

OKI Semiconductor

FEDR27V6402G-01-02

Issue Date: Jun. 4, 2003

MR27V6402G

4M-Word × 16-Bit or 8M-Word × 8-Bit **OTP**

GENERAL DESCRIPTION

The MR27V6402G is a 64 Mbit electrically One Time Programmable Read-Only Memory that can be electrically switched between 4,194,304-word × 16-bit and 8,388,608-word × 8-bit by the state of the BYTE# pin. The MR27V6402G supports high speed asynchronous read operation using a single 3.3V power supply.

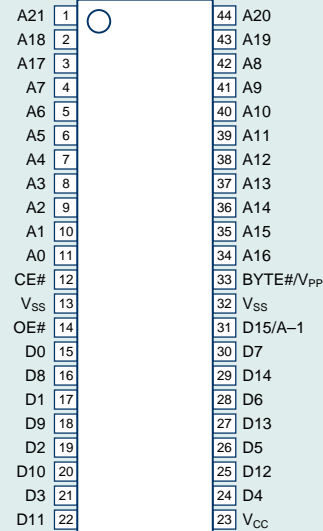
FEATURES

- 4,194,304-word × 16-bit / 8,388,608-word × 8-bit electrically switchable configuration
- +3.0 V to 3.6 V power supply
- Access time 80 ns MAX
- Operating current 20 mA MAX (5MHz)
- Standby current 10 μA MAX
- Input/Output TTL compatible
- Three-state output

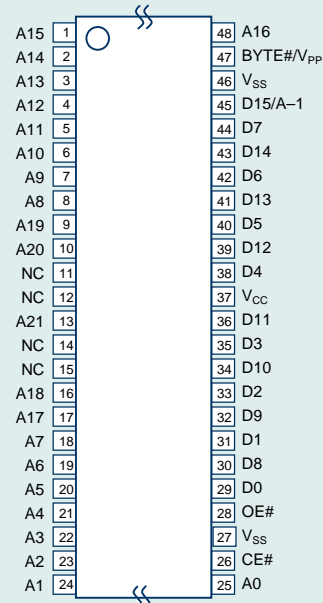
PACKAGES

- MR27V6402GMA
44-pin plastic SOP (SOP44-P-600-1.27-K)
- MR27V6402GTP
44-pin plastic TSOP (TSOP II 44-P-400-0.80-K)
- MR27V6402GTN
48-pin plastic TSOP (TSOP I 48-P-1220-0.50-1K)

PIN CONFIGURATION (TOP VIEW)



44SOP,
44TSOP(Type-II)

