

Tiny Package, High Efficiency, Step-up DC/DC Converter

● Features

- 1.0V Low Start-up Input Voltage
- High Supply Capability to Deliver 3.3V 100mA with 1 Alkaline Cell
- 17 μ A Quiescent (Switch-off) Supply Current
- Zero Shutdown Mode Supply Current
- 90% Efficiency
- 450KHz Fixed Switching Frequency
- Providing Flexibility for Using Internal and External Power Switches
- Small SOT23-6L & SOT89-5L Package

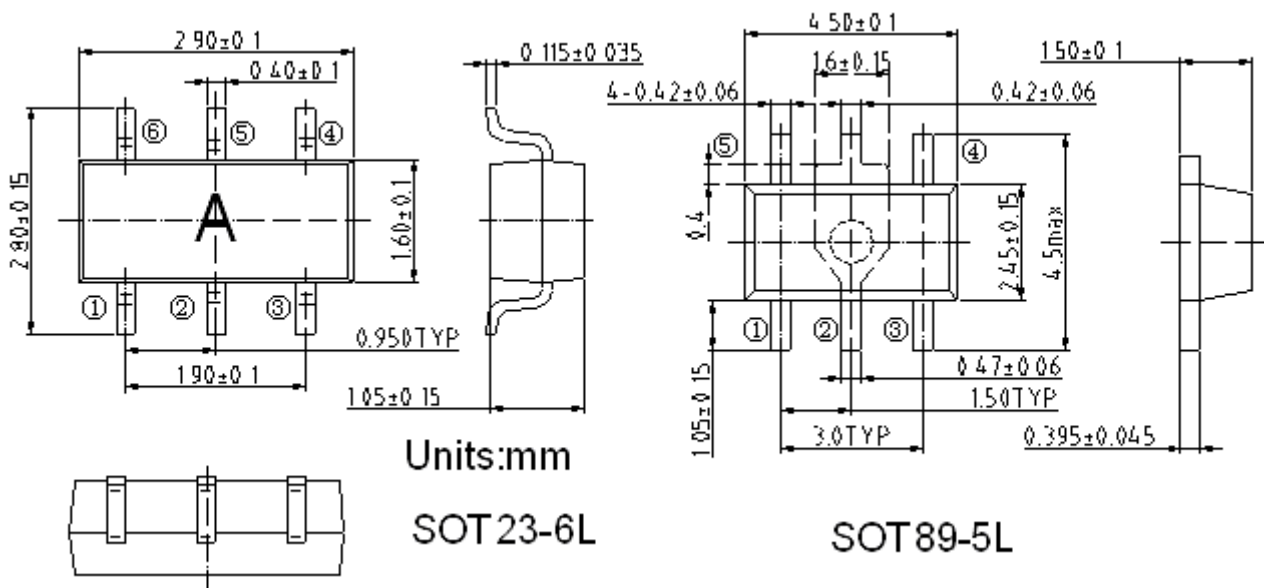
● Applications

- PDA
- DSC
- LCD Panel
- RF-Tags
- MP3
- Portable Instrument
- Wireless Equipment

● Applications

The TG1603 is a compact, high efficiency, and low voltage step-up DC/DC converter with an Adaptive Current Mode PWM control loop, includes an error amplifier, ramp generator, comparator, switch pass element and driver in which providing a stable and high efficient operation over a wide range of load currents. It operates in stable waveforms without external compensation. The low start-up input voltage below 1V makes TG1603 suitable for 1 to 4 battery cells applications of providing up to 300mA output current. The 450kHz high switching rate minimized the size of external components. Besides, the 17 μ A low quiescent current together with high efficiency maintains long battery lifetime. The output voltage is set with two external resistors.

