

# Integrated Circuit

## **MGF8003**

frequency divider IC

1GHz / 128 divide

# DATASHEET

OEM –Mitsubishi

Source: Mitsubishi Databook 1989

**MITSUBISHI GaAs INTEGRATED CIRCUIT (GaAs DIGITAL IC)**  
**MGF8000 Series (MGF8003)**  
**1/128, 1/129 2-MODULUS HIGH SPEED GaAs PRESCALER**

**DESCRIPTION**

MGF8003 is a high speed GaAs frequency divider by using a source coupled FET logic. This IC shows 2-modulus operation (1/128, 1/129) at a frequency range over 1.0 GHz with low dissipative current.

**FEATURES**

- High speed ( $f_{max} = 0.8 \text{ GHz}$ )
- Low dissipative current ( $I_D = 3 \text{ mA TYP. @ } V_{DD} = 5\text{V}$ )
- High output power ( $V_O \geq 0.5\text{V @ } R_L = 10\text{K}\Omega$ )

**APPLICATION**

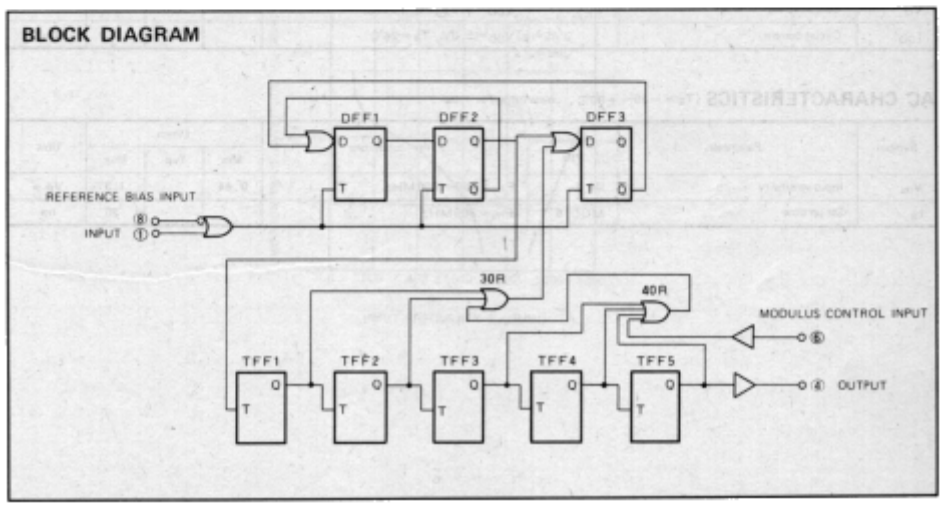
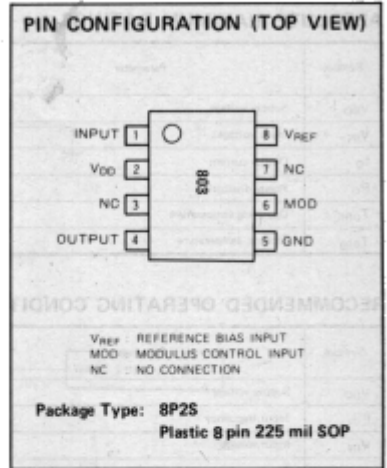
Mobile telephone, Personal radio, MCA radio

**QUALITY GRADE**

- GG

**FUNCTION TABLE**

MOD	Divided ratio	MOD Voltage
H	128 Divide	$4.0 - V_{DD}$
L	129 Divide	$0\text{V} \sim 1.0\text{V}$ or OPEN



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**ABSOLUTE MAXIMUM RATINGS** ( $T_A = -40 \sim +90^\circ\text{C}$ , unless otherwise noted.)

Symbol	Parameter	Conditions	Ratings			Unit
			Min	Typ	Max	
$V_{DD}$	Supply voltage		-0.5		6.0	V
$V_{IN}$	Input voltage		-0.5		$V_{DD}$	V
$I_O$	Output current				5.0	mA
$P_O$	Power dissipation	$T_A = 90^\circ\text{C}$			50	mW
$T_{opr}$	Operating temperature		-40		+90	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-55		+125	$^\circ\text{C}$

**RECOMMENDED OPERATING CONDITIONS** ( $V_{DD} = 4.75 \sim 5.25\text{V}$ ,  $T_A = -40 \sim +90^\circ\text{C}$ , unless otherwise noted.)