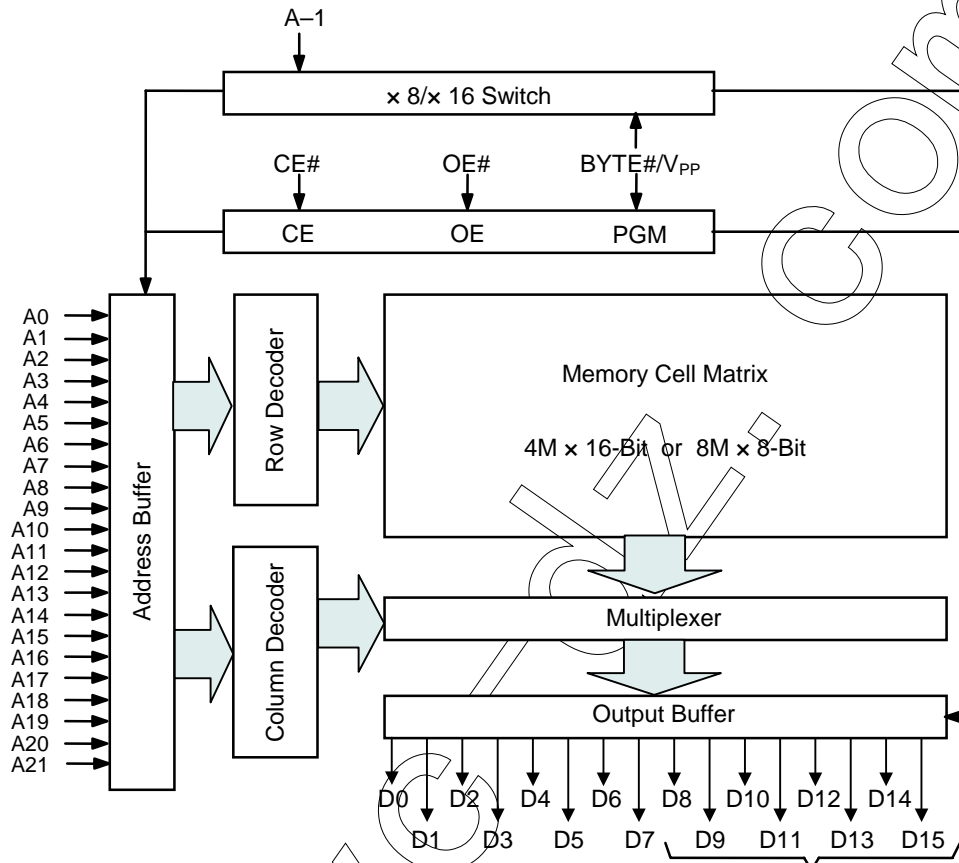


48TSOP(Type-I)



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BLOCK DIAGRAM



In 8-bit output mode, these pins are placed in a high-Z state and pin D15 functions as the A-1 address pin.

PIN DESCRIPTIONS

Pin name	Functions
D15 / A-1	Data output / Address input
A0 to A21	Address inputs
D0 to D14	Data outputs
CE#	Chip enable input
OE#	Output enable input
BYTE#/V _{PP}	Mode switch/Program power supply voltage
V _{CC}	Power supply voltage
V _{SS}	Ground
NC	No connect

FUNCTION TABLE

Mode	CE#	OE#	BYTE#/V _{PP}	V _{CC}	D0 to D7	D8 to D14	D15/A-1
Read (16-Bit)	L	L	H	3.0 V to 3.6 V	D _{OUT}		
Read (8-Bit)	L	L	L		D _{OUT}	Hi-Z	L/H
Output disable	L	H	H		Hi-Z		
			L		*		
Standby	H	*	H		Hi-Z		
			L		*		
Program	L	H	V _{PP}	V _{CC}	D _{IN}		
Program inhibit	H	H			Hi-Z		
Program verify	H	L			D _{OUT}		

*: Don't Care (H or L)

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Value	Unit
Operating temperature under bias	T _a		0 to 70	°C
Storage temperature	T _{stg}		-55 to 125	°C
Input voltage	V _I	relative to V _{SS}	-0.5 to V _{CC} +0.5	V
Output voltage	V _O		-0.5 to V _{CC} +0.5	V
Power supply voltage	V _{CC}		-0.5 to 5	V
Program power supply voltage	V _{PP}		-0.5 to 11.5	V
Power dissipation per package	P _D		—	1.0

RECOMMENDED OPERATING CONDITIONS

(T_a = 0 to 70°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
V _{CC} power supply voltage	V _{CC}	V _{CC} = 3.0 to 3.6 V	3.0	—	3.6	V
V _{PP} power supply voltage	V _{PP}		-0.5	—	V _{CC} +0.5	V
Input "H" level	V _{IH}		2.2	—	V _{CC} +0.5*	V
Input "L" level	V _{IL}		-0.5**	—	0.6	V

Voltage is relative to V_{SS}.

* : V_{CC}+1.5V(Max.) when pulse width of overshoot is less than 10ns.

** : -1.5V(Min.) when pulse width of undershoot is less than 10ns.

PIN CAPACITANCE

(V_{CC} = 3.3 V, T_a = 25°C, f = 1 MHz)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input	C _{IN1}	V _I = 0 V	—	—	8	pF
BYTE#/V _{PP}	C _{IN2}		—	—	200	
Output	C _{OUT}	V _O = 0 V	—	—	10	

ELECTRICAL CHARACTERISTICS

DC Characteristics

(V_{CC} = 3.3 V ± 0.3 V, T_a = 0 to 70°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input leakage current	I _{LI}	V _I = 0 to V _{CC}	—	—	10	μA
Output leakage current	I _{LO}	V _O = 0 to V _{CC}	—	—	10	μA
V _{CC} power supply current (Standby)	I _{CCSC}	CE# = V _{CC}	—	—	10	μA
	I _{CCST}	CE# = V _{IH}	—	—	1	mA
V _{CC} power supply current (Read)	I _{CCA}	CE# = V _{IL} , OE# = V _{IH} f=5MHz	—	—	20	mA
V _{PP} power supply current	I _{PP}	V _{PP} = V _{CC}	—	—	10	μA
Input "H" level	V _{IH}	—	2.2	—	V _{CC} +0.5*	V
Input "L" level	V _{IL}	—	-0.5**	—	0.6	V
Output "H" level	V _{OH}	I _{OH} = -2mA	2.4	—	—	V
Output "L" level	V _{OL}	I _{OL} = 4mA	—	—	0.4	V

Voltage is relative to V_{SS}.

