

# MEMORY PRODUCTS

Serial EEPROMs		Parallel EEPROMs	Flash	NVRAM
<b>I<sup>2</sup>C™ Bus, Full Array Write Protect</b>	<b>SPI Bus with Block Write Protection</b>	CAT28C16A CAT28C17A CAT28C64B CAT28C65B CAT28LV64 CAT28LV65 CAT28C256 CAT28C257 CAT28LV256 CAT28C512 CAT28C513	<b>Boot Block</b>	CAT22C10 CAT24C44
CAT24C01	CAT25010		CAT28F001	
CAT24C02	CAT25020		<b>Bulk Erase</b>	
CAT24C04	CAT25040		CAT28F512	
CAT24C08	CAT25080		CAT28F010	
CAT24C16	CAT25160		CAT28F020	
CAT24C164	CAT25320			
CAT24C32	CAT25640			
CAT24C64	CAT25128			
CAT24C128	CAT25256			
CAT24C256				
<b>I<sup>2</sup>C™ Bus, Full Array Write Protect No Address Input Pins</b>	<b>Microwire Bus</b>			
CAT24AA02	CAT93C46			
CAT24AA04	CAT93C46R			
CAT24AA08	CAT93C56			
CAT24AA16	CAT93C57			
	CAT93C66			
	CAT93C76			
	CAT93C86			
<b>I<sup>2</sup>C™ Bus, Partial Array Write Protect</b>				
CAT24C03				
CAT24C05				
<b>Application Specific EEPROM</b>				
CAT34C02				
CAT24C21				
CAT24C208				

Wide Range of EEPROMs, FLASH, NVRAM



## SERIAL EEPROMS

### CAT34C02 2-Kb I<sup>2</sup>C™ Serial EEPROM, Serial Presence Detect

#### FEATURES

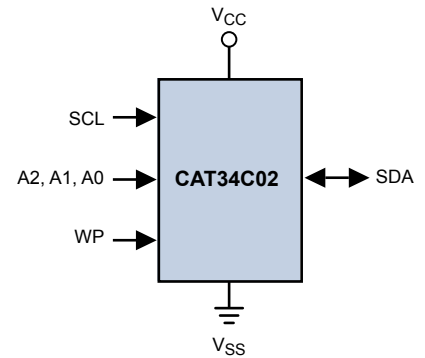
- ✓ Software Write Protection for first 128 Bytes
  - Permanent Software Write Protect (PSWP)
  - Reversible Software Write Protect (RSWP)
- ✓ Standard and Fast (400kHz) I<sup>2</sup>C™\* Protocol
- ✓ 1.7V to 5.5V Supply Voltage
- ✓ 16-Byte Page Write Buffer
- ✓ Hardware Write Protection for entire memory
- ✓ 1,000,000 Program/Erase Cycles
- ✓ 100 Year Data Retention

#### PACKAGE INFORMATION

- ✓ RoHS-compliant packages
  - TSSOP (Y)
  - TDFN 2 x 3mm (VP2)

#### APPLICATIONS

- DDR1 and DDR2 memory modules



\* I<sup>2</sup>C™ is a trademark of Philips Corporation. Catalyst Semiconductor is licensed by Philips Corporation to carry the I<sup>2</sup>C Bus Protocol.

#### CAT34C02 and Serial Presence Detect (SPD) for DDR2 Memory Modules

- **Permanent and Reversible Software Write Protect**
  - Compatible with JEDEC standard for the DDR2 DIMM memory market
- **PSWP backward compatible with DDR1 SPD**
  - $V_{CC} = 1.7V$  to  $5.5V$
- **RSWP is a temporary lock command for SPD**
  - Requires a High Voltage ( $V_{HV}$ ) on A0 pin
    - $V_{CC} = 1.7V$  to  $3.6V$
    - $V_{HV} = 7V$  to  $10V$ ; overdrive  $V_{HV} - V_{CC} > 4.8V$

