



## L3383

CMOS IC

### PFM CONTROLLED, STEP-UP DC/DC CONVERTERS (VARIABLE DUTY RATIO)

#### DESCRIPTION

The UTC **L3383** Series are PFM step-up DC/DC switching converter. The UTC **L3383** can support both large and small currents. It automatically switches duty ratio (45%/75%) when it senses changes in load.

Both built-in and external transistor types include 5-pin and 3-pin packages, which are provided with either a CE (chip enable) function that reduces power consumption during shut-down mode, or a  $V_{DD}$  pin function (separated power and voltage detect pins).

#### FEATURES

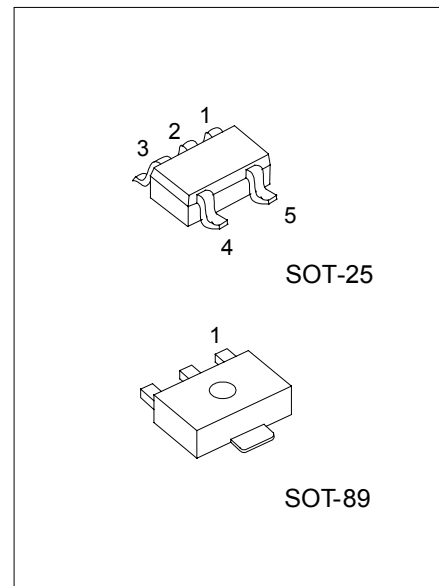
- \* Output voltage range: 2.0V~7.0V in 0.1V increments
- \* Operating (start-up) voltage range: 0.9V~10V
- \* Highly accurate: Set-up voltage  $\pm 2.5\%$
- \* Maximum oscillator frequency (Max Fosc1): 180kHz ( $\pm 15\%$ )
- \* Variable Duty Ratio: 45%/75% ( $\pm 5\%$ )
- \* Both switching transistor built-in and external types are available
- \* 5-lead package offer Chip Enable or independent  $V_{OUT}$  pin option.

#### ORDERING INFORMATION

Order Number		Package	Pin Assignment					Packing
Normal	Lead Free Plating		1	2	3	4	5	
L3383-xx-AB3-R	L3383L-xx-AB3-R	SOT-89	G	O	I	-	-	Tape Reel
L3383-xx-AF5-R	L3383L-xx-AF5-R	SOT-25	E	O	N	G	I	Tape Reel

Note: Pin Assignment: I:  $V_{IN}$  O:  $V_{OUT}$  G: GND N: No Connection E: Chip Enable  
xx: Output Voltage, refer to Marking Information.

<p>L3383L-xx-AB3-R</p>	<p>(1) Packing Type (2) Package Type (3) Output Voltage Code (4) Lead Plating</p>	<p>(1) R: Tape Reel (2) AB3: SOT-89, AF5: SOT-25 (3) xx: refer to Marking Information (4) L: Lead Free Plating, Blank: Pb/Sn</p>
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\*Pb-free plating product number: L3383L

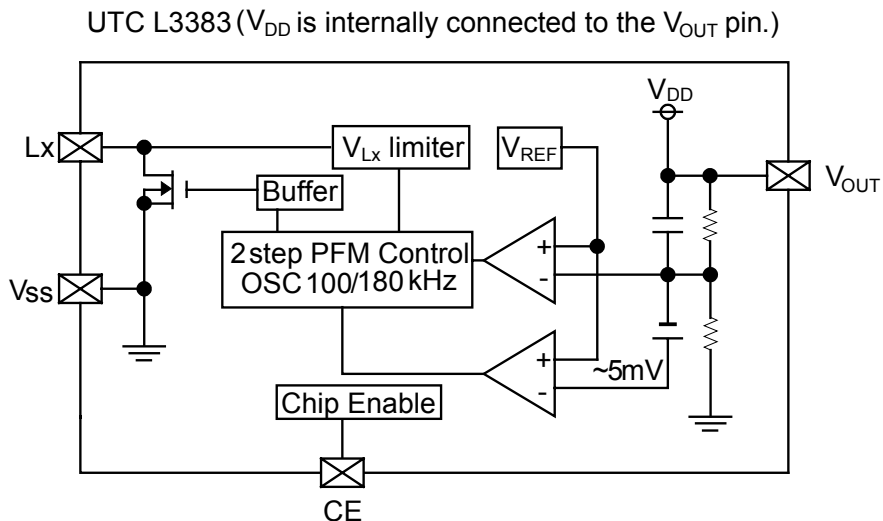
## MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-25	20:2.0V	
	25:2.5V	
	26:2.6V	
	27:2.7V	
	28:2.8V	
	30:3.0V	
	31:3.1V	
	32:3.2V	
	33:3.3V	
	36:3.6V	
SOT-89	37:3.7V	
	40:4.0V	
	45:4.5V	
	50:5.0V	

## PIN DESCRIPTION

PIN NO.		PIN NAME	FUNCTION
SOT-25	SOT-89		
1	-	CE	Chip Enable
2	2	V <sub>OUT</sub>	Output voltage monitor, IC internal power supply
3	-	NC	No Connection
4	1	V <sub>SS</sub>	Ground
5	3	Lx	Switch

## BLOCK DIAGRAM



Note: The CE pin is only used with the 5-Lead Package.