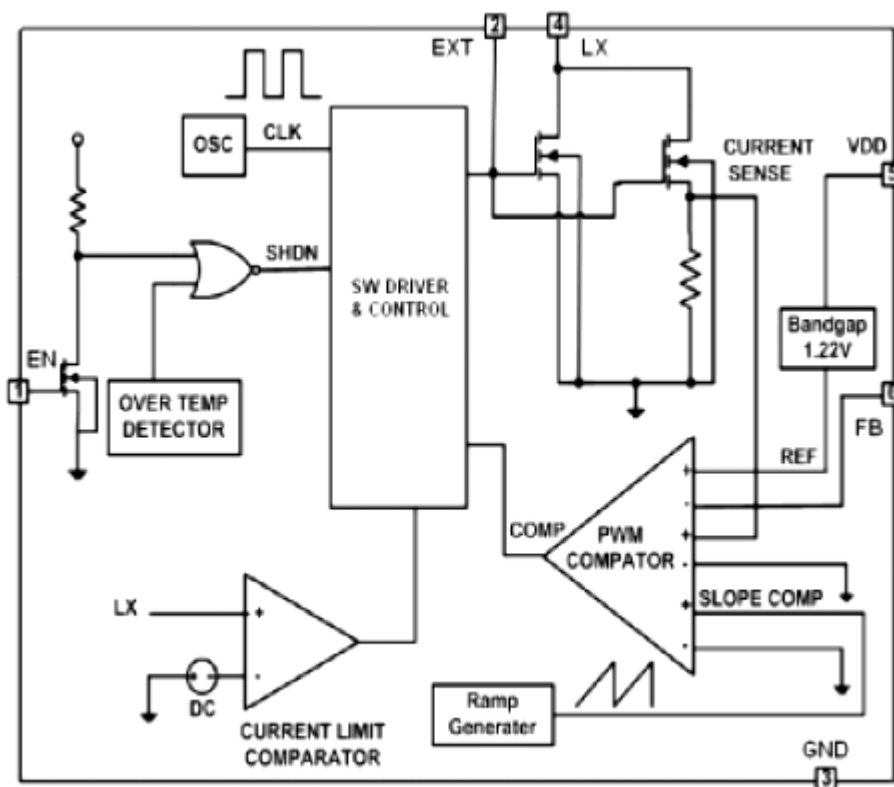
● Package Information



● Pin Configurations

Pin Port		Pin Name	Pin Function
TG1603SN	TG1603SL		
①	①	EN	Chip enable TG1603 gets into shutdown mode when CE pin set to low.
-	②	EXT	Output pin for driving external NMOS
⑤	③	GND	Ground
④	④	LX	Pin for switching
②	⑤	VDD	Input positive power pin of TG1603
③	⑥	FB	Feedback input pin Internal reference voltage for the error amplifier is 1.23V.

● Functional Block Diagram



TG1603

● Ordering Information

TG1603-①②

DESIGNATOR	SYMBOL	DESCRIPTION
①②	Package Type:	SL: SOT23-6L SN: SOT89-5L

● **Absolute Maximum Ratings**

Parameter	Symbol	Ratings	Units
Supply Voltage	VDD	-0.3 to 6V	V
LX Switch Voltage	-	-0.3 to 6V	V
Other I/O Pin Voltage	-	-0.3 to (VDD+0.3V)	V
LX Pin Current	-	2.5	A
EXT Pin Output Current	-	200	mA
Power Dissipation (T _{AMB} = 25°C)	PD	SOT89-5L	500
		SOT23-6L	400
Operating Temperature Range	T _{opr}	-25 to +125	°C
Storage Temperature Range	T _{stg}	-65 to +150	°C

● **Electrical Characteristics**

(V_{IN} = 1.5V, VDD set to 3.3V, Load Current = 0, T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Start-UP Voltage	VST	I _L =1mA	-	0.98	1.05	V
Operating VDD Range	VDD	VDD pin voltage	2	-	6	V
Shutdown Current I (VDD)	IOFF	IO _{UT} = 1mA, V _{IN} : 0 → 2V	-	0.01	1	μA
Switch-off Current I (VDD)	ISWITCH OFF	V _{IN} = 6V	-	35	50	μA
Continuous Switching Current(VDD)	ISWITCH	VDD = V _{EN} = 3.3V, V _{FB} = GND	-	0.4	0.6	mA
No Load Current I (VDD)	INO LOAD	V _{IN} = 1.5V, V _{OUT} = 3.3V	-	110	-	mA
Feedback Reference Voltage	VREF	Close Loop, VDD = 3.3V	1.190	1.220	1.250	V
Switching Frequency	FS	VDD = 3.3V	425	500	575	KHz
Maximum Duty	DMAX	VDD = 3.3V	85	90	-	%
LX ON Resistance	-	VDD = 3.3V	0.3	0.3	1.1	-
Current Limit Setting	ILIMIT	VDD = 3.3V	-	2	2.5	A
EXT ON Resistance to VDD	-	VDD = 3.3V	-	11	15	-
EXT OFF Resistance to GND	-	VDD = 3.3V	-	11	15	-
Line Regulation	VLINE	V _{IN} = 1.5 ~ 3V, I _L = 1mA	-	1.5	10	MV/V
Load Regulation	VLOAD	V _{IN} = 2.5V, I _L = 1 ~ 100mA	-	0.25	-	Mv/mA
EN Pin Trip Level	-	VDD = 3.3V	0.4	0.8	1.2	V
Temperature Stability for Vout	TS	-	-	50	-	Ppm/°C
Thermal Shutdown Hysterises	TSD	-	-	10	-	°C