	PIN			Slave Address							
Command	A2	A1	A0	B7	B6	B5	B4	B3	B2	B1	B0
Set PSWP	SA2	SA1	SA0	0	1	1	0	SA2	SA1	SA0	0
Set RSWP	0	0	$V_{HV}$	0	1	1	0	0	0	1	0
Clear RSWP	0	1	$V_{HV}$	0	1	1	0	0	1	1	0

## Serial EEPROMs Overview

- ✓ Complete Industry Standard Protocols:
  - I<sup>2</sup>C™: CAT24Cxxx Family
  - Microwire: CAT93Cxx Family
  - SPI™: CAT25xxx Family
- ✓ Wide  $V_{CC}$  Operating Range: 1.8V / 1.7V to 5.5V
- ✓ High Endurance: 1 million cycles
- ✓ Low Power
- ✓ Industrial and Extended Temperature Range
- ✓ RoHS-Compliant Packages with NiPdAu Finish
  - PDIP, TSSOP, SOIC, MSOP 8-Lead
  - TDFN, UDFN 8-Pad (2 x 3mm)
  - TSOT-23 5-Lead
- ✓ Chip Scale Package Solutions: contact factory for availability



**SERIAL EEPROMS**

**I<sup>2</sup>C™ Bus Serial EEPROM Family, Full Array Write Protect**

Part Number	Density (Organization)	Address Pins	V <sub>IN</sub> [V]	Max. Clock Frequency	Packages							Temperature Range	
					PDIP-8	SOIC-8 (JEDEC)	TSSOP-8	TDFN (2 x 3mm)	TDFN (3 x 3mm)	TDFN (3 x 4.9mm)	TSOT 23-5		
CAT24C01	1 Kb (128x8)	Yes	1.8 - 5.5	400 kHz	L	W	Y	VP2				TD	I, E
CAT24C02	2 Kb (256x8)	Yes	1.8 - 5.5	400 kHz	L	W	Y	VP2				TD	I, E
CAT24AA02	2 Kb (256x8)	No	1.7 - 5.5	400 kHz		W						TD	I
CAT24C04	4 Kb (512x8)	Yes	1.8 - 5.5	400 kHz	L	W	Y	VP2				TD	I, E
CAT24AA04	4 Kb (512x8)	No	1.7 - 5.5	400 kHz		W						TD	I
CAT24C08	8 Kb (1Kx8)	Yes	1.8 - 5.5	400 kHz	L	W	Y	VP2				TD	I, E
CAT24AA08	8 Kb (1Kx8)	No	1.7 - 5.5	400 kHz		W						TD	I
CAT24C16	16 Kb (2Kx8)	No	1.8 - 5.5	400 kHz	L	W	Y	VP2				TD	I, E
CAT24AA16	16 Kb (2Kx8)	No	1.7 - 5.5	400 kHz		W						TD	I
CAT24C164	16 Kb (2Kx8)	Yes	1.8 - 5.5	400 kHz	L	W	Y	VP2					I, E
CAT24C32	32 Kb (4Kx8)	Yes	1.8 - 5.5	400 kHz	L	W	Y	VP2					I, E
CAT24C64	64 Kb (8Kx8)	Yes	1.8 - 5.5	400 kHz	L	W	Y	VP2					I, E
CAT24C128	128 Kb (16Kx8)	Yes	1.8 - 5.5	400 kHz	L	W	Y	HU3 <sup>1</sup>					I, E
CAT24C256	256 Kb (32Kx8)	Yes	1.8 - 5.5	400 kHz	L	W	Y			ZD2			I, E

**I<sup>2</sup>C™ Bus Serial EEPROM Family, Partial Array Write Protect**

Part Number	Density (Organization)	V <sub>IN</sub> [V]	Max. Clock Frequency	Packages							Temperature Range	
				PDIP-8	SOIC-8 (JEDEC)	TSSOP-8	TDFN (2 x 3mm)	TDFN (3 x 3mm)	TDFN (3 x 4.9mm)	TSOT 23-5		
CAT24C03	2 Kb (256x8)	1.8 - 5.5	400 kHz	L	W	Y	VP2				TD	I, E
CAT24C05	4 Kb (512x8)	1.8 - 5.5	400 kHz	L	W	Y	VP2				TD	I, E

