

5A, 2.1MHz, Synchronous Buck Converter

FEATURES

- Input Voltage Range :2.5V~5.5V
- Up to 5A Output Current
- PFM at Light Load
- Typical 50µA Quiescent Current in Light Load PFM Mode
- 2.1MHz Switching Frequency
- 0.6V±2% Reference Voltage
- Integrated Soft-Start
- Input UVLO and OVP
- Build in Thermal Shutdown and OCP
- 0.25µH Inductor Support
- Compact WLCSP-20 Package

GENERAL DESCRIPTION

STI8071 is a high efficiency, 2.1MHz, Synchronous Buck converter that operates in wide input voltage range from 2.5V to 5.5V. Very low standby current ensure high efficiency in light load PFM mode. A COT (Constant On-Time) structure is adaptive to achieve the fixed switching frequency and fast load transient response. STI8071 provides up to 5A output current with Integrated 28mΩ(high side) and 18mΩ(low side) power switch. STI8071 also implement an internal soft-start and cycle-by-cycle over current protection function. In addition, the input UVLO and OVP protection, Thermal shutdown protection.

APPLICATIONS

- Smart Phones
- DSP or CPUs Processors
- Tablet, MID

APPILICATIONS

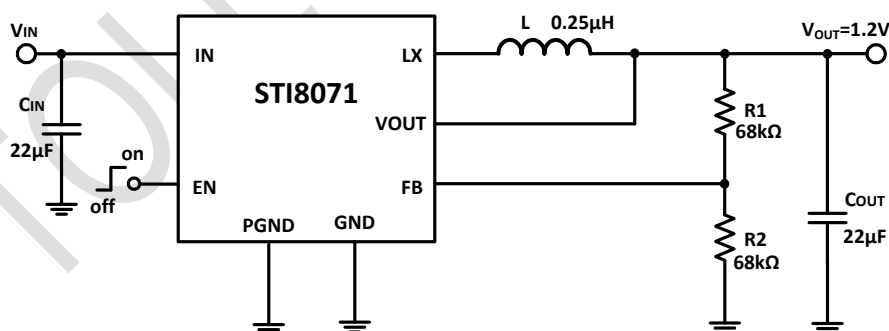
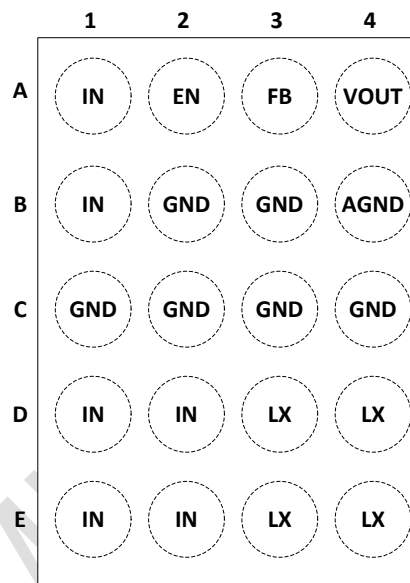


Figure 1. Basic Application Circuit

ABSOLUTE MAXIMUM RATINGS (Note 1)

Parameter	Value	Unit
ALL Voltage Range	-0.3~6.5	V
Junction Temperature <small>(Note2)</small>	-40~150	°C
Storage Temperature	-65~150	°C
Junction-to-ambient Thermal Resistance	38	°C/W
Junction-to-case Thermal Resistance	9	°C/W
Power Dissipation	2.6	W

PACKAGE/ORDER INFORMATION



WLCSP-20

Top Mark: S71XXX (S71: Device Code, XXX: Inside Code)

Part Number	Package	Top mark	Quantity/ Reel
STI8071	WLCSP-20	S71XXX	3000

STI8071 devices are Pb-free and RoHS compliant.