■ ABSOLUTE MAXIMUM RATINGS (Ta=25 )

PARAMETER	SYMBOL	RATINGS	UNIT
V <sub>OUT</sub> Input Voltage	V <sub>OUT</sub>	12	V
Lx pin Voltage	V <sub>Lx</sub>	12	V
CE Input Voltage	V <sub>CE</sub>	12	V
V <sub>DD</sub> Input Voltage	V <sub>DD</sub>	12	V
Lx pin Current	I <sub>Lx</sub>	400	mA
Power Dissipation	SOT-89	500	mW
	SOT-25	250	mW
Operating Junction Temperature	T <sub>J</sub>	+125	
Operating Ambient Temperature	T <sub>OPR</sub>	-30 ~ +80	
Storage Temperature	T <sub>STG</sub>	-40 ~ +125	

Note Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS(Ta=25 , V<sub>IN</sub>=V<sub>OUT</sub>× 0.6, unless otherwise specified.)

**UTC L3383-2.0V** (I<sub>OUT</sub>=10mA)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	L, SD, C <sub>L</sub> etc. connected	1.950	2.000	2.050	V
Maximum Input Voltage	V <sub>IN</sub>				10	V
Oscillation Start-up Voltage	V <sub>ST</sub>	I <sub>OUT</sub> =1mA		0.80	0.90	V
Oscillation Hold Voltage	V <sub>HLD</sub>	I <sub>OUT</sub> =1mA	0.70			V
Lx Limit Voltage	V <sub>LxLMT</sub>	Same as I <sub>DD1</sub> . Fosc>Fosc1×2	0.7		1.1	V
No-Load Input Current	I <sub>IN</sub>	I <sub>OUT</sub> =0mA (Note 1)		4.3	8.6	μA
Supply Current 1(Note 2)	I <sub>DD1</sub>	V <sub>IN</sub> =V <sub>OUT</sub> ×0.95		13.6	27.3	μA
Supply Current 2	I <sub>DD2</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +0.5V		1.9	3.9	μA
Lx Leakage Current	I <sub>LXL</sub>	No external components, V <sub>OUT</sub> =V <sub>Lx</sub> =10V.			1.0	μA
Lx Switch-On Resistance	R <sub>SWON</sub>	Same as I <sub>DD1</sub> . V <sub>Lx</sub> =0.4V		9.1	13.7	Ω
Duty Ratio 1	DTY1	Same as I <sub>DD1</sub> . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	I <sub>OUT</sub> =1mA. Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, C <sub>L</sub> etc. connected		70		%
Maximum Oscillation Frequency	Fosc1	Same as I <sub>DD1</sub> . 75% duty	150	180	210	kHz
	Fosc2	Same as I <sub>DD1</sub> . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	V <sub>CEH</sub>	Same as I <sub>DD1</sub> . Existence of Lx Oscillation.	0.75		V
	Low	V <sub>CEL</sub>	Same as I <sub>DD1</sub> . Disappearance of Lx Oscillation		0.20	V
CE "High" Current	High	I <sub>CEH</sub>	Same as I <sub>DD1</sub> . V <sub>CE</sub> =V <sub>OUT</sub> ×0.95		0.25	μA
	Low	I <sub>CEL</sub>	Same as I <sub>DD1</sub> . V <sub>CE</sub> =0V		-0.25	μA
Stand-by Current		I <sub>STB</sub>	Same as I <sub>DD1</sub> .		0.5	μA

■ ELECTRICAL CHARACTERISTICS(Cont.)

**UTC L3383-2.5V** ( $I_{OUT}=10mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	2.438	2.500	2.563	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>F_{osc1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.45	8.95	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		16.65	33.35	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.0	4.05	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{Lx}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{Lx}=0.4V$		7.15	10.8	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFFI	L, SD, $C_L$ etc. connected		70		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation		0.20	V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$		0.25	$\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$		-0.25	$\mu A$
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .			0.5	$\mu A$

**UTC L3383-2.6V** ( $I_{OUT}=10mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	2.535	2.600	2.665	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>F_{osc1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.48	9.02	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		17.26	34.56	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.02	4.08	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{Lx}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{Lx}=0.4V$		6.76	10.22	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFFI	L, SD, $C_L$ etc. connected		70		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation		0.20	V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$		0.25	$\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$		-0.25	$\mu A$
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .			0.5	$\mu A$

■ ELECTRICAL CHARACTERISTICS(Cont.)

