

## LOW POWER NARROW BAND FM IF

### ■ GENERAL DESCRIPTION

The **NJM3359** is a low power narrow band FM detector integrated circuit. for FM dual conversion of communication equipment. The **NJM3359** includes oscillator, limiting amplifier, AFC circuit, quadrature detect, operational amplifier, squelch circuit, scan-control and muting switch.

The **NJM3359** is a circuit of **NJM3357** plus one stage limiting IF amplifier and AFC output terminal.

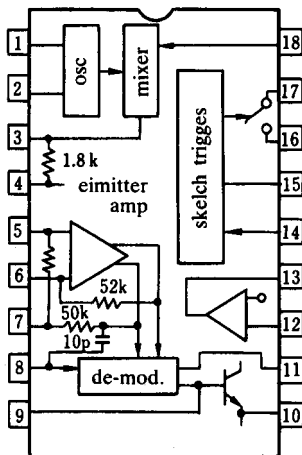
### ■ FEATURES

- Low Operating Current (3.6mA typ@V<sup>+</sup>=6V)
- Input Limiting Voltage (2.0μVrms typ@-3dB)
- Minimum other parts.
- Package Outline           DIP18
- Bipolar Technology

### ■ RECOMMENDED OPERATIONAL CODITION

- Operating Voltage       4 to 9V

### ■ PIN CONFIGURATION



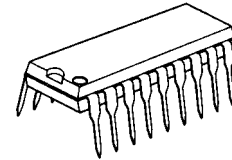
**NJM3359D**

### PIN FUNCTION

Pin No.

- |                       |                         |
|-----------------------|-------------------------|
| 1. crystal            | 10. de-modulator output |
| 2. crystal            | 11. AFC                 |
| 3. mixer output       | 12. filter input        |
| 4. V <sup>+</sup>     | 13. filter output       |
| 5. limiter input      | 14. skelch input        |
| 6. de-coupling        | 15. scan, control       |
| 7. de-coupling        | 16. audio muting        |
| 8. detector input     | 17. GND                 |
| 9. de-modulator input | 18. RF input            |

### ■ PACKAGE OUTLINE



**NJM3359D**

# NJM3359

## ■ ABSOLUTE MAXIMUM RATINGS

( $T_a=25^{\circ}\text{C}$ )

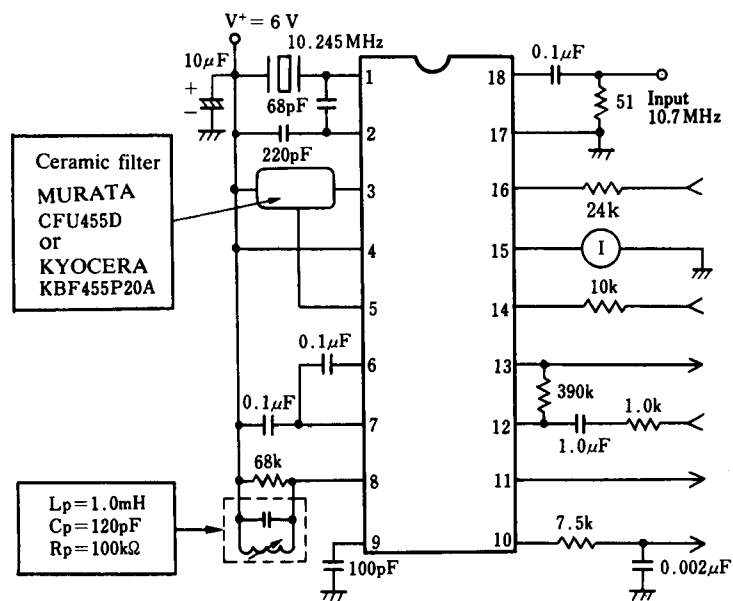
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+$	12	V
Input Voltage	V18	1.0	V <sub>rms</sub>
Muting Function	V16	-0.7 to 12	V <sub>PK</sub>
Operating Temperature Range	$T_{opr}$	-40 to 85	$^{\circ}\text{C}$
Storage Temperature Range	$T_{stg}$	-40 to 125	$^{\circ}\text{C}$

