdown voltage	$\pm I_{G2S} = 10\text{ mA}$, $V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)G2SS}$	7		10	V



Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Gate 1 - source leakage current	$+ V_{G1S} = 5 \text{ V}, V_{G2S} = V_{DS} = 0$	$+ I_{G1SS}$			20	nA
Gate 2 - source leakage current	$\pm V_{G2S} = 5 \text{ V}, V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$			20	nA
Drain - source operating current	$V_{DS} = V_{RG1} = 5 \text{ V}, V_{G2S} = 4 \text{ V}, R_{G1} = 56 \text{ k}\Omega$	I_{DSO}	8	12	17	mA
Gate 1 - source cut-off voltage	$V_{DS} = 5 \text{ V}, V_{G2S} = 4 \text{ V}, I_D = 20 \text{ }\mu\text{A}$	$V_{G1S(OFF)}$	0.3		1.0	V
Gate 2 - source cut-off voltage	$V_{DS} = V_{RG1} = 5 \text{ V}, R_{G1} = 100 \text{ k}\Omega, I_D = 20 \text{ }\mu\text{A}$	$V_{G2S(OFF)}$	0.3		1.2	V

Amplifier 2

Following data are valid for operating amplifier 2 (pin 6, 4, 2, 5) which is optimized for VHF applications

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Drain - source breakdown voltage	$I_D = 10 \text{ }\mu\text{A}, V_{G1S} = V_{G2S} = 0$	$V_{(BR)DSS}$	12			V
Gate 1 - source breakdown voltage	$+ I_{G1S} = 10 \text{ mA}, V_{G2S} = V_{DS} = 0$	$+ V_{(BR)G1SS}$	7		10	V
Gate 2 - source breakdown voltage	$\pm I_{G2S} = 10 \text{ mA}, V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)G2SS}$	7		10	V
Gate 1 - source leakage current	$+ V_{G1S} = 5 \text{ V}, V_{G2S} = V_{DS} = 0$	$+ I_{G1SS}$			20	nA
Gate 2 - source leakage current	$\pm V_{G2S} = 5 \text{ V}, V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$			20	nA
Drain - source operating current	$V_{DS} = V_{RG1} = 5 \text{ V}, V_{G2S} = 4 \text{ V}, R_{G1} = 56 \text{ k}\Omega$	I_{DSO}	8	12	17	mA
Gate 1 - source cut-off voltage	$V_{DS} = 5 \text{ V}, V_{G2S} = 4 \text{ V}, I_D = 20 \text{ }\mu\text{A}$	$V_{G1S(OFF)}$	0.3		1.0	V
Gate 2 - source cut-off voltage	$V_{DS} = V_{RG1} = 5 \text{ V}, R_{G1} = 56 \text{ k}\Omega, I_D = 20 \text{ }\mu\text{A}$	$V_{G2S(OFF)}$	0.3		1.2	V

Electrical AC Characteristics

$T_{amb} = 25 \text{ }^\circ\text{C}$, unless otherwise specified

Amplifier 1

$V_{DS} = V_{RG1} = 5 \text{ V}, V_{G2S} = 4 \text{ V}, R_{G1} = 100 \text{ k}\Omega, I_D = I_{DSO}, f = 1 \text{ MHz}, T_{amb} = 25 \text{ }^\circ\text{C}$, unless otherwise specified

Following data are valid for operating amplifier 1 (pin 1, 3, 2, 5) which is optimized for UHF applications

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward transadmittance		$ y_{21s} $	27	31	35	mS
Gate 1 input capacitance		C_{issg1}		1.9	2.3	pF
Feedback capacitance		C_{rss}		20		fF
Output capacitance		C_{oss}		0.9		pF
Power gain	$G_S = 2 \text{ mS}, B_S = B_{Sopt}, G_L = 0.5 \text{ mS}, B_L = B_{Lopt}, f = 200 \text{ MHz}$	G_{ps}		33		dB
	$G_S = 2 \text{ mS}, B_S = B_{Sopt}, G_L = 1 \text{ mS}, B_L = B_{Lopt}, f = 400 \text{ MHz}$	G_{ps}		30		dB
	$G_S = 3.3 \text{ mS}, B_S = B_{Sopt}, G_L = 1 \text{ mS}, B_L = B_{Lopt}, f = 800 \text{ MHz}$	G_{ps}		25		dB
AGC range	$V_{DS} = 5 \text{ V}, V_{G2S} = 0.5 \text{ to } 4 \text{ V}, f = 200 \text{ MHz}$	G_{ps}		50		dB
Noise figure	$G_S = G_L = 20 \text{ mS}, B_S = B_L = 0, f = 50 \text{ MHz}$	F		6.0	8.0	dB
	$G_S = 2 \text{ mS}, G_L = 1 \text{ mS}, B_S = B_{Sopt}, f = 400 \text{ MHz}$	F		1.0	1.5	dB
	$G_S = 3.3 \text{ mS}, G_L = 1 \text{ mS}, B_S = B_{Sopt}, f = 800 \text{ MHz}$	F		1.3	2.0	dB