- Typical Application Circuit

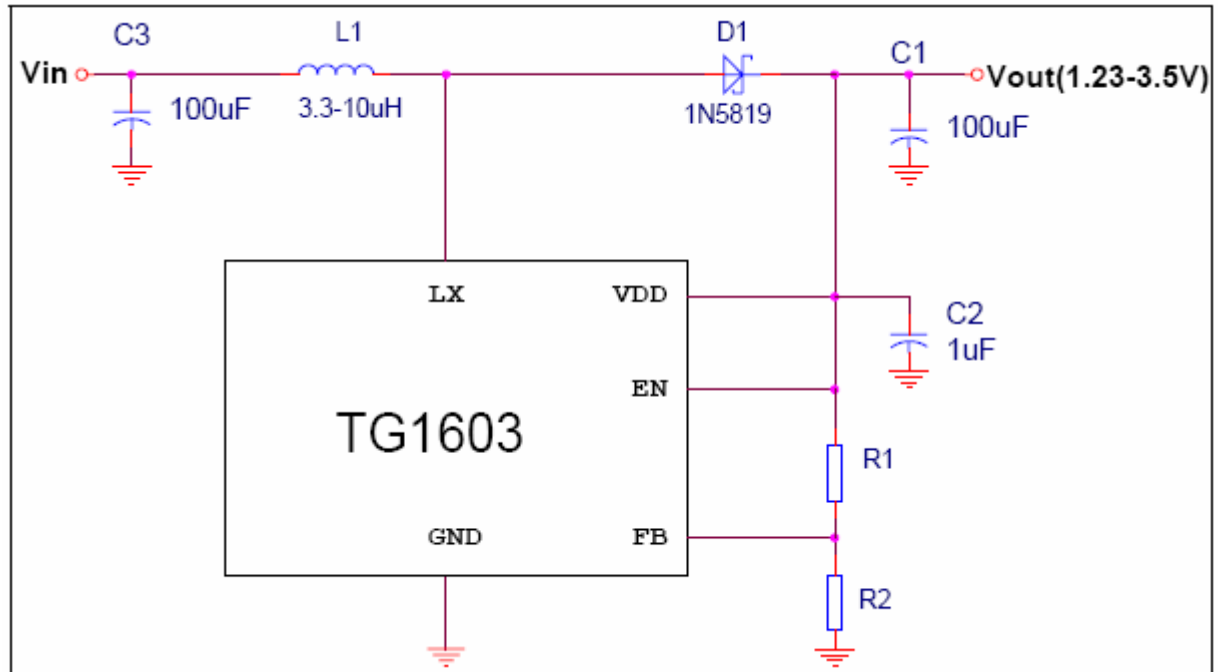


Figure 1. TG1603 T typical Application for Portable Instruments