**UTC L3383-2.7V** ( $I_{OUT}=10mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	2.633	2.700	2.768	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{OSC}>F_{OSC1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.51	9.09	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		17.87	35.77	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.04	4.11	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$		6.37	9.64	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, $C_L$ etc. connected		70		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$			0.25 $\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$			-0.25 $\mu A$
Stand-by Current		$I_{STB}$	Same as $I_{DD1}$ .			0.5 $\mu A$

**UTC L3383-2.8V** ( $I_{OUT}=10mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	2.730	2.800	2.870	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{OSC}>F_{OSC1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.54	9.16	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		18.48	36.98	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.06	4.14	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$		5.98	9.06	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, $C_L$ etc. connected		70		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$			0.25 $\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$			-0.25 $\mu A$
Stand-by Current		$I_{STB}$	Same as $I_{DD1}$ .			0.5 $\mu A$

■ ELECTRICAL CHARACTERISTICS(Cont.)

**UTC L3383-3.0V** ( $I_{OUT}=30mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	2.925	3.000	3.075	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD}$ . $F_{osc}>F_{osc1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.6	9.3	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		19.7	39.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.1	4.2	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{Lx}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{Lx}=0.4V$		5.2	7.9	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFFI	L, SD, $C_L$ etc. connected		80		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation		0.20	V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$		0.25	$\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$		-0.25	$\mu A$
Stand-by Current		$I_{STB}$	Same as $I_{DD1}$ .		0.5	$\mu A$

**UTC L3383-3.1V** ( $I_{OUT}=30mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	3.023	3.100	3.178	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD}$ . $F_{osc}>F_{osc1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.635	9.365	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		20.3	40.6	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.115	4.23	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{Lx}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{Lx}=0.4V$		5.08	7.72	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFFI	L, SD, $C_L$ etc. connected		80		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation		0.20	V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$		0.25	$\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$		-0.25	$\mu A$
Stand-by Current		$I_{STB}$	Same as $I_{DD1}$ .		0.5	$\mu A$

■ ELECTRICAL CHARACTERISTICS(Cont.)

UTC L3383-3.2V (I<sub>OUT</sub>=30mA)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	L, SD, C <sub>L</sub> etc. connected	3.120	3.200	3.280	V
Maximum Input Voltage	V <sub>IN</sub>				10	V
Oscillation Start-up Voltage	V <sub>ST</sub>	I <sub>OUT</sub> =1mA		0.80	0.90	V
Oscillation Hold Voltage	V <sub>HLD</sub>	I <sub>OUT</sub> =1mA	0.70			V
Lx Limit Voltage	V <sub>LXLMT</sub>	Same as I <sub>DD1</sub> . Fosc>Fosc1×2	0.7		1.1	V
No-Load Input Current	I <sub>IN</sub>	I <sub>OUT</sub> =0mA (Note 1)		4.67	9.34	μA
Supply Current 1(Note 2)	I <sub>DD1</sub>	V <sub>IN</sub> =V <sub>OUT</sub> ×0.95		20.9	41.8	μA
Supply Current 2	I <sub>DD2</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +0.5V		2.13	4.26	μA
Lx Leakage Current	I <sub>LXL</sub>	No external components, V <sub>OUT</sub> =V <sub>Lx</sub> =10V.			1.0	μA
Lx Switch-On Resistance	R <sub>SWON</sub>	Same as I <sub>DD1</sub> . V <sub>Lx</sub> =0.4V		4.96	7.54	Ω
Duty Ratio 1	DTY1	Same as I <sub>DD1</sub> . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	I <sub>OUT</sub> =1mA. Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, C <sub>L</sub> etc. connected		80		%
Maximum Oscillation Frequency	Fosc1	Same as I <sub>DD1</sub> . 75% duty	150	180	210	kHz
	Fosc2	Same as I <sub>DD1</sub> . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	V <sub>CEH</sub>	Same as I <sub>DD1</sub> . Existence of Lx Oscillation.	0.75		V
	Low	V <sub>CEL</sub>	Same as I <sub>DD1</sub> . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	I <sub>CEH</sub>	Same as I <sub>DD1</sub> . V <sub>CE</sub> =V <sub>OUT</sub> ×0.95			0.25 μA
	Low	I <sub>CEL</sub>	Same as I <sub>DD1</sub> . V <sub>CE</sub> =0V			-0.25 μA
Stand-by Current		I <sub>STB</sub>	Same as I <sub>DD1</sub> .			0.5 μA

