

NMF3506

Advance Information

RF Filtering and ESD Protection on I²C Bus and Digital Line, Thermal Shutdown and Power Switch with Short Circuit Protection

The NMF3506 interfaces with mobile phone accessories using I²C bus. It includes two I²C line filters and a general purpose digital line filter. It is compliant with EMC international standards required for cellular phones and portable equipment. It also includes a low voltage drop power switch to control the accessory supply. It has safety features such as thermal shutdown and main switch short circuit protection. All I/O are ESD protected according to the stringent IEC 61000-4-2 international standard.

Features

- ESD Protection IEC 61000-4-2 Level 4 (V_{batt} and Output Pins)
- ESD Protection IEC 61000-4-2 Level 1 (All I/O)
- RF Filtering (800 MHz-6.0 GHz): -25 dB
- RF Filtering (1.0 GHz-2.5 GHz): -30 dB
- Power Switch: 120 mA (<200 mV)
- Voltage Drop Across Power Switch: <200 mV
- Controlled I²C Bias
- Low Quiescent Current, 10 μ A_{off}, 100 μ A_{on}
- 15 Bump Flip-Chip Direct Chip Attach:
2.1 mm x 2.1 mm x 0.65 mm
- This is a Pb-Free Device

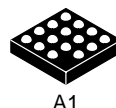
Typical Application

- Cellular Phones
- Portable Equipment



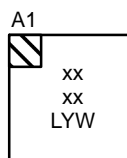
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FLIP-CHIP 15 CSP
CASE TBD

MARKING DIAGRAM



xx = Specific Device Code
L = Wafer Lot
Y = Year
W = Work Week

ORDERING INFORMATION

Device	Package	Shipping†
NMF3506FCT1G	Flip-Chip	3000 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

This document contains information on a new product. Specifications and information herein are subject to change without notice.

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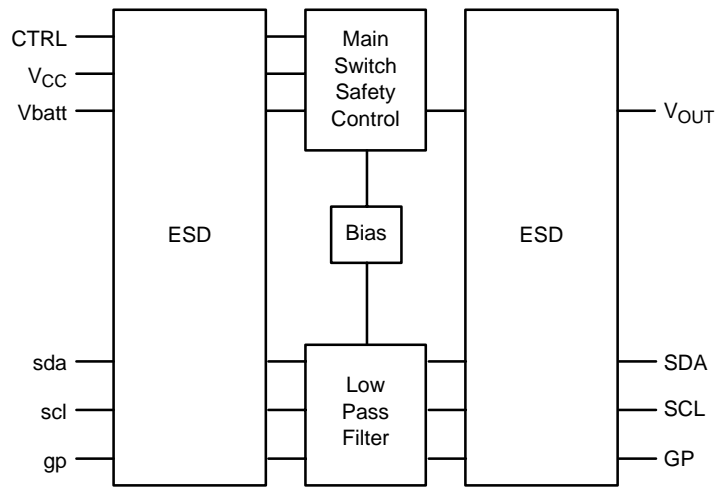