Symbol	Parameter	Conditions	Limits			Unit
			Min	Typ	Max	
$V_{DD}$	Supply voltage		4.75	5.0	5.25	V
$F_{IN}$	Input frequency	$V_{IN} = 0.44\text{ V}_{p-p}^*$	400		800	MHz
$V_{IN}$	Input voltage		0.44		1.30	$V_{p-p}$
$I_O$	Output current				0.5	mA
$C_L$	Output load capacitance	$R_L = 10\text{k}\Omega$			8	pF

\* Sine wave

**ELECTRICAL CHARACTERISTICS** ( $T_A = -40 \sim +90^\circ\text{C}$ , unless otherwise noted.)

Symbol	Parameter	PIN	Test conditions	Limits			Unit
				Min	Typ	Max	
$V_{IH}$	High-level input voltage	MOD 6	$V_{DD} = 4.75 \sim 5.25\text{V}$	4.0		$V_{DD}$	V
$V_{IL}$	Low-level input voltage	MOD 6	$V_{DD} = 4.75 \sim 5.25\text{V}$	0		1.0	V
$I_{IH}$	High-level input current	MOD 6	$V_{DD} = V_{IH} = 5.25\text{V}$			300	$\mu\text{A}$
$I_{IL}$	Low-level input current	MOD 6	$V_{DD} = 5.25\text{V}$ , $V_{IL} = 0\text{V}$	-10			$\mu\text{A}$
$V_O$	Output voltage	OUT 4	$V_{DD} = 5.0\text{V}$ , $R_L = 10\text{k}\Omega$	0.5	1.0		V
$I_{DD}$	Circuit current		$V_{DD} = 5.0\text{V}$ , $T_A = 25^\circ\text{C}$		3.0	4.0	mA

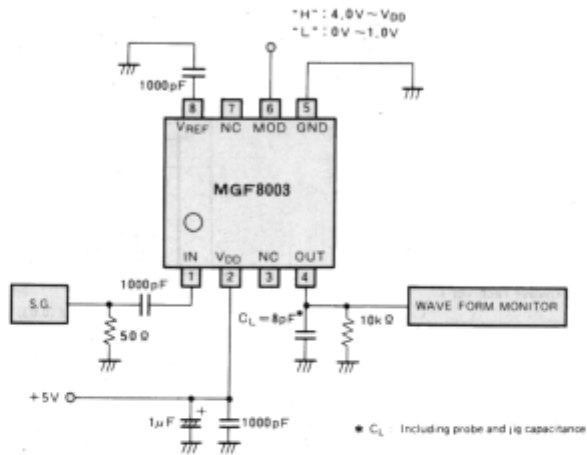
**AC CHARACTERISTICS** ( $T_A = -40 \sim +90^\circ\text{C}$ , unless otherwise noted.)

Symbol	Parameter	PIN	Test conditions	Limits			Unit
				Min	Typ	Max	
$V_{IN}$	Input sensitivity	IN 1	$F_{IN} = 400 \sim 800\text{MHz}$	0.44		1.3	$V_{p-p}$
$t_s$	Set up time	MOD 6	$F_{IN} = 800\text{MHz}$			20	ns

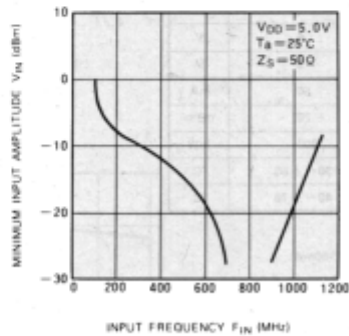
**MITSUBISHI GaAs INTEGRATED CIRCUIT <GaAs DIGITAL IC>  
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**TEST CIRCUIT ELECTRICAL CHARACTERISTICS**