UTC L3383-3.3V (I<sub>OUT</sub>=30mA)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	L, SD, C <sub>L</sub> etc. connected	3.218	3.300	3.383	V
Maximum Input Voltage	V <sub>IN</sub>				10	V
Oscillation Start-up Voltage	V <sub>ST</sub>	I <sub>OUT</sub> =1mA		0.80	0.90	V
Oscillation Hold Voltage	V <sub>HLD</sub>	I <sub>OUT</sub> =1mA	0.70			V
Lx Limit Voltage	V <sub>LXLMT</sub>	Same as I <sub>DD1</sub> . Fosc>Fosc1×2	0.7		1.1	V
No-Load Input Current	I <sub>IN</sub>	I <sub>OUT</sub> =0mA (Note 1)		4.705	9.41	μA
Supply Current 1(Note 2)	I <sub>DD1</sub>	V <sub>IN</sub> =V <sub>OUT</sub> ×0.95		21.5	43	μA
Supply Current 2	I <sub>DD2</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +0.5V		2.145	4.29	μA
Lx Leakage Current	I <sub>LXL</sub>	No external components, V <sub>OUT</sub> =V <sub>Lx</sub> =10V.			1.0	μA
Lx Switch-On Resistance	R <sub>SWON</sub>	Same as I <sub>DD1</sub> . V <sub>Lx</sub> =0.4V		4.84	7.36	Ω
Duty Ratio 1	DTY1	Same as I <sub>DD1</sub> . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	I <sub>OUT</sub> =1mA. Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, C <sub>L</sub> etc. connected		80		%
Maximum Oscillation Frequency	Fosc1	Same as I <sub>DD1</sub> . 75% duty	150	180	210	kHz
	Fosc2	Same as I <sub>DD1</sub> . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	V <sub>CEH</sub>	Same as I <sub>DD1</sub> . Existence of Lx Oscillation.	0.75		V
	Low	V <sub>CEL</sub>	Same as I <sub>DD1</sub> . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	I <sub>CEH</sub>	Same as I <sub>DD1</sub> . V <sub>CE</sub> =V <sub>OUT</sub> ×0.95			0.25 μA
	Low	I <sub>CEL</sub>	Same as I <sub>DD1</sub> . V <sub>CE</sub> =0V			-0.25 μA
Stand-by Current		I <sub>STB</sub>	Same as I <sub>DD1</sub> .			0.5 μA

■ ELECTRICAL CHARACTERISTICS(Cont.)

**UTC L3383-3.6V** ( $I_{OUT}=30mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	3.510	3.600	3.690	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>F_{osc1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.81	9.62	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		23.3	46.6	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.19	4.38	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$		4.48	6.82	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, $C_L$ etc. connected		80		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$			0.25 $\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$			-0.25 $\mu A$
Stand-by Current		$I_{STB}$	Same as $I_{DD1}$ .			0.5 $\mu A$

**UTC L3383-3.7V** ( $I_{OUT}=30mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	3.608	3.700	3.793	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>F_{osc1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.845	9.755	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		23.9	47.8	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.205	4.41	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$		4.36	6.64	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, $C_L$ etc. connected		80		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$			0.25 $\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$			-0.25 $\mu A$
Stand-by Current		$I_{STB}$	Same as $I_{DD1}$ .			0.5 $\mu A$



■ ELECTRICAL CHARACTERISTICS(Cont.)

**UTC L3383-4.0V** ( $I_{OUT}=30mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	3.900	4.000	4.100	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>F_{osc1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.95	9.94	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		25.7	51.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.25	4.5	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$		4.0	6.1	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, $C_L$ etc. connected		80		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$			0.25 $\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$			-0.25 $\mu A$
Stand-by Current		$I_{STB}$	Same as $I_{DD1}$ .			0.5 $\mu A$

**UTC L3383-4.5V** ( $I_{OUT}=30mA$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	4.388	4.500	4.613	V
Maximum Input Voltage	$V_{IN}$				10	V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>F_{osc1}\times 2$	0.7		1.1	V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		5.125	10.25	$\mu A$
Supply Current 1(Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT}\times 0.95$		28.8	57.6	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.325	4.65	$\mu A$
Lx Leakage Current	$I_{LXL}$	No external components, $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$		3.4	5.2	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, $C_L$ etc. connected		80		%
Maximum Oscillation Frequency	Fosc1	Same as $I_{DD1}$ . 75% duty	150	180	210	kHz
	Fosc2	Same as $I_{DD1}$ . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75		V
	Low	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT}\times 0.95$			0.25 $\mu A$
	Low	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$			-0.25 $\mu A$
Stand-by Current		$I_{STB}$	Same as $I_{DD1}$ .			0.5 $\mu A$

■ ELECTRICAL CHARACTERISTICS(Cont.)