PIN DESCRIPTIONS

Pin	Name	Function
A1 B1	IN	Power input pin, Connect to input capacitor
A2	EN	Enable pin, 0: Shut down, 1: Enable
A3	FB	Output Voltage Feedback Pin.
A4	OUT	Output voltage sense pin, Connect to output capacitor
B2~B3 C1~C4	GND	Power Ground pins
B4	AGND	Analog Ground pin
D1~B2 E1~E2	IN	Power input pin, Connect to input capacitor
D3~B4 E3~E4	LX	Switching Pin, Connect to external Inductor

ESD RATING

Items	Description	Value	Unit
V_{ESD}	Human Body Model for all pins	± 2000	V

JEDEC specification JS-001
RECOMMENDED OPERATING CONDITIONS

Items	Description	Min	Max	Unit
Voltage Range	IN	2.5	5.5	V
T_A	Operating Temperature Range	-40	85	°C

ELECTRICAL CHARACTERISTICS

($V_{IN} = 3.6V$, $V_{OUT} = 1V$, $T_A = 25^{\circ}C$, unless otherwise noted.)

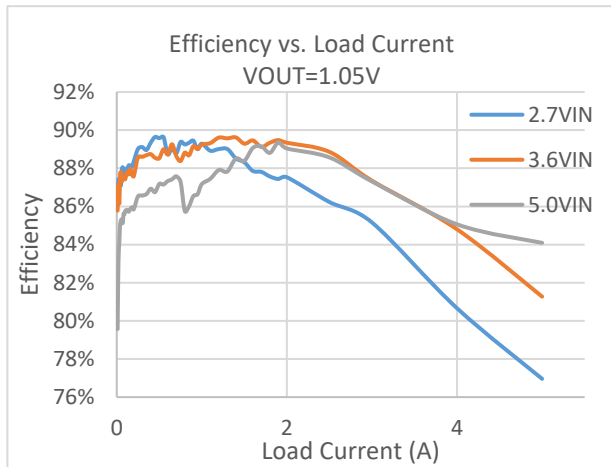
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		2.5		5.5	V
Under Voltage Lockout	V_{UVLO}	Vin rising		2.45		V
UVLO Hysteresis	V_{UVLO_HY}			100		mV
Input OVP Voltage	V_{INOVP}	Vin rising		6.15		V
Input OVP Hysteresis	V_{OVP_HY}			400		mV
OVP blank time	T_{OVP_BT}			20		μs
Feedback Voltage Accuracy	V_{FB}	Vin=3.6V	0.588	0.600	0.612	V
Input Supply Current	I_{IN}	EN=1, $I_{load}=0$, $V_{out}>105\%*V_{FB}$		50		μA
Input Shutdown current	I_{SDN}	EN=0		0.1	1	μA
EN Logic high Threshold	V_{INH}		1.1			V
EN Logic low Threshold	V_{INL}				0.4	V
PFET peak Current limit	I_{LIM_MAX}		6.7			A
Switch On-Resistance (high side)	R_{DSONH}			28		m Ω
Switch On-Resistance (low side)	R_{DSONL}			18		m Ω
Switching Frequency	F_{osc}			2.1		MHz
Minimum Turn-on Time	T_{ON_MIN}			52		ns
Soft-start Time	T_{sst}			300		μs
Thermal Shutdown Threshold (Note 3)	T_{SDN}	Thermal rising		165		$^{\circ}C$
Thermal Shutdown Hysteresis (Note 3)	T_{SDN_HY}			30		$^{\circ}C$

Note 1: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

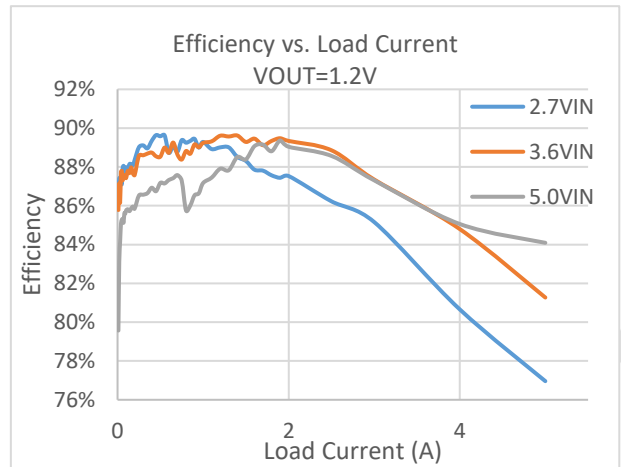
Note 2: T_J is calculated from the ambient temperature T_A and power dissipation P_D according to the following formula: $T_J = T_A + (P_D) \times \theta_{JA}$.