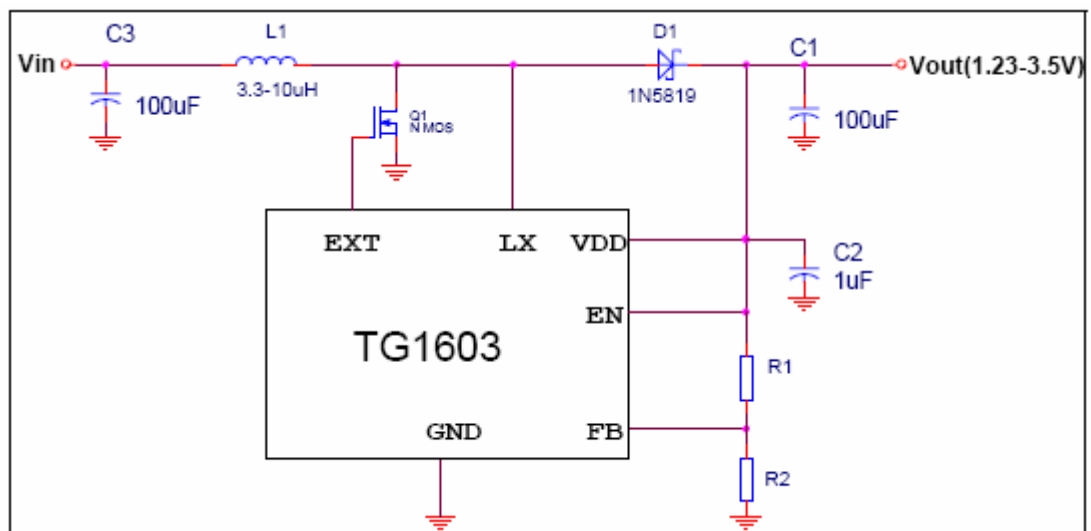
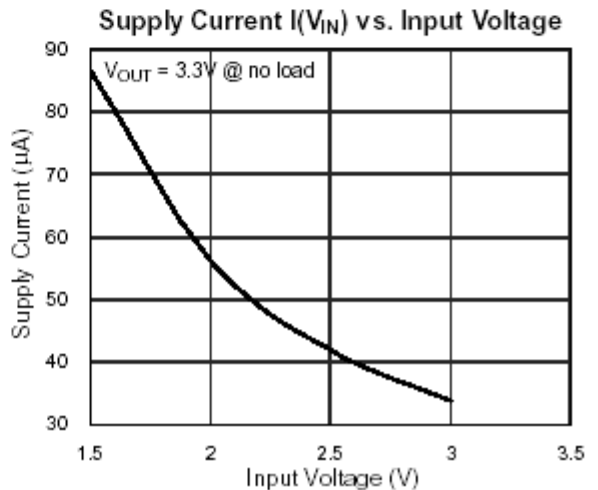
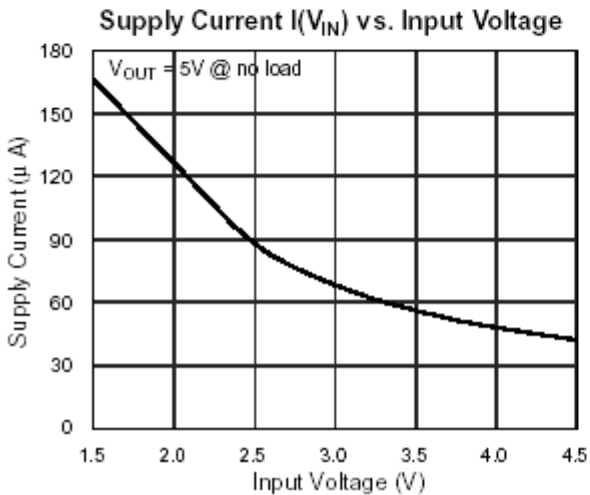
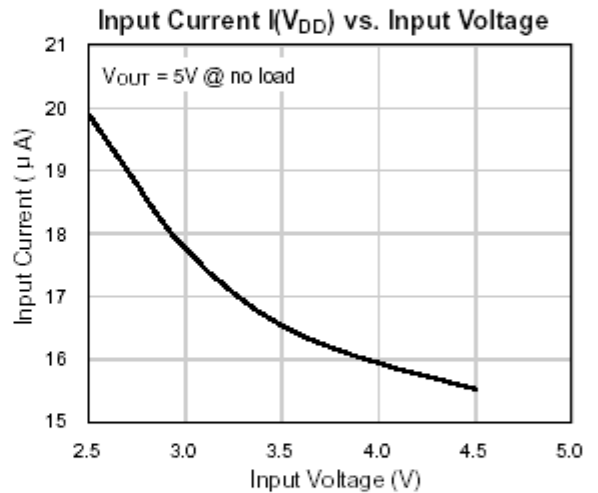