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Cross modulation	Input level for $k = 1\%$ @ 0 dB AGC $f_w = 50\text{ MHz}$, $f_{unw} = 60\text{ MHz}$	X_{mod}	90			dB μ V
	Input level for $k = 1\%$ @ 40 dB AGC $f_w = 50\text{ MHz}$, $f_{unw} = 60\text{ MHz}$	X_{mod}	100	105		dB μ V

Remark on improving intermodulation behavior:

By setting R_{G1} smaller than 100 k Ω , e.g. 68 k Ω typical value of I_{DSO} will raise and improved intermodulation behavior will be performed.

Amplifier 2

$V_{DS} = V_{RG1} = 5\text{ V}$, $V_{G2S} = 4\text{ V}$, $R_{G1} = 56\text{ k}\Omega$, $I_D = I_{DSO}$, $f = 1\text{ MHz}$, $T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified

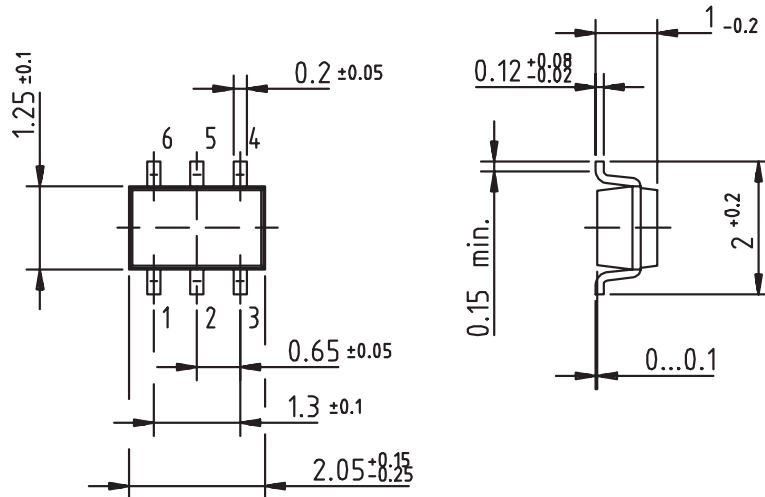
Following data are valid for operating amplifier 2 (pin 6, 4, 2, 5) which is optimized for VHF applications

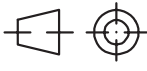
Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward transadmittance		$ y_{21s} $	23	28	33	mS
Gate 1 input capacitance		C_{issg1}		2.5	3.0	pF
Feedback capacitance		C_{rss}		20		fF
Output capacitance		C_{oss}		0.9		pF
Power gain	$G_S = 2\text{ mS}$, $B_S = B_{Sopt}$, $G_L = 0.5\text{ mS}$, $B_L = B_{Lopt}$, $f = 200\text{ MHz}$	G_{ps}		32		dB
	$G_S = 2\text{ mS}$, $B_S = B_{Sopt}$, $G_L = 1\text{ mS}$, $B_L = B_{Lopt}$, $f = 400\text{ MHz}$	G_{ps}		28		dB
	$G_S = 3.3\text{ mS}$, $B_S = B_{Sopt}$, $G_L = 1\text{ mS}$, $B_L = B_{Lopt}$, $f = 800\text{ MHz}$	G_{ps}		22		dB
AGC range	$V_{DS} = 5\text{ V}$, $V_{G2S} = 0.5\text{ to }4\text{ V}$, $f = 200\text{ MHz}$	G_{ps}		50		dB
Noise figure	$G_S = G_L = 20\text{ mS}$, $B_S = B_L = 0$, $f = 50\text{ MHz}$	F		4.5	6.0	dB
	$G_S = 2\text{ mS}$, $G_L = 1\text{ mS}$, $B_S = B_{Sopt}$, $f = 400\text{ MHz}$	F		1.0	1.6	dB
	$G_S = 3.3\text{ mS}$, $G_L = 1\text{ mS}$, $B_S = B_{Sopt}$, $f = 800\text{ MHz}$	F		1.5	2.3	dB
Cross modulation	Input level for $k = 1\%$ @ 0 dB AGC $f_w = 50\text{ MHz}$, $f_{unw} = 60\text{ MHz}$	X_{mod}	90			dB μ V
	Input level for $k = 1\%$ @ 40 dB AGC $f_w = 50\text{ MHz}$, $f_{unw} = 60\text{ MHz}$	X_{mod}	105			dB μ V

Remark on improving intermodulation behavior:

By setting R_{G1} smaller than 56 k Ω , typical value of I_{DSO} will raise and improved intermodulation behavior will be performed.

Package Dimensions in mm




 technical drawings
 according to DIN
 specifications

14280



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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