Note 3: Thermal shutdown threshold and hysteresis are guaranteed by design.

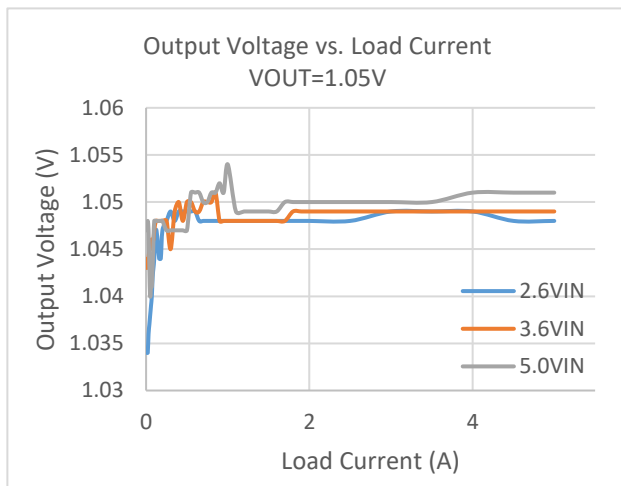
Typical Characteristics



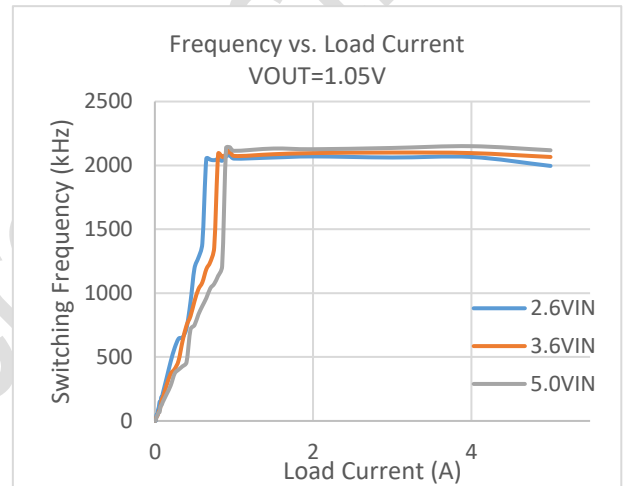
Efficiency vs. Load Current



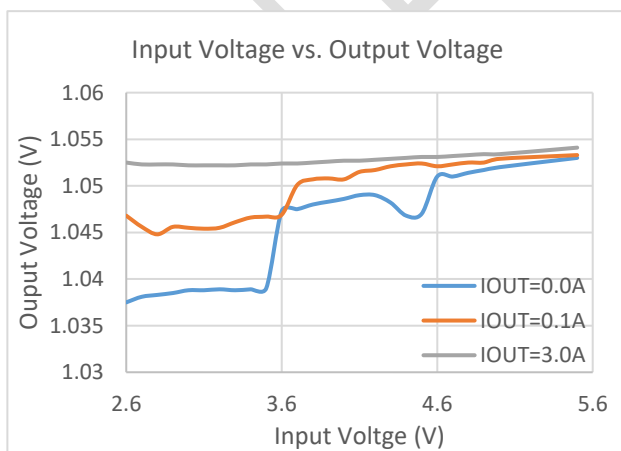
Efficiency vs. Load Current



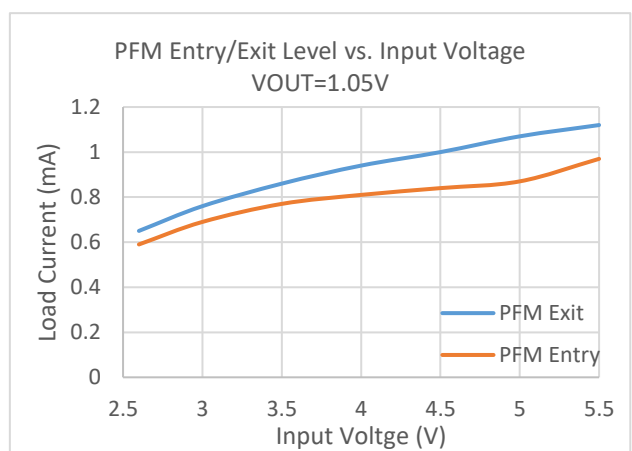
Load Current vs. Output Voltage