* : V_{CC}+1.5V(Max.) when pulse width of overshoot is less than 10ns.

** : -1.5V(Min.) when pulse width of undershoot is less than 10ns.

AC Characteristics

(V_{CC} = 3.3 V ± 0.3 V, T_a = 0 to 70°C)

Parameter	Symbol	Condition	Min.	Max.	Unit
Address cycle time	t _c	—	80	—	ns
Address access time	t _{ACC}	CE# = OE# = V _{IL}	—	80	ns
CE# access time	t _{CE}	OE# = V _{IL}	—	80	ns
OE# access time	t _{OE}	CE# = V _{IL}	—	30	ns
Output disable time	t _{CHZ}	OE# = V _{IL}	0	20	ns
	t _{OHZ}	CE# = V _{IL}	0	20	ns
Output hold time	t _{OH}	CE# = OE# = V _{IL}	0	—	ns

Measurement conditions

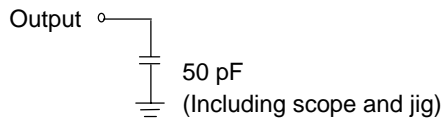
Input signal level ----- 0 V/3 V

Input timing reference level----- 1/2V_{CC}

Output load ----- 50 pF

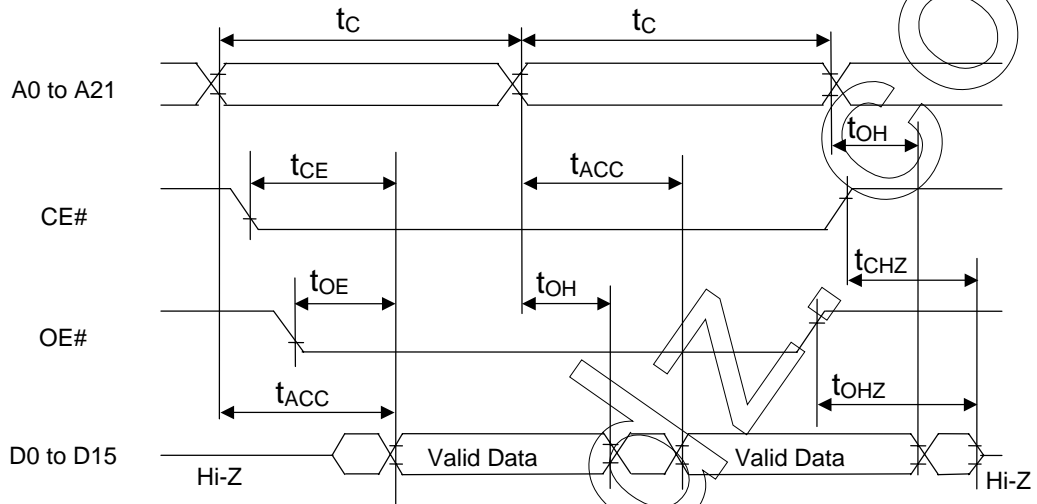
Output timing reference level----- 1/2V_{CC}

Output load

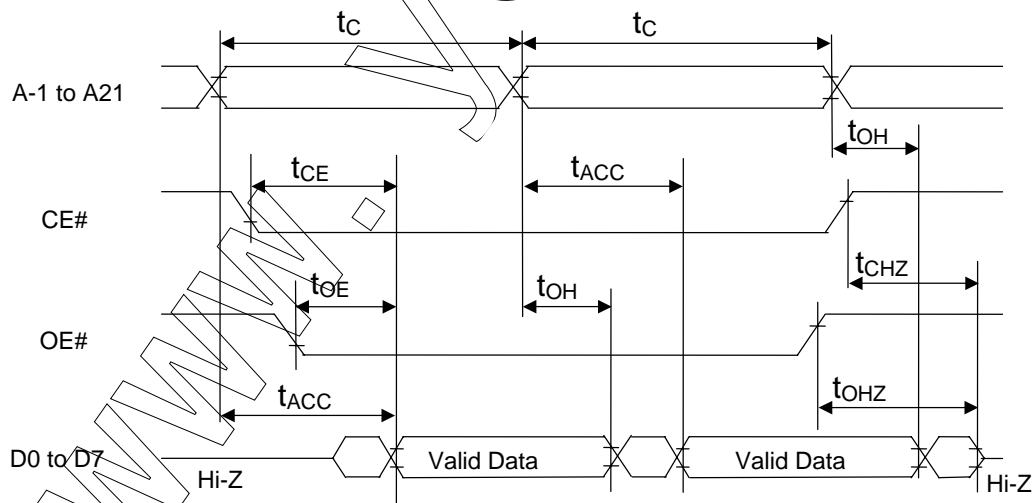


TIMING CHART (READ CYCLE)