UTC L3383-5.0V (I<sub>OUT</sub>=50mA)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	L, SD, C <sub>L</sub> etc. connected	4.875	5.000	5.125	V
Maximum Input Voltage	V <sub>IN</sub>				10	V
Oscillation Start-up Voltage	V <sub>ST</sub>	I <sub>OUT</sub> =1mA		0.80	0.90	V
Oscillation Hold Voltage	V <sub>HLD</sub>	I <sub>OUT</sub> =1mA	0.70			V
Lx Limit Voltage	V <sub>LXLMT</sub>	Same as I <sub>DD1</sub> . Fosc>Fosc1×2	0.7		1.1	V
No-Load Input Current	I <sub>IN</sub>	I <sub>OUT</sub> =0mA (Note 1)		5.3	10.6	μA
Supply Current 1(Note 2)	I <sub>DD1</sub>	V <sub>IN</sub> =V <sub>OUT</sub> ×0.95		31.7	63.4	μA
Supply Current 2	I <sub>DD2</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +0.5V		2.4	4.8	μA
Lx Leakage Current	I <sub>LXL</sub>	No external components, V <sub>OUT</sub> =V <sub>LX</sub> =10V.			1.0	μA
Lx Switch-On Resistance	R <sub>SWON</sub>	Same as I <sub>DD1</sub> . V <sub>LX</sub> =0.4V		2.8	4.3	Ω
Duty Ratio 1	DTY1	Same as I <sub>DD1</sub> . Measuring of Lx waveform	70	75	80	%
Duty Ratio 2	DTY2	I <sub>OUT</sub> =1mA. Measuring of Lx on-time	40	45	50	%
Efficiency	EFF1	L, SD, C <sub>L</sub> etc. connected		85		%
Maximum Oscillation Frequency	Fosc1	Same as I <sub>DD1</sub> . 75% duty	150	180	210	kHz
	Fosc2	Same as I <sub>DD1</sub> . 45% duty	100	120	130	kHz
<b>For 5-Pins package Only</b>						
CE Voltage	High	V <sub>CEH</sub>	Same as I <sub>DD1</sub> . Existence of Lx Oscillation.	0.75		V
	Low	V <sub>CEL</sub>	Same as I <sub>DD1</sub> . Disappearance of Lx Oscillation			0.20 V
CE "High" Current	High	I <sub>CEH</sub>	Same as I <sub>DD1</sub> . V <sub>CE</sub> =V <sub>OUT</sub> ×0.95			0.25 μA
	Low	I <sub>CEL</sub>	Same as I <sub>DD1</sub> . V <sub>CE</sub> =0V			-0.25 μA
Stand-by Current		I <sub>STB</sub>	Same as I <sub>DD1</sub> .			0.5 μA

- Note: 1. The Schottky diode (SD) must be type MA735, with reverse current(I<sub>R</sub>)<1.0μA at reverse voltage (V<sub>R</sub>) =10V.  
 2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. The current actually provided by an external V<sub>IN</sub> source is represented by "No-Load Input Current (I<sub>IN</sub>)".

## ■ TYPICAL APPLICATION CIRCUITS

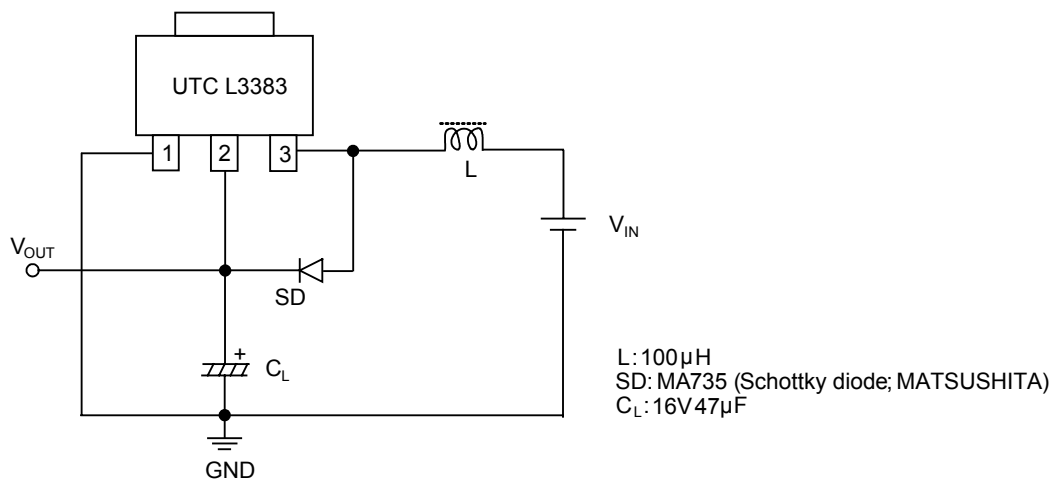


Fig.1 3-Lead Package Application(SOT-89)