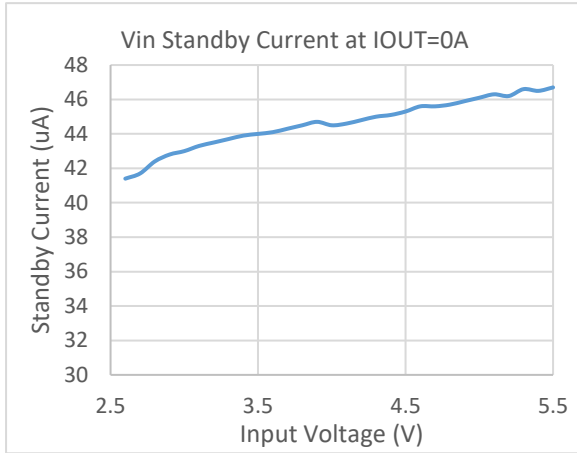
Frequency vs. Load Current



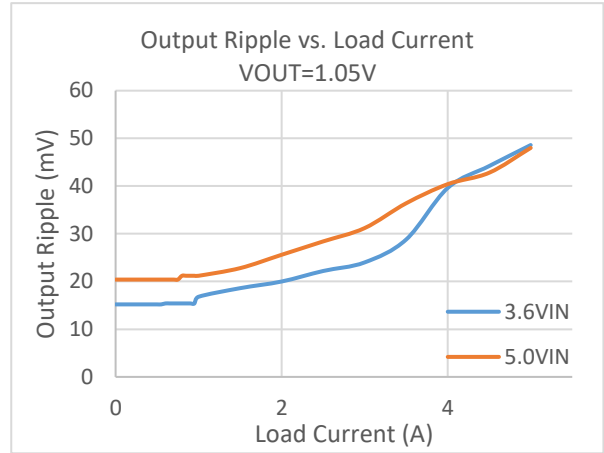
Input Voltage vs. Output Voltage



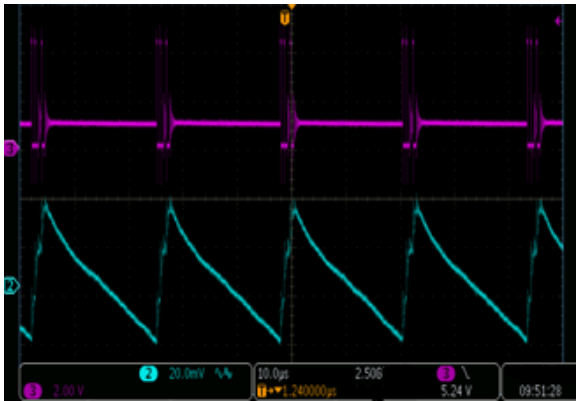
PFM Entry/Exit Level vs. Input Voltage



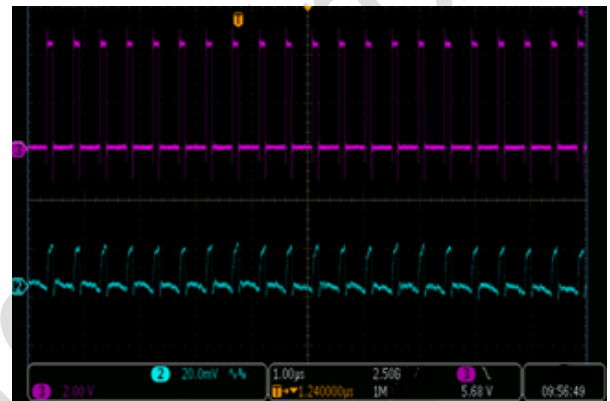
Standby Current Vs Input Voltage



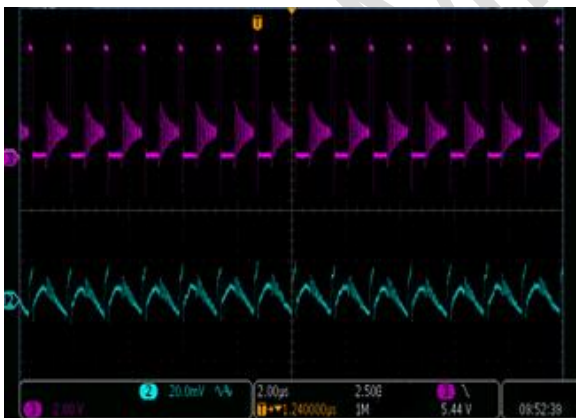
Output Ripple vs. Load Current



