

TriMag IV

Triple Track Secure MagStripe Decoding ASIC

Three Track Decoding in a Small Footprint

TriMag IV is ID TECH's MSR decoding ASIC that is 5mm x 5mm, 36-pin component. It integrates MSR functions with the triple DES encryption engine, physical security protection hardware, and UART/SPI interface. Upon receipt of the magnetic head signals, the card data is recovered, encrypted, and transferred to the external interfaces via UART or SPI interface. The chip supports up to 3 tracks of card reading at the same time. Signal processing techniques are employed to recover F2F encoded MSR data reliably from head signals with severe fluctuation of signal amplitude, widely varying bit interval, and jittery bit position.

Security

The ASIC is able to take the incoming MSR data and encrypt it with the built-in Triple DES engine. Advanced DUKPT key management is supported, as well as hardware Random Number Generator. The ASIC contains an on-chip physical tamper, over/under voltage, over/under temperature detectors against attacks.

Additional Interfaces

In addition to the MSR signal processing, TriMag IV has an EMV compliant ISO 7816 smart card interface, and a bar code reader interface. It has three GPIO ports with 12mA driving capability for directly driving LED indicators and a beeper. A mobile phone audio jack interface with a micro-power signal detector is provided for the mobile phone communicating with TriMag IV via the earphone port.

Features and Benefits:

- Designed for decoding "real world" cards
- Compact size of 5mm x 5mm
- Supports TDES encryption and DUKPT key management
- PCI SRED compliant Security Protection circuits (Physical Tamper Detect, Over/Under Voltage, Over/Under Temperature)
- 96K Byte Code space and 6KB RAM
- UART and SPI interfaces
- Smart Card ISO 7816 UART
- 13 General Purpose I/O's (GPIO) with 4mA push-pull strength
- 3 General Purpose I/O's with 12mA push-pull strength, useful for LED and beeper
- Micro Power Signal Detection - Mobile phone audio jack interface
- Random Number Generator and Real Time Clock
- Low Power Mode: Sleep Mode 35 μ A, Shutdown Mode with tamper on <3 μ A, Battery Ship Mode <2 μ A

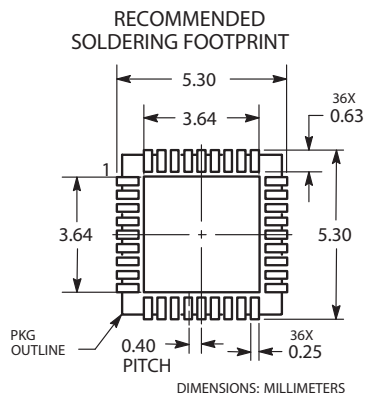


TriMag IV Specifications ICC288R

	TriMag IV	TriMag III
Size	5mm x 5mm	6mm x 6mm
Additional input reading	EMV compliant smart card & bar code reader	EMV compliant smart card & bar code reader
Hardware Encryption Engine	Yes	Yes
Interfaces	SPI and UART	SPI, UART, and USB
PCI SRED Security Features	On-chip physical tamper, over/under voltage, over/under temperature detectors	No
Mobile Phone Audio Jack Interface	Yes	No
Random Number Generator	Yes	No
Real Time Clock	Yes	No
MCU	32MHz 32bit ARM Cortex M0	12MHz 8 bit 8051
Code Space	96KB	64KB
RAM Space	6KB	4KB
Built-In EEPROM	Yes	No
Low Power Modes	Sleep: 35 μ A Shutdown Mode with tamper on: $< 3 \mu$ A Battery Ship Mode: $< 2 \mu$ A	Sleep: $< 150 \mu$ A

Recommended Operation Conditions

Symbol	Parameter	Min	Type	Max	Units
VDD3	3.3V DC Supply	2.5		3.6	V
VBAT	3.3V Battery Supply	2.5		3.7	V
I _{dd32M}	CPU working current @ 32 MHz		12.92		mA
I _{dd8m}	CPU working current @ 8 MHz		4.09		mA
I _{dd4m}	CPU working current @ 4 MHz		2.43		mA
I _{ddMSR}	3 Track MSR decode current @1M		1.5		mA
I _{ddslp2}	Sleep Mode (50kHz)		30		μ A
I _{ddsl1}	Shut Down Current with Tamper on		2		μ A
I _{ddsl2}	Power Down Keep Code		1		μ A
I _{ddbat}	Battery ship mode current		1		μ A
VSS	Analog/Digital Ground			0	V
T _a	Ambient Temperature	-40		85	°C
T _j	Junction Temperature	-40		90	°C



Pin Descriptions

Pin #	Name	Pad Description
1	HDA1	Magnetic head input 1 (+) track A
2	HDA2	Magnetic head input 2 (-) track A
3	HDB1	Magnetic head input 1 (+) track B
4	HDB2	Magnetic head input 2 (-) track B
5	HDC1	Magnetic head input 1 (+) track C
6	HDC2	Magnetic head input 2 (-) track C
7	VSS	Ground pin
8	TAMP_IN	Tamper in
9	VDD18	1.8V supply for digital. External decoupling capacitor for internal 1.8V regulator
10	VBAT	3.0V Battery voltage used for "battery ship" mode.
11	VDD3	3.3V power pin.
12	COMP	Micro Power Signal Detector
13	RESETN	External Reset In. Active low. This will power down all of the analog, digital, and power management.
14	TX	TXD for UART0. Alternative function is GPIO11
15	RX	RXD for UART0. Alternative function is GPIO10. (Also Connect to WIC)
16	LEDG	Green LED, 8mA GPIO3, Compare0 Output
17	LEDR	Red LED, 8mA GPIO4, Compare1 Output
18	BEEP	BEEP, 8mA GPIO5, Compare2 Output
19	TCNT	Timer Count, 4mA GPIO6
20	TCAP	Capture Input, 4mA GPIO7
21	GPIO0	General Purpose, 4mA GPIO0 (Also Connect to WIC via NMI)
22	GPIO1	General Purpose, 4mA GPIO1
23	VSS	Ground pin
24	TEST	TEST mode input
25	SPCLK	SPI Clock. Alternative function is GPIO12
26	MOSI	SPI data (Master Out/Slave In). Alternative function is GPIO13
27	MISO	SPI data (Master In/Slave Out). Alternative function is GPIO14
28	NCS	SPI chip select not. Alternative function is GPIO15. (Also Connect to WIC)
29	GPIO2	General Purpose, 4mA GPIO2
30	SWDIO	Serial Wire Data
31	SWCLK	Serial Wire Clock.
32	SMIO	UART1 RXD/TXD for Smart Card I/O. Alternative function is GPIO9.
33	SMCLK	Output clock for Smart Card. Alternative function is GPIO8
34	TAMP_OUT_	Tamper out
35	XTL_IN	32K Crystal Input
36	XTL_OUT	32K Crystal Output