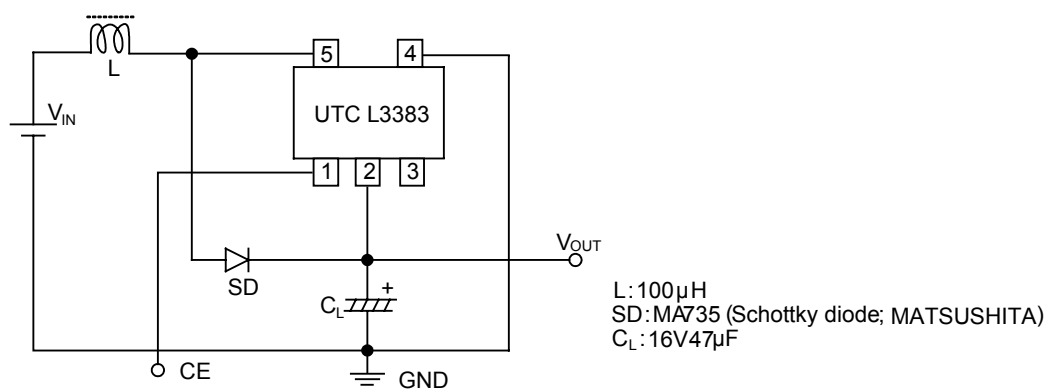
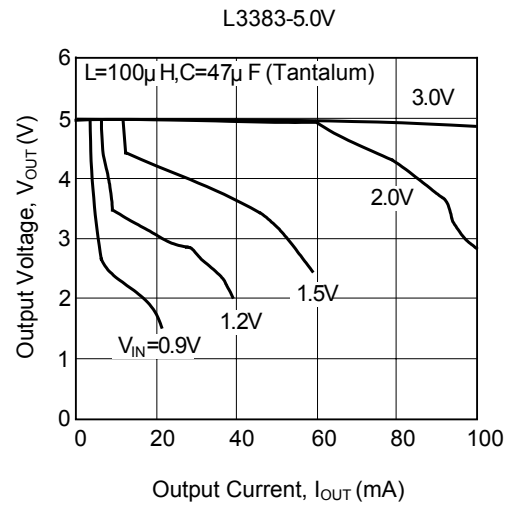
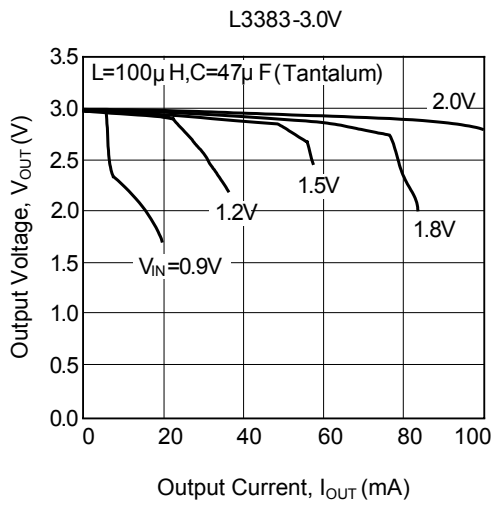


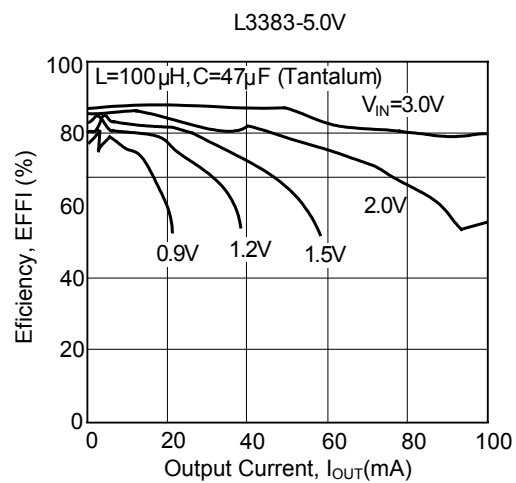
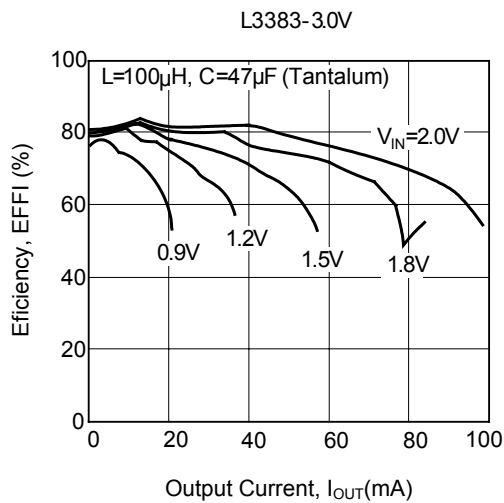
Fig.2 5-Lead Package Application(SOT-25)