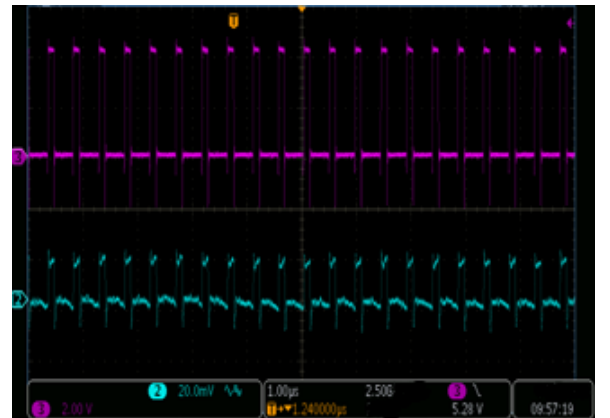
V_{IN}=5V, I_{OUT}=0.1A Ripple Waveform



V_{IN}=5V, I_{OUT}=1.0A Ripple Waveform

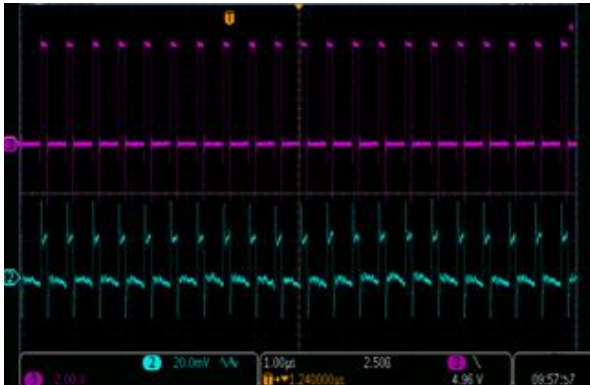


V_{IN}=5V, I_{OUT}=0.5A Ripple Waveform

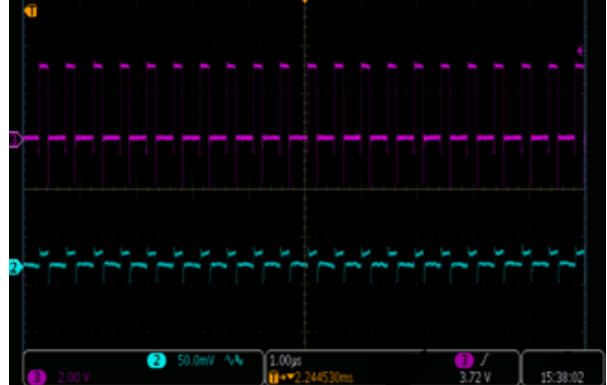


V_{IN}=5V, I_{OUT}=3.0A Ripple Waveform

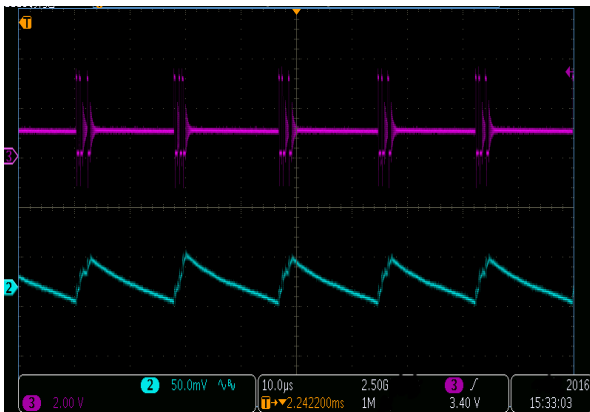
Typical Characteristics (Continued)