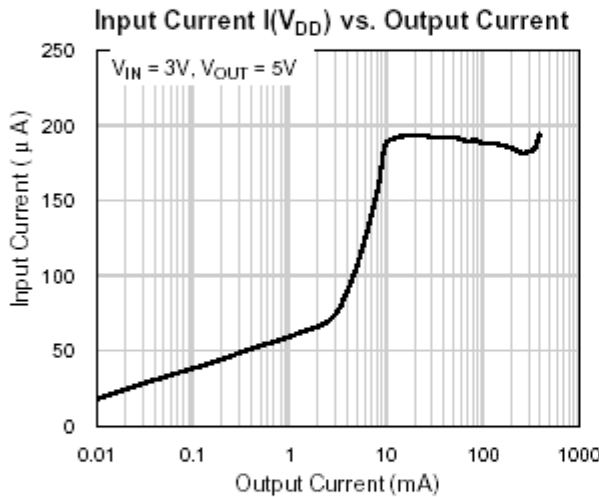
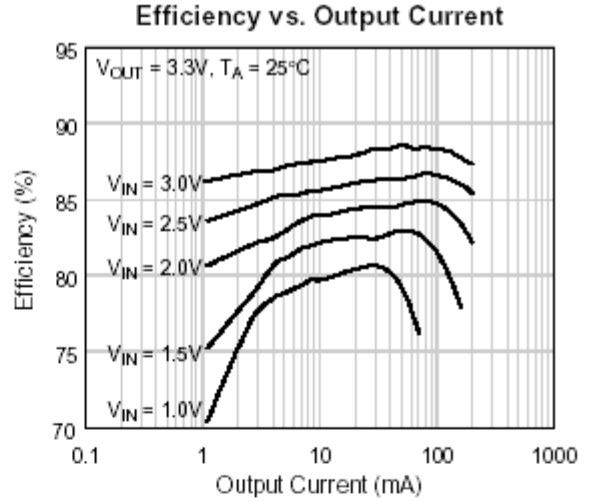
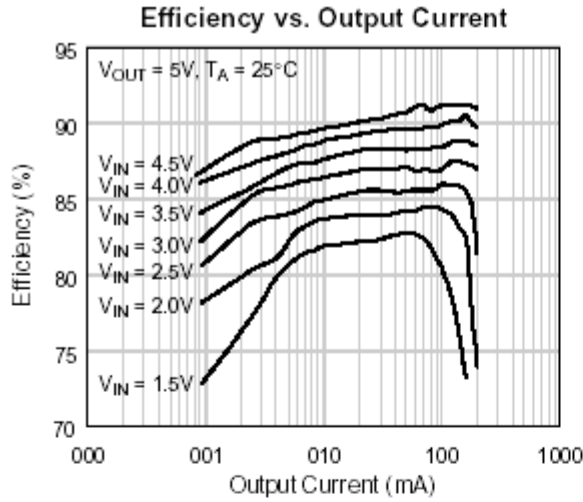
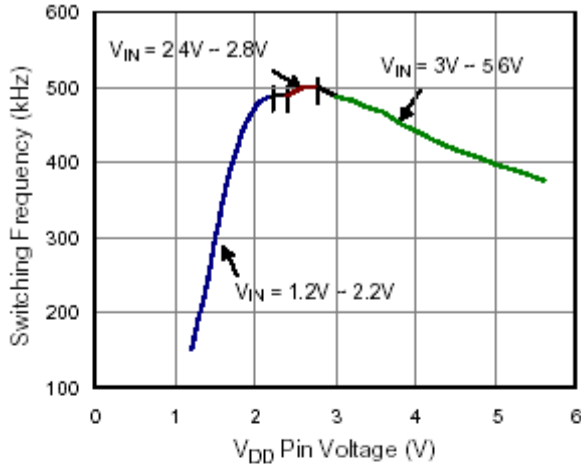