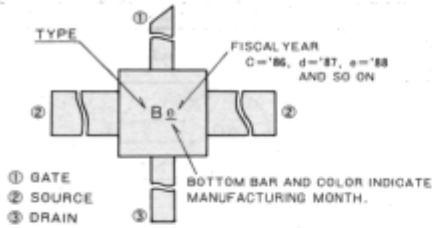


**TYPICAL CHARACTERISTICS**



**MITSUBISHI SEMICONDUCTOR <GaAs FET>  
SYMBOL ON PACKAGE**

**EXAMPLE OF SYMBOL ON MICRO DISK PACKAGE**



	Without bottom bar	with bottom bar
Blue	Apr.	Oct.
Orange	May	Nov.
Black	June	Dec.
Red	July	Jan.
Green	Aug.	Feb.
Brown	Sep.	Mar.

\* Left side character indicates the type number.  
\* Right side character, bottom bar and the color indicate manufacturing year and month.

**SYMBOL ON PACKAGE  
Low Noise GaAs FET & HEMT**

Type	Symbol	Outline	Classification
MGF1100	D	GD-1	Low Noise Dual Gate
MGF1102	E	GD-2	
MGF1202	B	GD-3	
MGF1302	A	GD-4	
MGF1303	B		
MGF1304A	E		
MGF1305	D		
MGF1402	B		GD-9
MGF1412	C		
MGF1403	D		
MGF1404	E		
MGF1405	F		
MGF1423	G		
MGF1425	H		
MGF1501	I	GD-5	Low Noise Dual Gate FET (Mold)
MGF1502	I	GD-6	Low Noise FET (Mold)
MGF1902	A	GD-7	Low Noise FET (Tape-Carrier)
MGF1903	B		
MGF1904	C	GD-4	Low Noise HEMT
MGF4301A	R		
MGF4302A	S		
MGF4303A	M		
MGF4304A	N		
MGF4305A	P	GD-9	
MGF4401A	J		
MGF4402A	K		
MGF4403A	L		
MGF4404A	N		
MGF4405A	P	GD-7	Low Noise HEMT (Tape-Carrier)
MGF4901A	D		
MGF4902A	E		
MGF4903A	F	GD-8	S.B.D.
MGF3000	A		