16-BIT READ MODE (BYTE# = V_{III})



8-BIT READ MODE (BYTE# = V_{II})



ELECTRICAL CHARACTERISTICS (PROGRAMMING OPERATION)**DC CHARACTERISTICS**

(Ta = 25°C ± 5°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input leakage current	I _{LI}	V _I = V _{CC} +0.5 V	—	—	10	μA
V _{PP} power supply current (Program)	I _{PP2}	CE# = V _{IL}	—	—	50	mA
V _{CC} power supply current	I _{CC}	—	—	—	50	mA
Input "H" level	V _{IH}	—	V _{CC} -0.5	—	V _{CC} +0.5	V
Input "L" level	V _{IL}	—	-0.5	—	0.8	V
Output "H" level	V _{OH}	I _{OH} = -400 μA	2.4	—	—	V
Output "L" level	V _{OL}	I _{OL} = 2.1 mA	—	—	0.45	V
Program voltage	V _{PP}	—	8.0	8.2	8.4	V
V _{CC} power supply voltage	V _{CC}	—	3.9	4.0	4.1	V

Voltage is relative to V_{SS}.

AC CHARACTERISTICS

(V_{CC} = 4.0 V ± 0.1 V, BYTE#/V_{PP} = 8.2 V ± 0.25 V, Ta = 25°C ± 5°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Address set-up time	t _{AS}	—	100	—	—	ns
OE# set-up time	t _{OES}	—	2	—	—	μs
Data set-up time	t _{DS}	—	100	—	—	ns
Address hold time	t _{AH}	—	2	—	—	μs
Data hold time	t _{DH}	—	100	—	—	ns
Output float delay time from OE#	t _{OZH}	—	0	—	100	ns
V _{PP} voltage set-up time	t _{Vs}	—	2	—	—	μs
Program pulse width	t _{PW}	—	7	8	9	μs
Data valid from OE#	t _{OE}	—	—	—	100	ns
Address hold from OE# high	t _{AOH}	—	0	—	—	ns

Pin Check Function

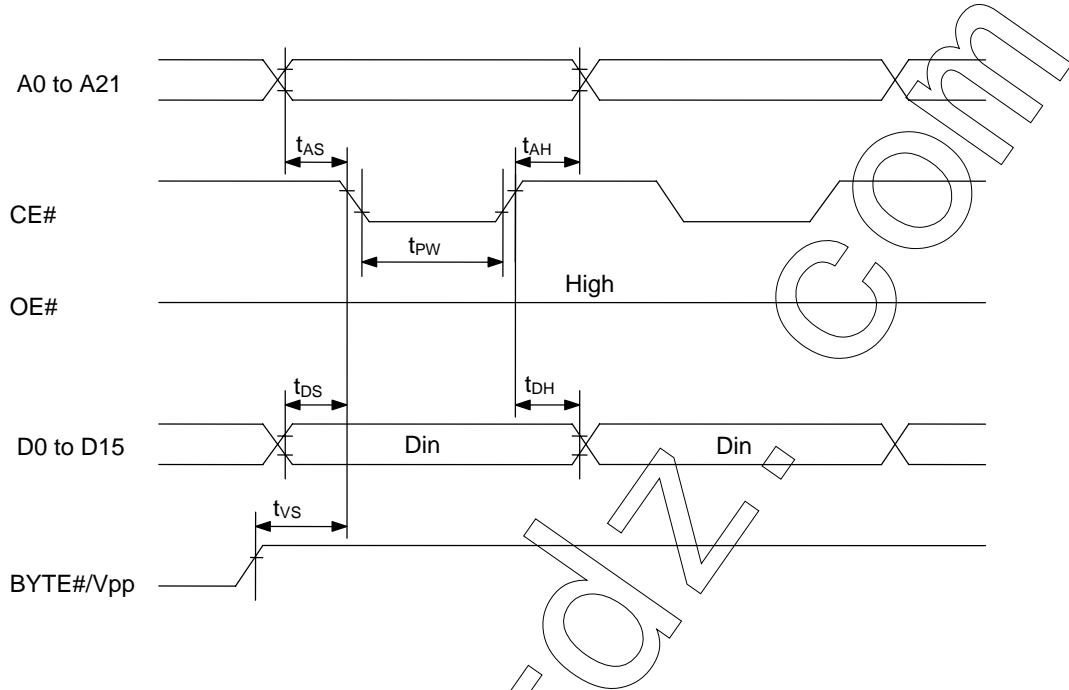
Pin Check Function is to check contact between each device-pin and each socket-lead with EPROM programmer. Setting up address as following condition call the preprogrammed codes on device outputs.