Figure 2. TG1603 for Higher Current Applications

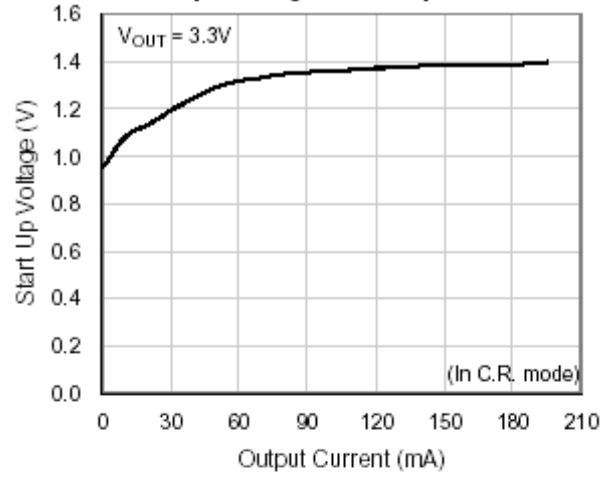
● **Typical Performance Characteristics**



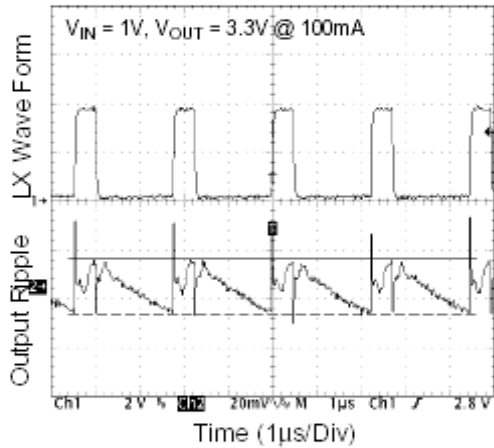
Switching Frequency vs. V_{DD} Pin Voltage



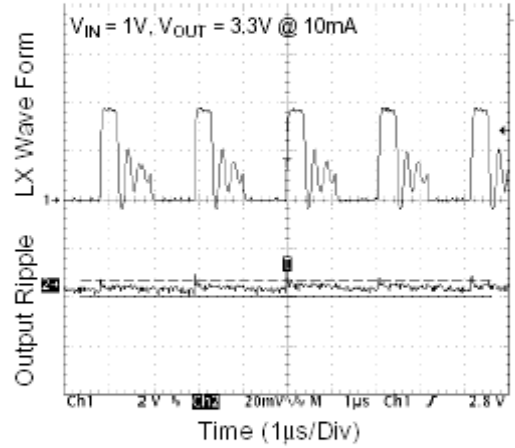
Start Up Voltage vs. Output Current



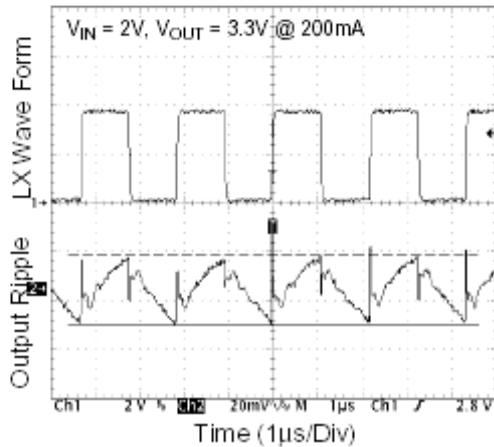
LX Pin Wave Form & Output Ripple



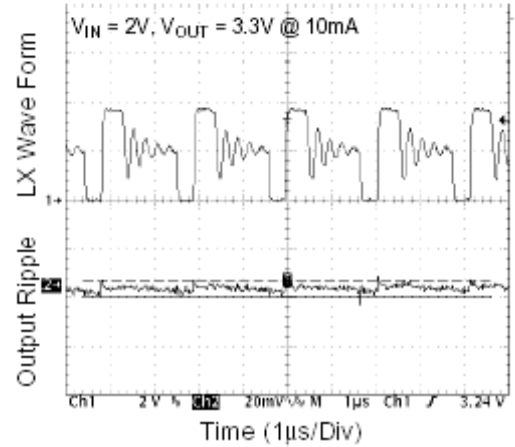
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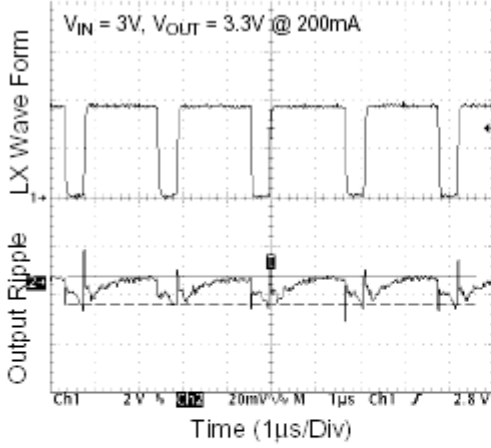
LX Pin Wave Form & Output Ripple