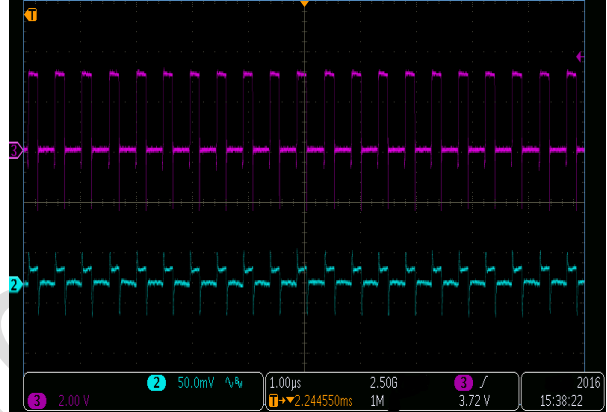
$V_{IN}=5V, I_{OUT}=5.0A$ Ripple Waveform



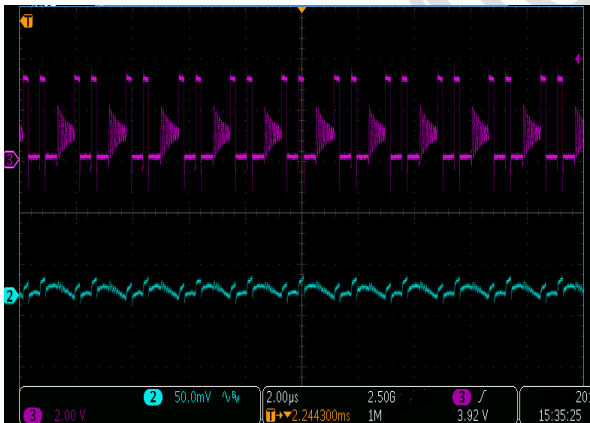
$V_{IN}=3.6V, I_{OUT}=3.0A$ Ripple Waveform



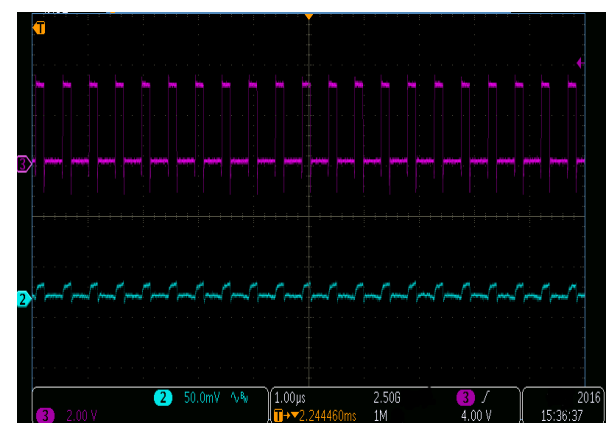
$V_{IN}=3.6V, I_{OUT}=0.1A$ Ripple Waveform