Figure 1. Simplified Block Diagram

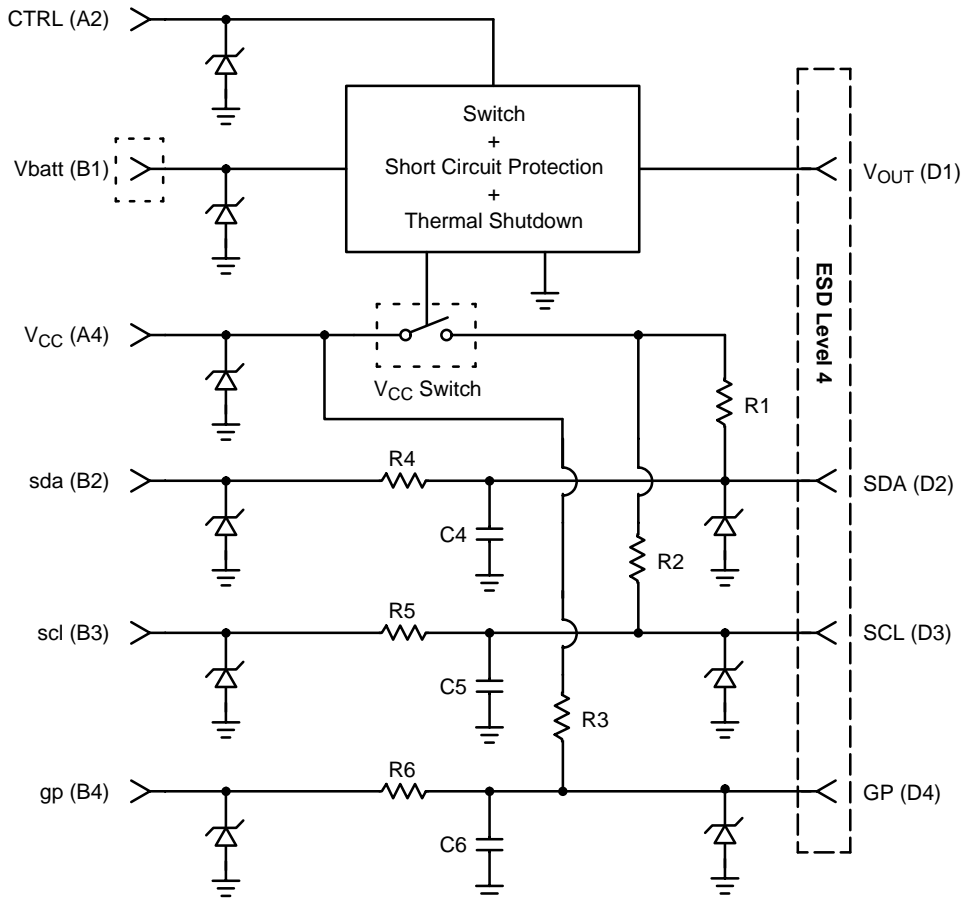


Figure 2. Schematic

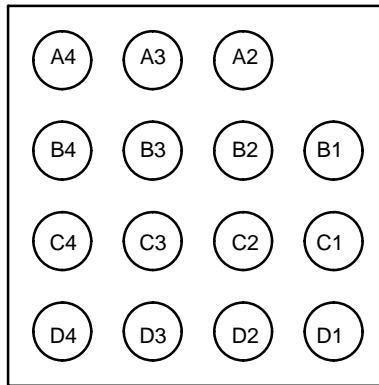
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PIN FUNCTION DESCRIPTION

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A4	V _{CC}	A3	GND	A2	CTRL	A1	–
B4	gp	B3	scl	B2	sda	B1	V _{batt}
C4	GND	C3	GND	C2	GND	C1	GND
D4	GP	D3	SCL	D2	SDA	D1	V _{OUT}

ESD Level 1

ESD Level 4



Bump Side Up

Figure 3. Pin Configuration

MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Junction Temperature	T _J	150	°C
Operating Temperature Range	T _{OP}	–40 to +85	°C
Storage Temperature Range	T _{stg}	–55 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
ESD Structure Breakdown Voltage (I _R = 1.0 mA)	V _{BRES}	6.0	–	20	V
ESD Structure Leakage Current (Per Line) (V _{RM} = 3.0 V)	I _R	–	–	0.1	μA
ESD Discharge IEC61000–4–2 Level 1 Air ESD Discharge IEC61000–4–2 Level 1 Contact Machine Model (For CTRL, V _{CC} , sda, scl, gp Pins)	V _{PP}	2.0 2.0 0.2	– – –	– – –	kV
ESD Discharge IEC61000–4–2 Level 4 Air ESD Discharge IEC61000–4–2 Level 4 Contact Machine Model (For V _{batt} , V _{OUT} , SDA, SCL, GP Pins)	V _{PP}	15 8.0 0.2	– – –	– – –	kV
Line Capacitance	C _L	37	46	55	pF
I ² C Filter Bias Resistors R1, R2 Ambient Temperature –40 to 85°C Temperature Range	RB _{I2C} AMB	1.8	2.0	2.2	kΩ
	RB _{I2C}	1.4	2.0	2.6	kΩ
GP Filter Bias Resistors R3 Ambient Temperature –40 to 85°C Temperature Range	RB _{GP} AMB	90	100	110	kΩ
	RB _{GP}	70	100	130	kΩ
I ² C Filter Resistors R4, R5 Ambient Temperature –40 to 85°C Temperature Range	R _{I2C} AMB	90	100	110	Ω
	R _{I2C}	70	100	130	Ω
GP Filter Resistor R6 Ambient Temperature –40 to 85°C Temperature Range	R _{GP} AMB	225	250	275	Ω
	R _{GP}	175	250	325	Ω
Stopband Rejection, R _S = R _L = 50 Ω Freq = 0.8 GHz to 6.0 GHz Freq = 1.0 GHz to 2.5 GHz	SB _{REJ1}	–25	–	–	dB
	SB _{REJ2}	–30	–	–	dB
Crosstalk Rejection, R _S = R _L = 50 Ω Freq = 1.0 kHz to 0.8 GHz Freq = 0.8 GHz to 6.0 GHz	XT _{REJ1}	–	–	–30	dB
	XT _{REJ2}	–	–	–20	dB
V _{batt} Input Voltage	V _{batt} _{in}	2.8	–	5.5	V
Voltage Drop from V _{batt} to V _{OUT} @ I _{out} = 120 mA	V _{batt} _{DROP}	–	–	200	mV
Thermal Shutdown Rising Threshold	TSD _{up}	150	–	–	°C
Thermal Shutdown Falling Threshold	TSD _{dn}	85	–	–	°C
Thermal Shutdown Hysteresis	TSD _{hyst}	10	–	–	°C
V _{OUT} Current V _{batt} _{DROP} < 200 mV	I _{OUT}	–	–	120	mA
V _{OUT} Short Circuit Current	I _{OUT} _{SC}	–	–	200	mA
V _{CC} Input Voltage	V _{CC}	1.7	1.8	1.95	V
Voltage Drop in V _{CC} Switch	V _{CC} _{DROP}	–	–	120	mV
Input CTRL Voltage High = ON	V _{CTRL} _{HI}	0.7xV _{CC}	–	V _{CC} +0.3	V
Input CTRL Voltage Low = OFF	V _{CTRL} _{LO}	0.0	–	0.3xV _{CC}	V
Quiescent Current (I _{Vbatt} +I _{VCC}) Load < 100 μA CTRL = 1.0	I _{QON}	–	–	100	μA
Quiescent Current (I _{Vbatt} +I _{VCC}) CTRL = 0 Does Not Include I _{2K} and I _{100K}	I _{QOFF}	–	–	10	μA