**I<sup>2</sup>C™ Bus Application Specific EEPROM**

Part Number	Density (Organization)	V <sub>IN</sub> [V]	Max. Clock Frequency	Packages							Temperature Range	
				PDIP-8	SOIC-8 (JEDEC)	TSSOP-8	TDFN (2 x 3mm)	TDFN (3 x 3mm)	TDFN (3 x 4.9mm)	TSOT 23-5		
CAT34C02	2 Kb (256x8)	1.7 - 5.5 <sup>2</sup>	400 kHz			Y	VP2					I
CAT24C21	1 Kb (128x8)	2.5 - 5.5	400 kHz	L	W	Y		ZD4				I, E
CAT24C208	8 Kb (1Kx8)	2.5 - 5.5	400 kHz		W							I

Notes:

1 UDFN (2 x 3mm)

2 CAT34C02 Reversible Software Write Protect Feature V<sub>CC</sub> = 1.7V to 3.6V

LED Drivers  
DC/DC Converters  
Linear Voltage Regulators  
Bus Products  
Voltage Supervisors  
Digital Potentiometers  
Serial EEPROMs  
Parallel EEPROMs  
FLASH Memories  
NVRAM

## SERIAL EEPROMS

### SPI Bus Serial EEPROM Family with Block Write Protection

Part Number	Density (Organization)	V <sub>IN</sub> [V]	Max. Clock Frequency / Min. V <sub>CC</sub>	Packages						Temperature Range
				PDIP-8	SOIC-8 (JEDEC)	TSSOP-8	TDFN (2 x 3mm)	SOIC-8 (EIAJ)	TDFN (3 x 4.9mm)	
CAT25010	1 Kb (128x8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y	VP2			I, E
CAT25020	2 Kb (256x8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y	VP2			I, E
CAT25040	4 Kb (512x8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y	VP2			I, E
CAT25080	8 Kb (1Kx8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y	VP2			I, E
CAT25160	16 Kb (2Kx8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y	VP2			I, E
CAT25320	32 Kb (4Kx8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y	VP2			I, E
CAT25640	64 Kb (8Kx8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y	VP2			I, E
CAT25128	128 Kb (16Kx8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y	VP2	X		I, E
CAT25256	256 Kb (32Kx8)	1.8 - 5.5	10MHz/2.5V, 5MHz/1.8V	L	V	Y		X	ZD2	I, E

### Microwire Bus Serial EEPROM Family

Part Number	Density (Organization)	V <sub>IN</sub> [V]	Max. Clock Frequency	Packages						Temperature Range
				PDIP-8	SOIC-8 (JEDEC)	SOIC-8 (EIAJ)	TSSOP-8	TDFN (2 x 3mm)	TDFN (3 x 3mm)	
CAT93C46	1 Kb (64x16/128x8)	1.8 - 5.5	2MHz	L	V / W <sup>1</sup>	X	Y	VP2		I, E
CAT93C46R	1 Kb (64x16/128x8)	1.8 - 5.5	2MHz	L	V / W <sup>1</sup>	X	Y	VP2		I, E
CAT93C56	2 Kb (128x16/256x8)	1.8 - 5.5	2MHz	L	V / W <sup>1</sup>	X	Y	VP2		I, E
CAT93C57	2 Kb (128x16/256x8)	1.8 - 5.5	2MHz	L	V / W <sup>1</sup>	X	Y	VP2		I, E
CAT93C66	4 Kb (256x16/512x8)	1.8 - 5.5	2MHz	L	V / W <sup>1</sup>	X	Y	VP2		I, E
CAT93C76	8 Kb (512x16/1024x8)	1.8 - 5.5	3MHz/2.5V, 1MHz/1.8V	L	V		Y		ZD4	I, E
CAT93C86	16 Kb (1024x16/2048x8)	1.8 - 5.5	3MHz/4.5V, 1MHz/2.5V, 0.5MHz/1.8V	L	V / W <sup>1</sup>	X	Y		ZD4	I, E

Note:

1 W = Rotated pinout with V<sub>CC</sub> on pin 2.

**PARALLEL EEPROMS**

Parallel EEPROMs										
Part Number	Density (Organization)	Access Time (ns)	I <sub>CC</sub> (Active/Standby)	V <sub>IN</sub> [V]	Packages (Pin Count)					Temperature Range
					PDIP	SOIC-JEDEC	SOIC-EIAJ	PLCC	TSOP	
CAT28C16A	16 Kb (2Kx8)	90, 120, 200	25mA/100µA	4.5 - 5.5	L (24)	W (24)	X (24)	G (32)		C, I, A
CAT28C17A	16 Kb (2Kx8)	90, 120, 200	25mA/100µA	4.5 - 5.5	L (28)	W (28)	X (28)	G (32)		C, I, A
CAT28C64B	64 Kb (8Kx8)	90, 120, 150	25mA/100µA	4.5 - 5.5	L (28)	W (28)	X (28)	G (32)	H13 (28)	C, I, A
CAT28C65B	64 Kb (8Kx8)	90, 120, 150	25mA/100µA	4.5 - 5.5	L (28)	W (28)	X (28)	G (32)	H13 (28)	C, I, A
CAT28LV64	64 Kb (8Kx8)	150, 200, 250	8mA/100µA	3.0 - 3.6	L (28)	W (28)	X (28)	G (32)	H13 (28)	C, I, A
CAT28LV65	64 Kb (8Kx8)	150, 200, 250	8mA/100µA	3.0 - 3.6	L (28)	W (28)	X (28)	G (32)	H13 (28)	C, I, A
CAT28C256	256 Kb (32Kx8)	120, 150	25mA/150µA	4.5 - 5.5	L (28)			G (32)	H13 (28)	C, I, A
CAT28C257	256 Kb (32Kx8)	120, 150	25mA/150µA	4.5 - 5.5	L (28)			G (32)		C, I, A
CAT28LV256	256 Kb (32Kx8)	200, 250, 300	15mA/150µA	3.0 - 3.6	L (28)			G (32)	H13 (28)	C, I, A
CAT28C512	512 Kb (64Kx8)	120, 150	50mA/500µA	4.5 - 5.5	L (28)			G (32)	H14 (32)	C, I, A
CAT28C513	512 Kb (64Kx8)	120, 150	50mA/500µA	4.5 - 5.5				G (32)		C, I, A

**FLASH**

Flash Memories – Boot Block									
Part Number	Density (Organization)	Access Time (ns)	I <sub>CC</sub> (Active/Standby)	V <sub>IN</sub> [V]	Packages (Pin Count)				Temperature Range
					PDIP	PLCC	TSOP	TSOP Reverse	
CAT28F001	1 Mb (128Kx8)	90, 120	30mA/100µA	5 - 12	L (32)	G (32)	H14 (32)		C, I, A

Flash Memories – Bulk Erase									
Part Number	Density (Organization)	Access Time (ns)	I <sub>CC</sub> (Active/Standby)	V <sub>IN</sub> [V]	PDIP	PLCC	TSOP	HR	Temperature Range
CAT28F512	512 Kb (64Kx8)	90, 120, 150	30mA/100µA	5 - 12	L (32)	G (32)	H14 (32)	HR (32)	C, I, A
CAT28F010	1 Mb (128Kx8)	90, 120	30mA/100µA	5 - 12	L (32)	G (32)	H14 (32)	HR (32)	C, I, A
CAT28F020	2 Mb (256Kx8)	90, 120	30mA/100µA	5 - 12	L (32)	G (32)	H14 (32)	HR (32)	C, I, A

**NVRAM**

NVRAM							
Part Number	Density (Organization)	Access Time (ns)	I <sub>CC</sub> (Active/Standby)	V <sub>IN</sub> [V]	Packages (Pin Count)		Temperature Range
					PDIP	SOIC-JEDEC	
CAT22C10	256 b (64x4)	200, 300	40mA/30µA	4.5 - 5.5	L (18)	W (16)	C, I, A
CAT24C44	256 b (16x16)	375	3mA/30µA	4.5 - 5.5	L (8)	V (8)	C, I, A

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