## ■ ELECTRICAL CHARACTERISTICS

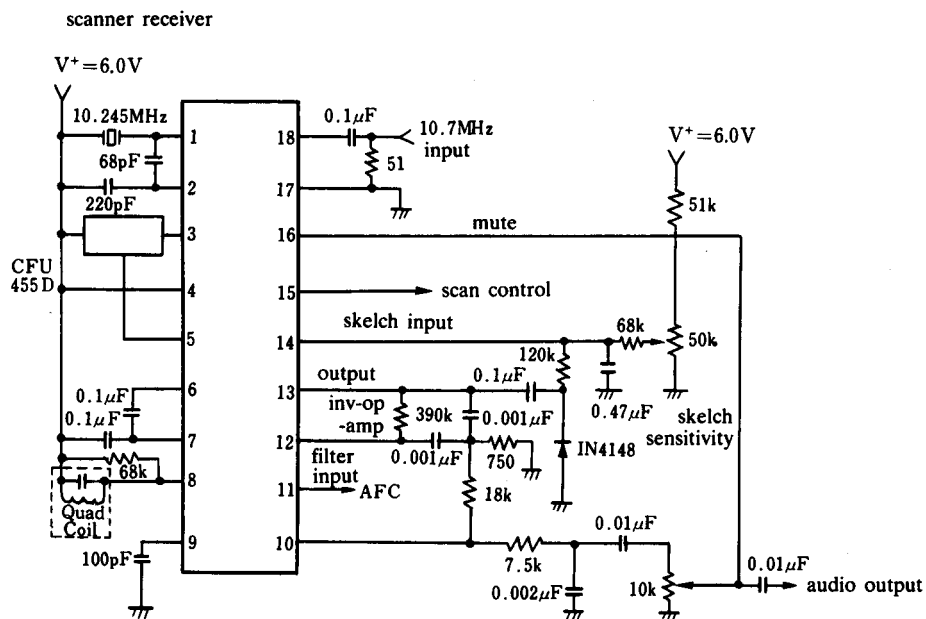
( $V^+=6\text{V}$ ,  $f_o=10.7\text{MHz}$ ,  $\Delta f=\pm 3.0\text{kHz}$ ,  $f_{mod}=1.0\text{kHz}$ ,  $T_a=25^{\circ}\text{C}$ )

PARAMETER	PIN	MIN.	TYP.	MAX.	UNIT
Operating Current	PIN 4,8				
Squelch OFF		-	3.6	6.0	mA
Squelch ON		-	5.4	7.0	mA
Input Sensitivity (S / N : 20dB)		-	8.0	-	$\mu\text{Vrms}$
Input Limiting Voltage (-3dB)		-	2.0	-	$\mu\text{Vrms}$
Mixer Voltage Gain	PIN 18 - PIN 3 Open	-	33	-	dB
Mixer Intercept Point	50 $\Omega$ input	-	-1.0	-	dBm
Mixer Input Resistance		-	3.6	-	k $\Omega$
Mixer Input Capacitance		-	2.2	-	pF
Recovered Audio Output Voltage	PIN 10, $V_{IN}=1.0\text{mVrms}$	450	700	-	mVrms
Detector Center Frequency Slope	PIN 10	-	0.3	-	V / kHz
AFC Center Frequency Slope	PIN 11, $R_L=\infty$	-	12	-	V / kHz
Filter Gain	$f_{IN}=10\text{kHz}$ , $V_{IN}=5\text{mV}$	40	51	-	dB
Squelch Threshold Voltage	PIN 14, 10k $\Omega$	-	0.62	-	Vdc
Scan Control Current	PIN 15				
	PIN 14 - High	-	0.01	1.0	$\mu\text{A}$
	- Low	2.0	2.4	-	mA
Mute Switch Impedance	PIN 16 - GND				
	PIN14 - High	-	5.0	10	$\Omega$
	- Low	-	1.5	-	M $\Omega$