## TYPICAL CHARACTERISTICS (BUILT-IN SWITCHING TRANSISTOR)

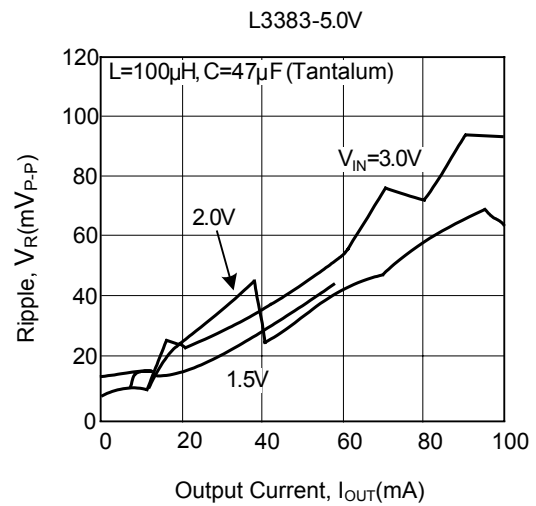
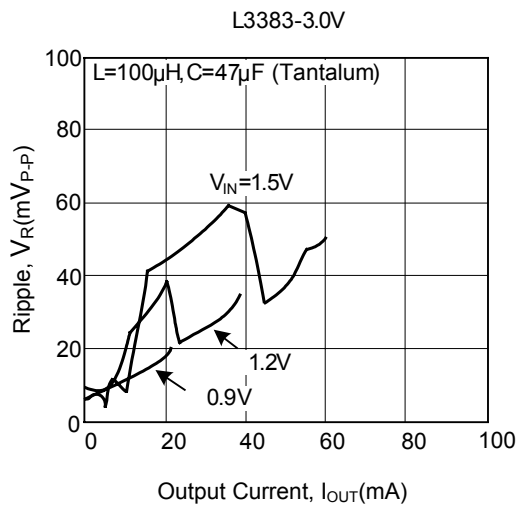
### (1) OUTPUT VOLTAGE vs. OUTPUT CURRENT