$V_{IN}=3.6V, I_{OUT}=5.0A$ Ripple Waveform

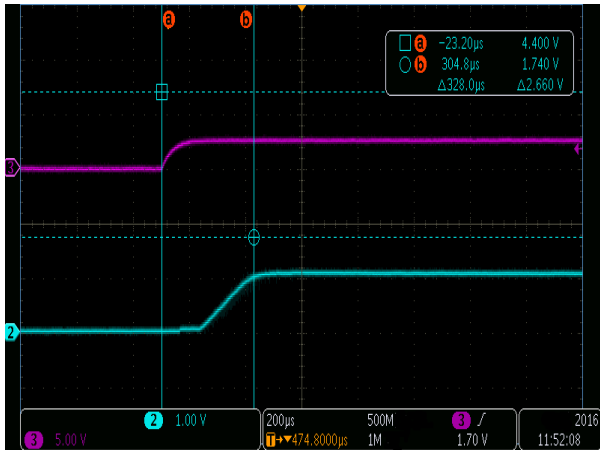


$V_{IN}=3.6V, I_{OUT}=0.6A$ Ripple Waveform

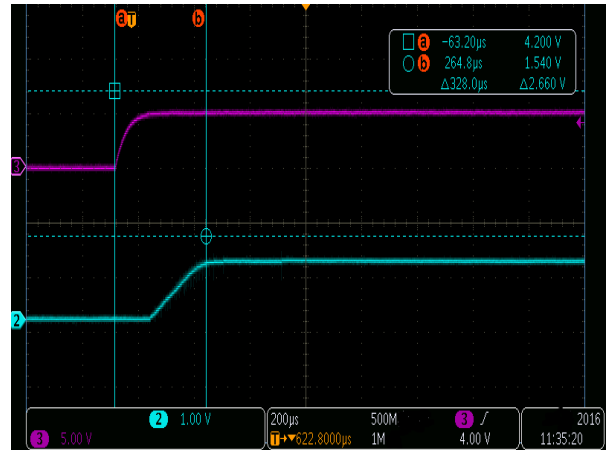


$V_{IN}=3.6V, I_{OUT}=1.0A$ Ripple Waveform

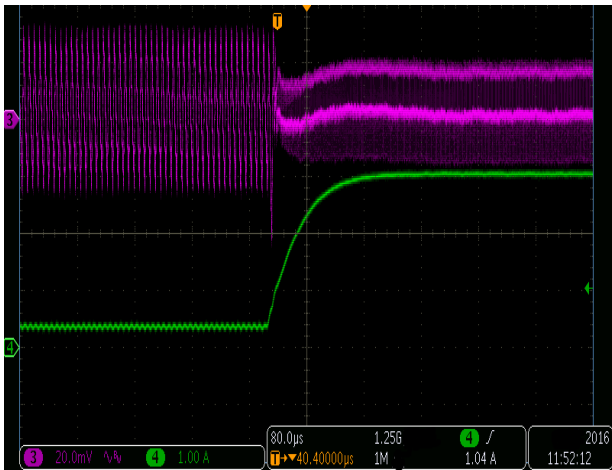
Typical Characteristics (Continued)



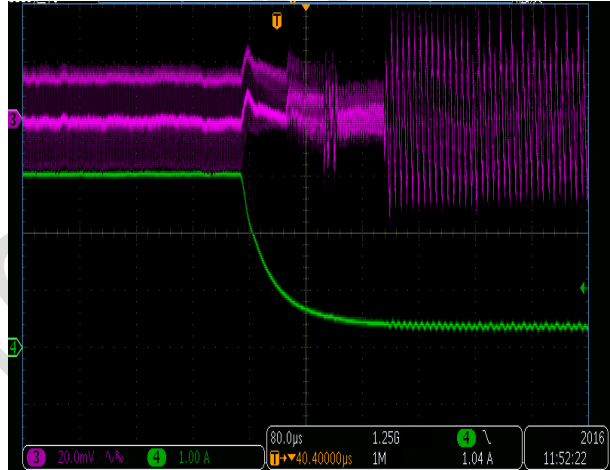
Soft-Start Waveform $V_{IN}=2.6V$, $I_{OUT}=0$