(V_{CC} = 3.0 V ± 0.1 V, CE# = V_{IL}, OE# = V_{IL}, BYTE#/V_{PP} = V_{IH}, Ta = 25°C ± 5°C)

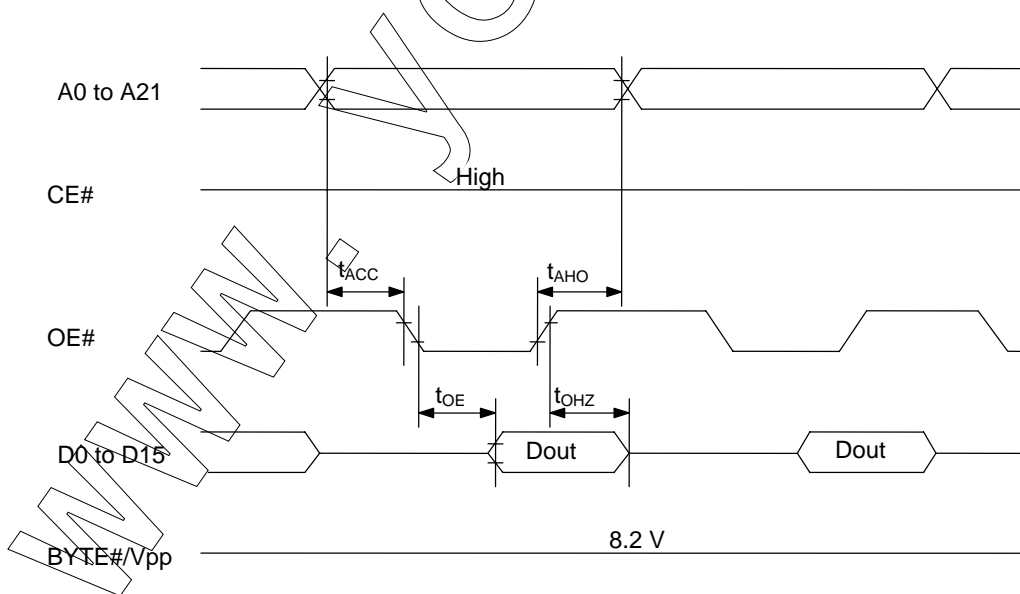
A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	DATA
0	1	0	1	0	1	0	1	0	VH	0	1	0	1	0	1	0	0	1	1	0	0	FF00
1	0	1	0	1	0	1	0	1	VH	1	0	1	0	1	0	1	1	0	0	1	1	00FF
Other conditions																					FFFF	