**MITSUBISHI SEMICONDUCTOR <GaAs FET>**  
**SYMBOL ON PACKAGE**

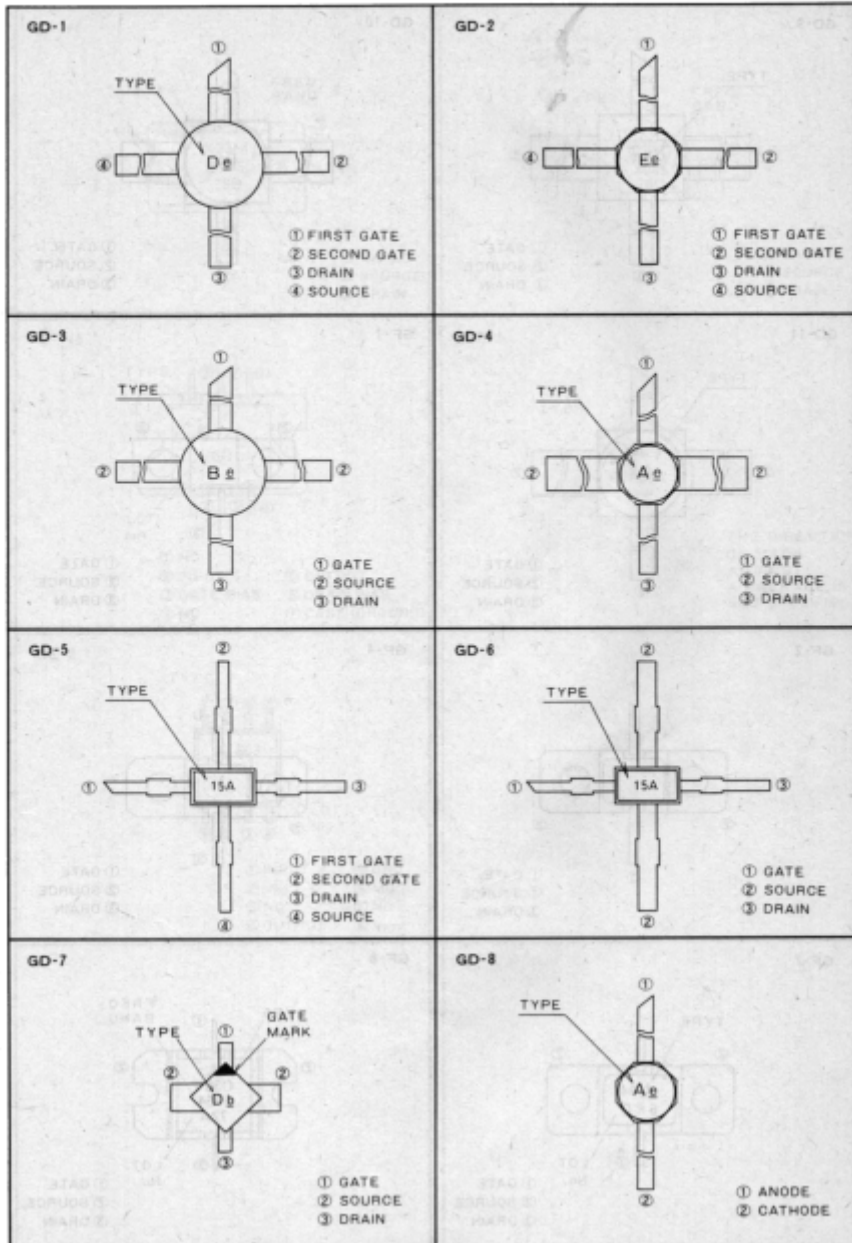
**Power GaAs FET**

Type	Symbol	Outline	Classification
MGF1601	B	GD-10	Power FET (Micro Disk)
MGF1601	A	GD-11	
MGF1602		GF-1	Power FET (Fringe Type)
MGF2116		GF-2	
MGF2117		GF-1	
MGF2124		GF-4	
MGF2148			
MGF2172			
MGF2407		GF-1	
MGF2415			
MGF2430			
MGF2445		GF-4	
MGF0904	94	GF-7	Power FET (Internally Matched)
MGF0905	95		
MGFC36V SERIES	C36V	GF-8	
MGFC39V SERIES	C39V		
MGFX35V9095	X35V	GF-14	
MGFX38V9095	X38V		
MGFK25M4045	K25M	GF-11	
MGFK30M4045	K30M		
MGFK33M4045	K33M		
MGFK35M4045	K35M	GF-14	
MGFK35V4045	K35V		
MGFK37V4045	K37V		