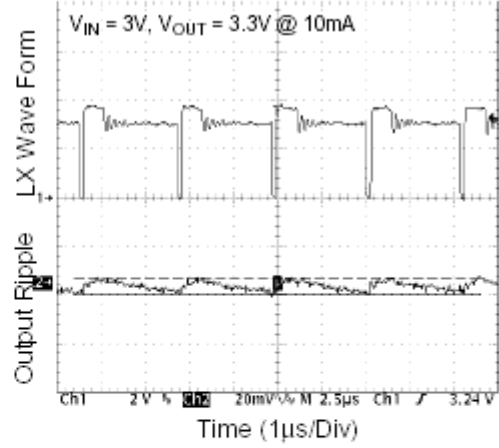
LX Pin Wave Form & Output Ripple



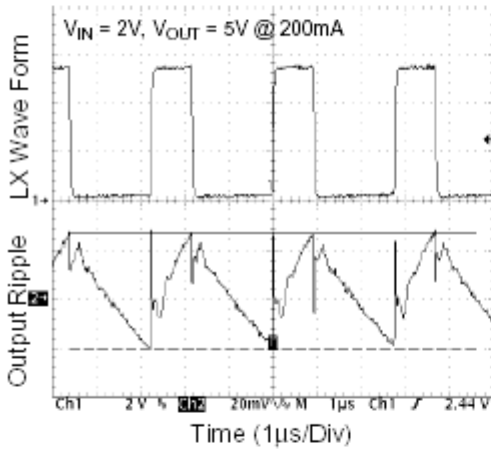
LX Pin Wave Form & Output Ripple



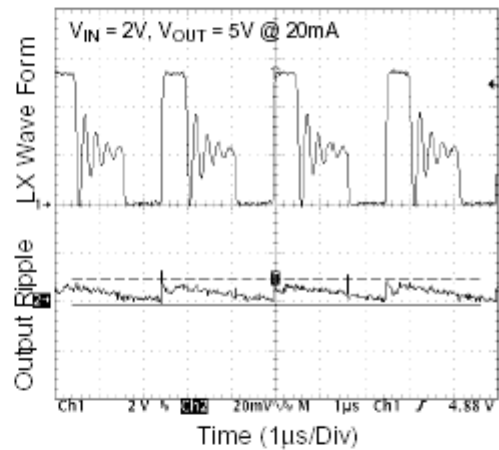
LX Pin Wave Form & Output Ripple



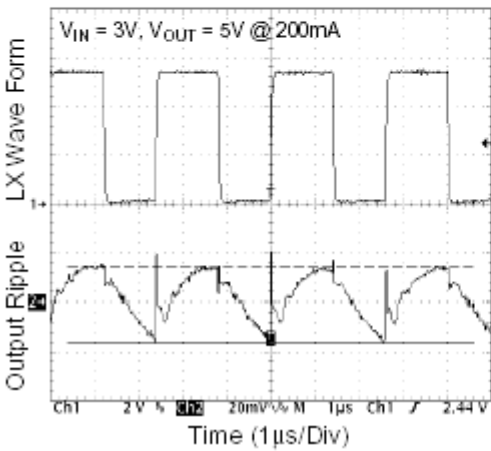
LX Pin Wave Form & Output Ripple



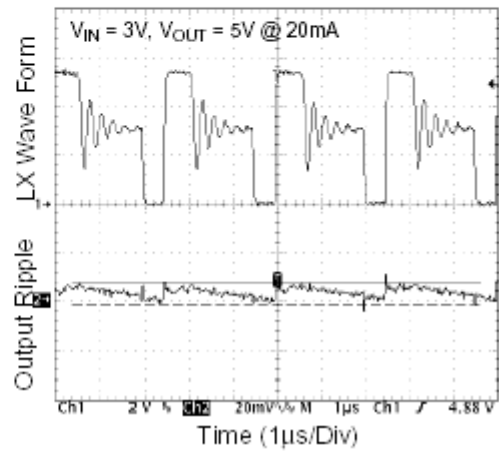
LX Pin Wave Form & Output Ripple



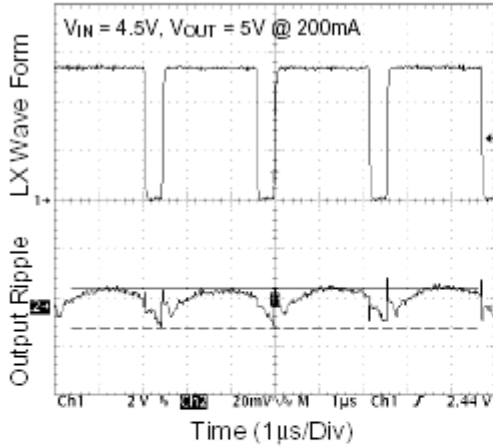
LX Pin Wave Form & Output Ripple