*: VH = 7 V ± 0.25 V

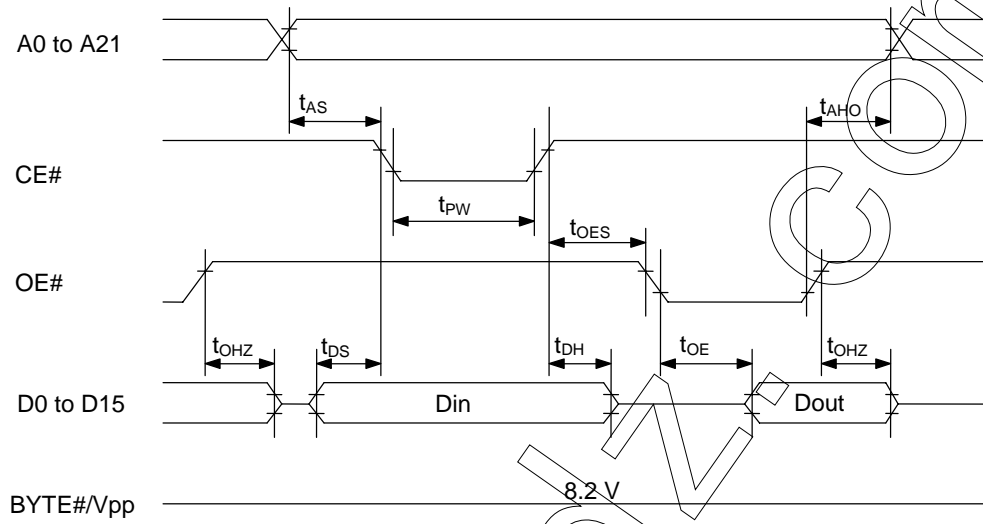
Consecutive Programming Waveforms



Consecutive Program Verify Waveforms

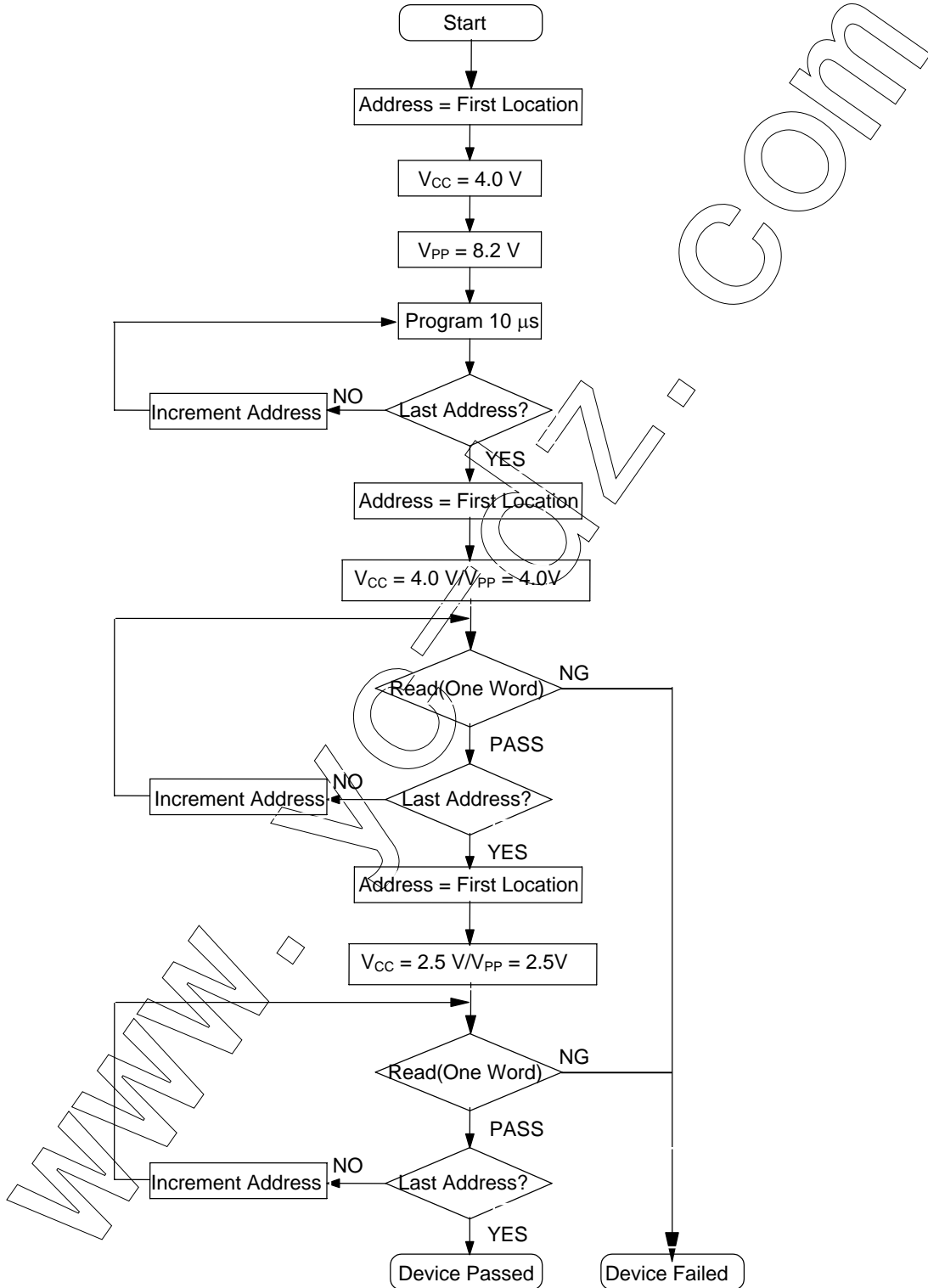


Program and Program Verify Cycle Waveforms

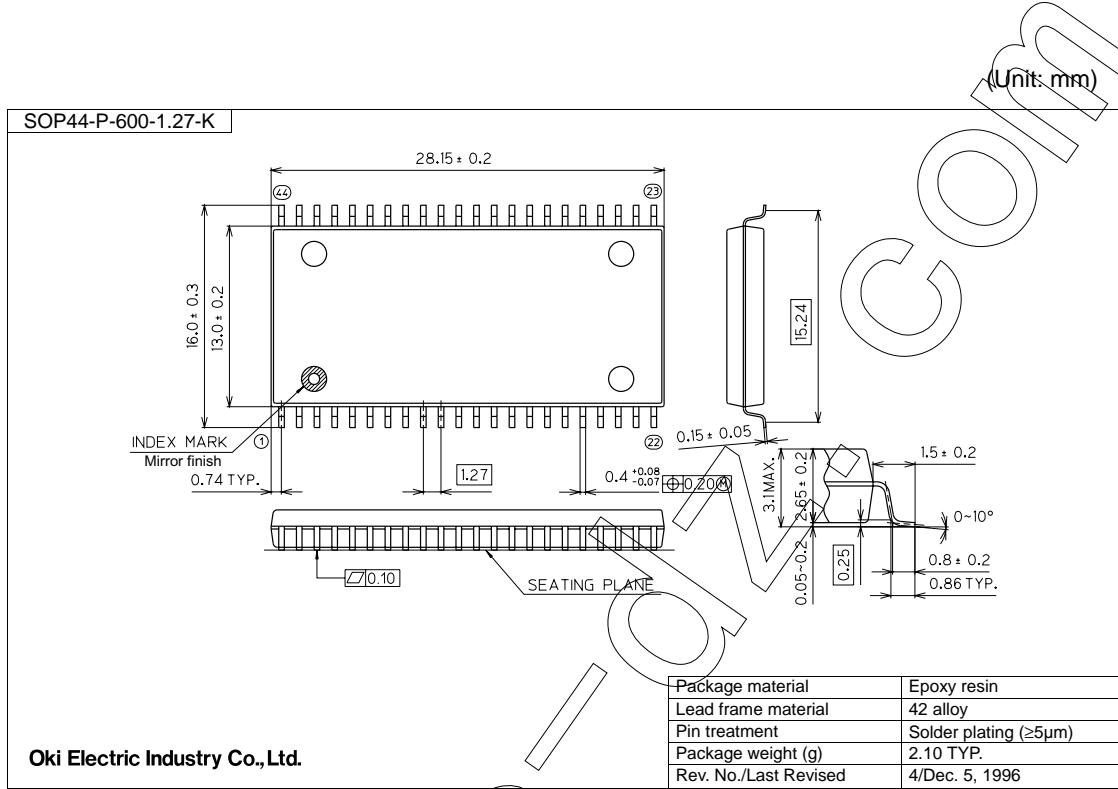


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Programming Flow Chart



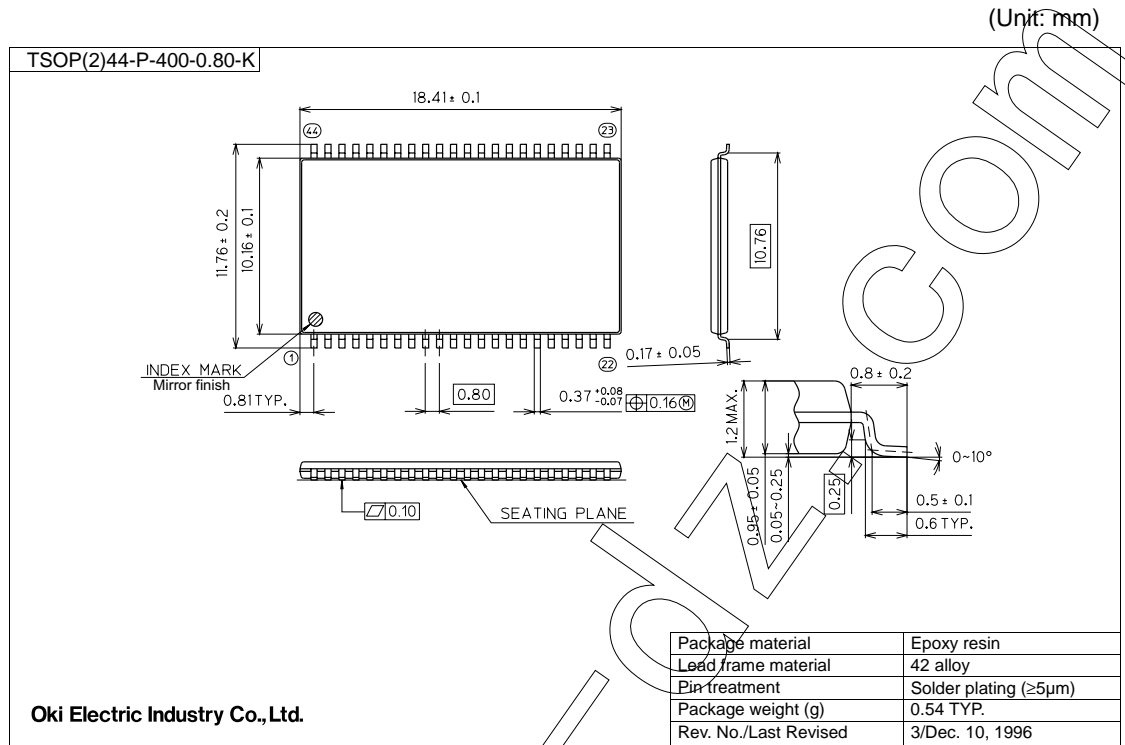
PACKAGE DIMENSIONS