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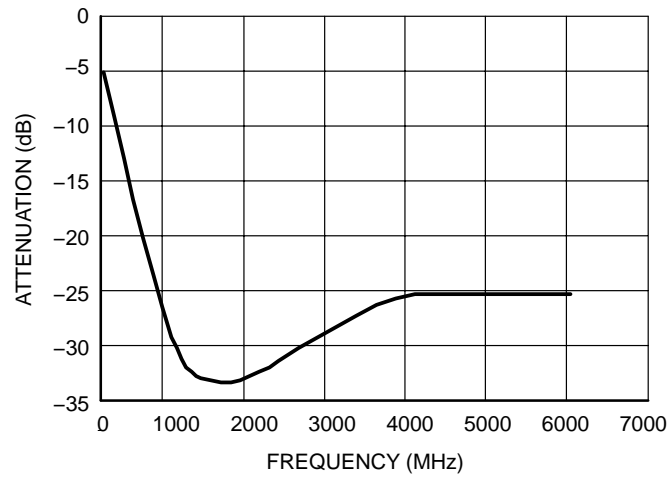
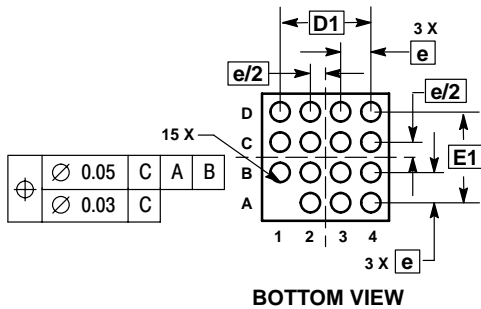
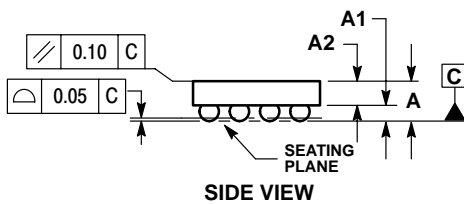
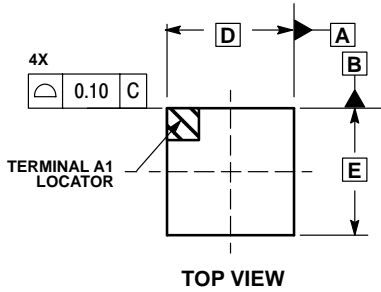


Figure 4. S21 Characteristic

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PACKAGE DIMENSIONS


FLIP-CHIP 15 CSP CASE TBD ISSUE O



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS IN COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

DIM	MILLIMETERS	
	MIN	MAX
A	---	0.660
A1	0.210	0.270
A1	0.380	0.430
D	2.100 BSC	
E	2.100 BSC	
b	0.290	0.340
e	0.500 BSC	
D1	1.500 BSC	
E1	1.500 BSC	

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