Soft-Start Waveform $V_{IN}=5.0V$, $I_{OUT}=0$



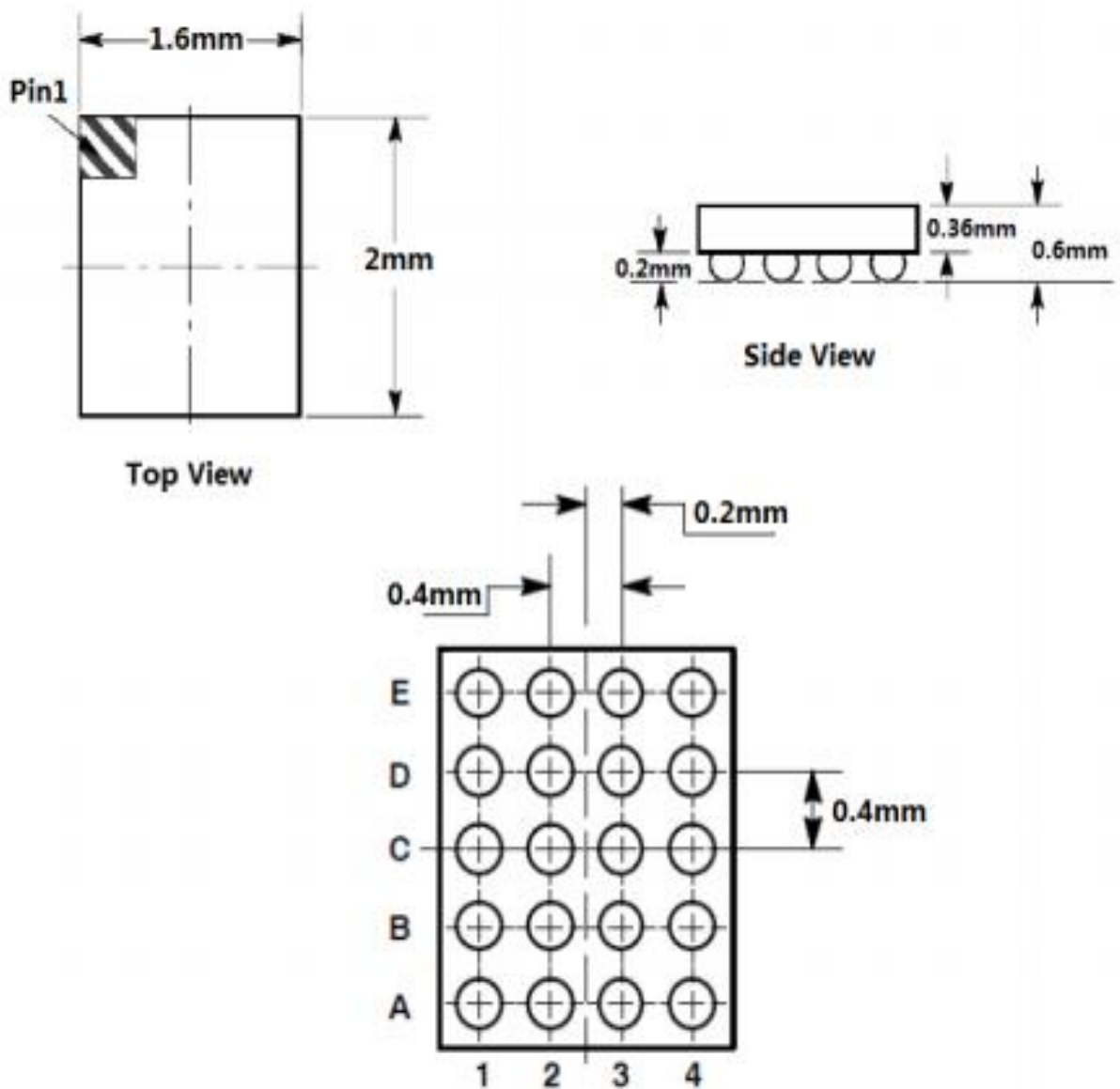
Load Transient from 0.3A to 3A



Load Transient from 3A to 0.3A

PACKAGE INFORMATION

WLCSP-20



WLCSP-20

Note:

- 1) All dimensions are in millimeters.
- 2) Package length does not include mold flash, protrusion or gate burr.
- 3) Package width does not include inter lead flash or protrusion.
- 4) Lead popularity (bottom of leads after forming) shall be 0.10 millimeters max.
- 5) Pin 1 is lower left pin when reading top mark from left to right.