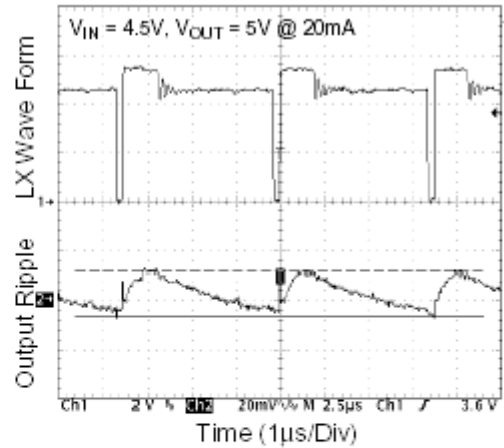
LX Pin Wave Form & Output Ripple



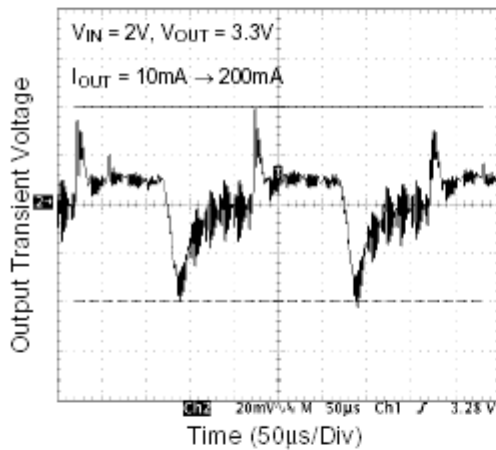
LX Pin Wave Form & Output Ripple



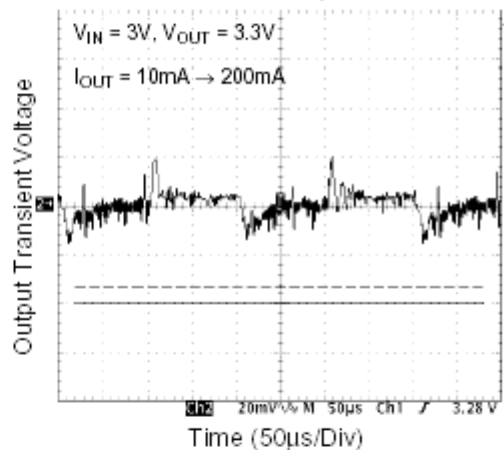
LX Pin Wave Form & Output Ripple



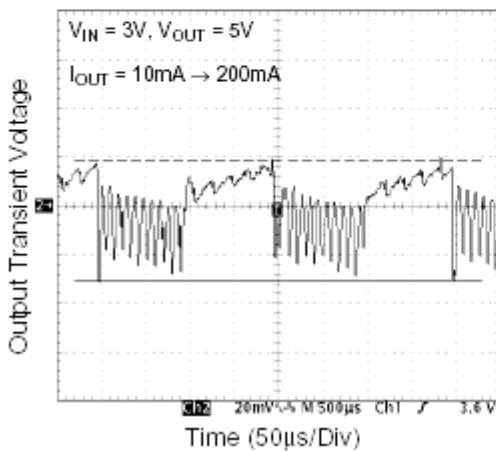
Transient Response



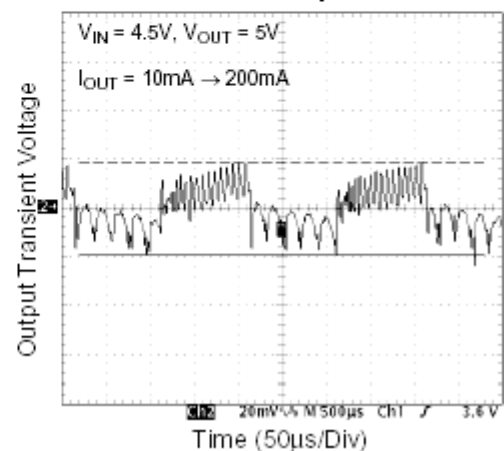
Transient Response



Transient Response



Transient Response





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