## TEST CIRCUIT



## APPLICATION EXAMPLE

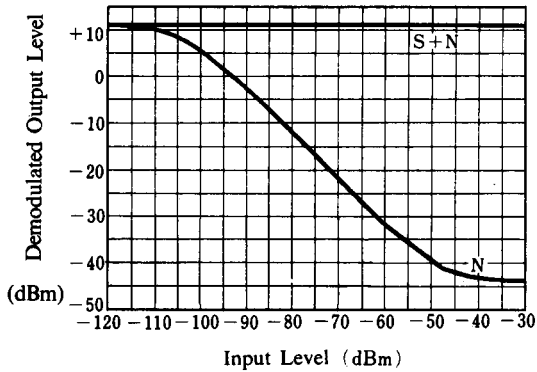


# NJM3359

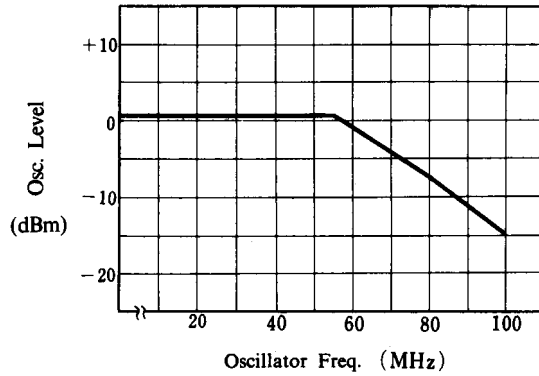
## ■ TYPICAL CHARACTERISTICS

### Input - Output

( $V^+ = 6.0V$ ,  $f_{in} = 10.7MHz$ ,  $\Delta f = \pm 3kHz$ ,  
 $f_{mod} = 1kHz$ )

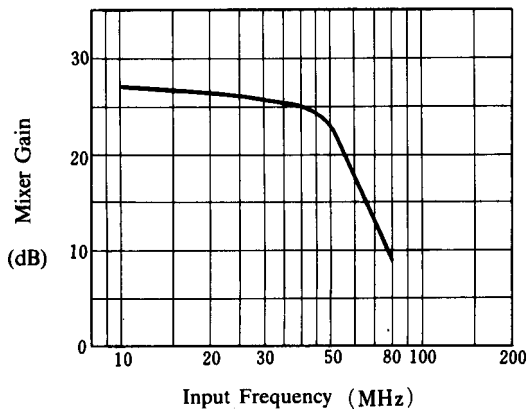


### Local OSC Frequency

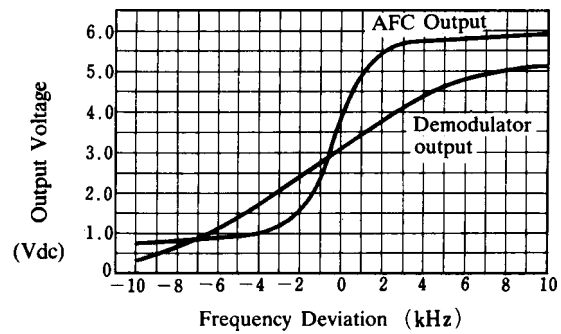


### Mixer Gain vs. Input Frequency

(2nd IF = 455kHz, adjust Local OSC  
frequency)

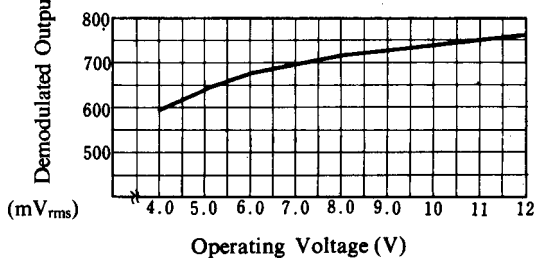


### AFC Characteristics



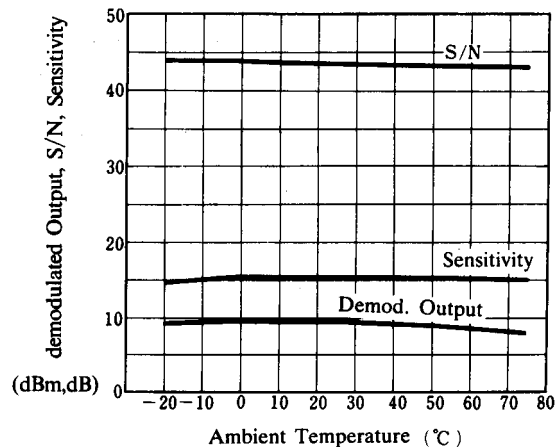
### Demodulator Output

( $f_{in} = 10.7MHz$ ,  $f_{mod} = 1kHz$ ,  $\Delta f = \pm 3kHz$ ,  
 $V_{in} = 1mV_{rms}$ )



### Temperature Characteristics

( $V^+ = 6.0V$ ,  $f_{in} = 10.7MHz$ ,  $f_{mod} = 1kHz$ ,  
 $\Delta f = \pm 3kHz$ ,  $S/N : V_{in} = 1mV_{rms}$ ,  
Sensitivity :  $V_{in} = 8.0\mu V_{rms}$ )



#### [CAUTION]

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