Notes for Mounting the Surface Mount Type Package

The surface mount type packages are very susceptible to heat in reflow mounting and humidity absorbed in storage.

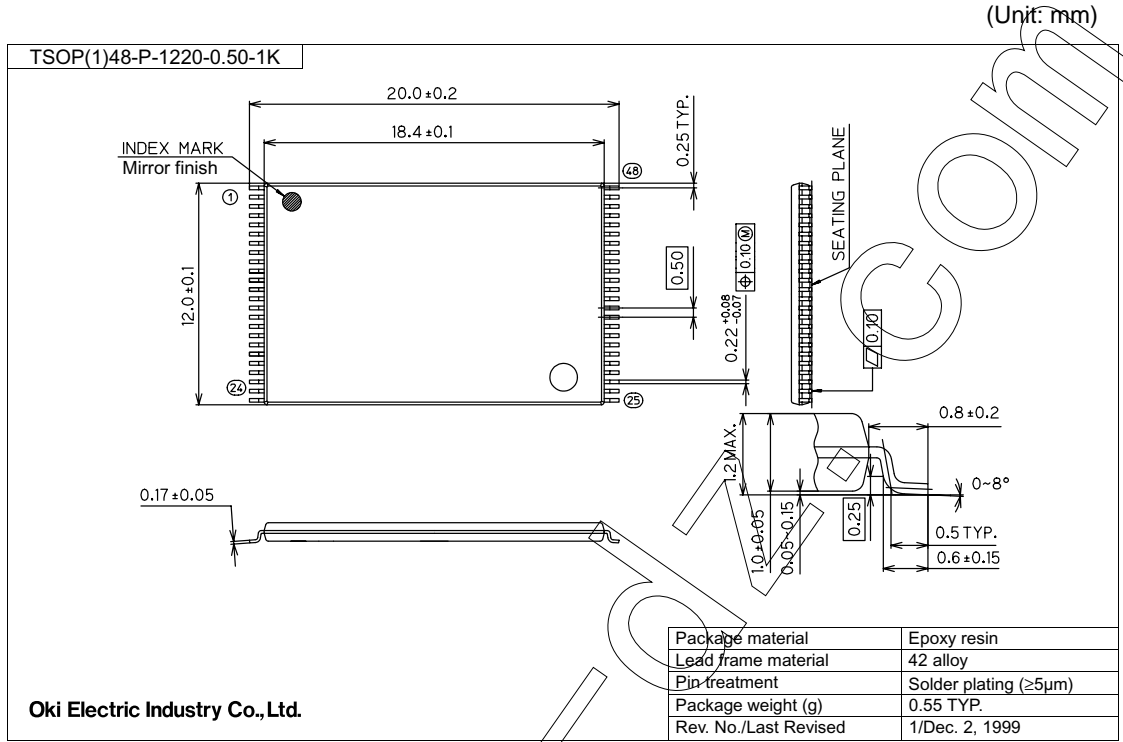
Therefore, before you perform reflow mounting, contact Oki's responsible sales person for the product name, package name, pin number, package code and desired mounting conditions (reflow method, temperature and times).



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REVISION HISTORY

Document No.	Date	Page		Description
		Previous Edition	Current Edition	
FEDR27V6402G-01-01	Apr., 2003	–	–	Final edition 1
FEDR27V6402G-01-02	Jun 4, 2003	1	1	Change 48TSOP(1) package code to -1K
		1, 4	1, 4	Unify I_{CCA} condition into f=5MHz
		4	4	Change t_{CHZ}, t_{OHZ} to 20ns

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