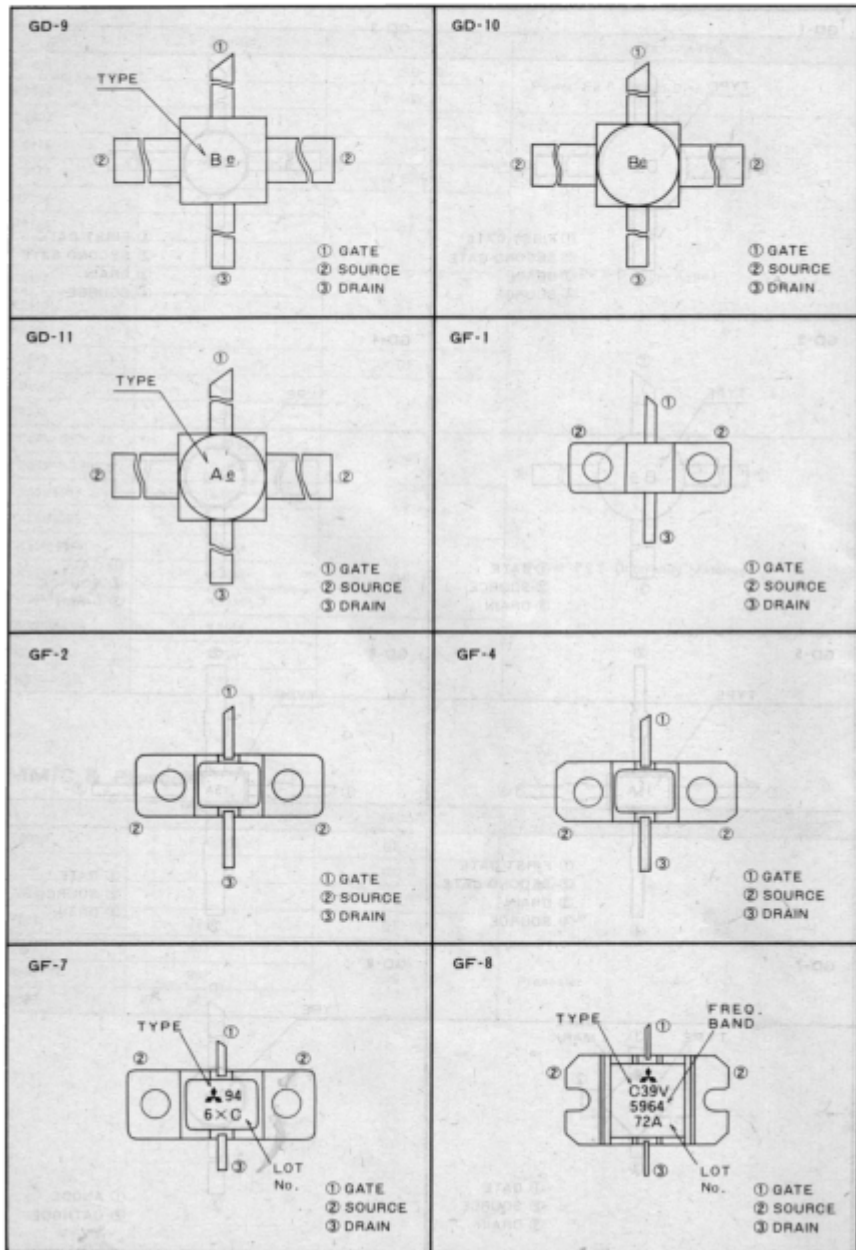
**GaAs MMIC & Prescaler**

Type	Symbol	Outline	Classification
MGF7002A	F7002A	GE-1	MMIC
MGF7003	F	GD-4	
MGF7004	2	GD-6	
MGF7201	721	GF-15	
MGF8001	801	GE-2	Prescaler
MGF8002	802		
MGF8003	803		

**MITSUBISHI SEMICONDUCTOR <GaAs FET>  
SYMBOL ON PACKAGE**

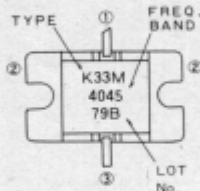
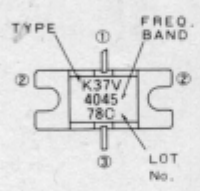
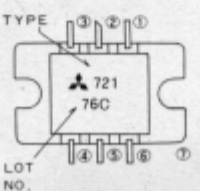
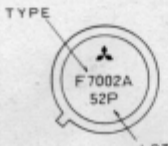
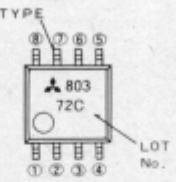


**MITSUBISHI SEMICONDUCTOR <GaAs FET>  
SYMBOL ON PACKAGE**





**MITSUBISHI SEMICONDUCTOR <GaAs FET>  
SYMBOL ON PACKAGE**

<p>GF-11</p>  <p>① GATE ② SOURCE ③ DRAIN</p>	<p>GF-14</p>  <p>① GATE ② SOURCE ③ DRAIN</p>
<p>GF-15</p>  <p>① NC                      ⑤ OUTPUT ② INPUT                ⑥ DRAIN BIAS ③ GATE BIAS           ⑦ CASE (GROUND) ④ NC</p>	<p>GE-1</p>  <p>THE DIRECTION OF MARK AGAINST A PACKAGE IS NOT SPECIFIED</p>
<p>GE-2</p>  <p>① INPUT                ⑤ GND ② V<sub>DD</sub>                    ⑥ MOD ③ NC                      ⑦ NC ④ OUTPUT              ⑧ V<sub>REF</sub></p>	