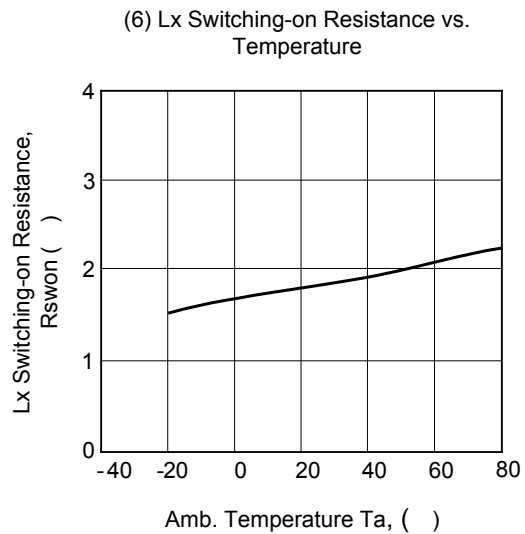
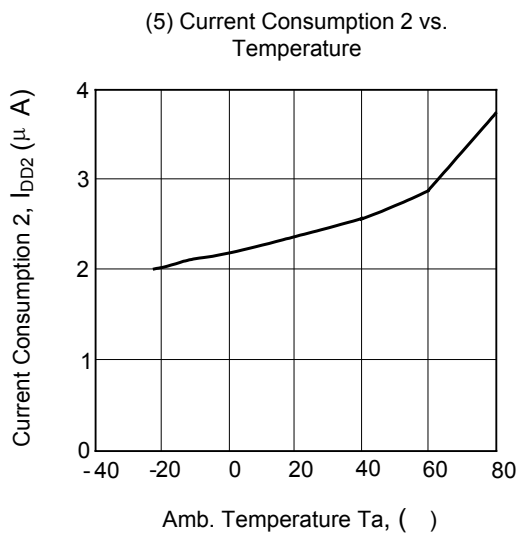
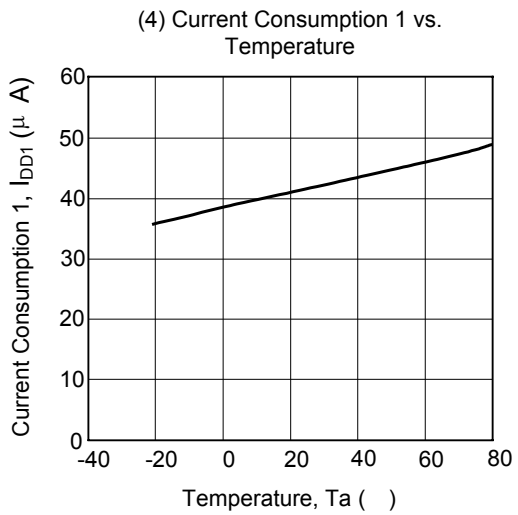
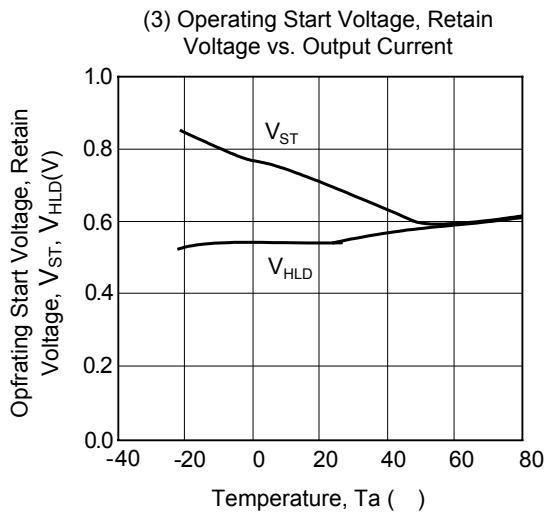
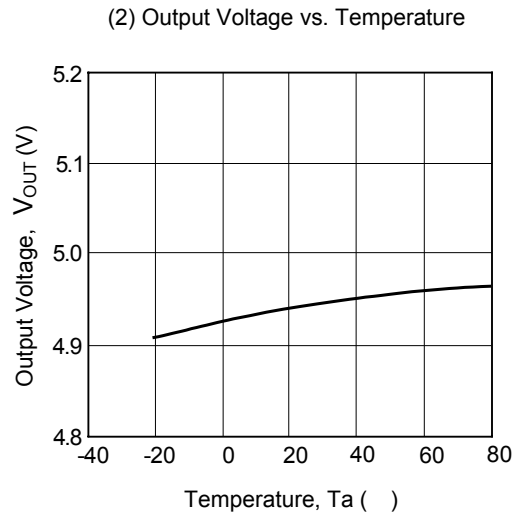
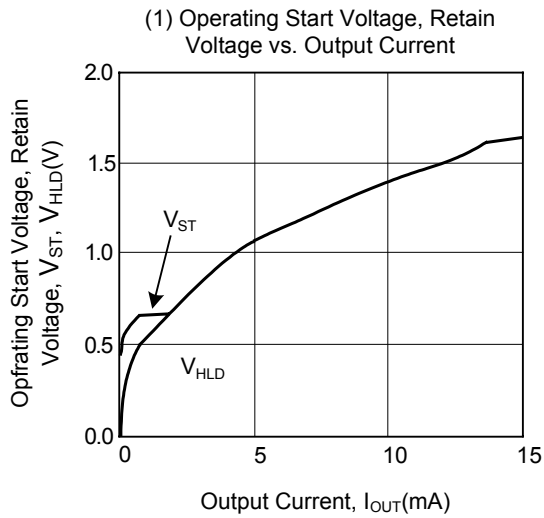
### (2) EFFICIENCY vs. OUTPUT CURRENT



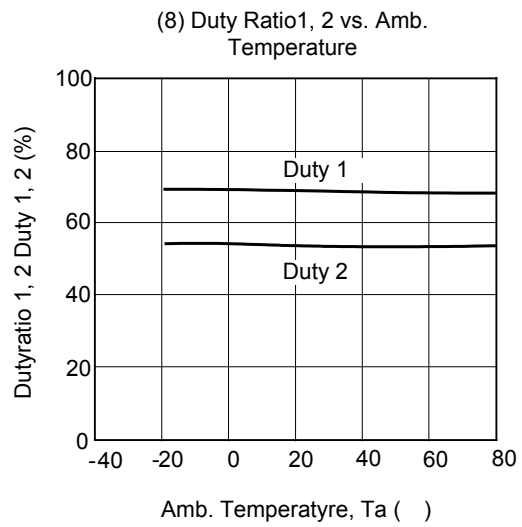
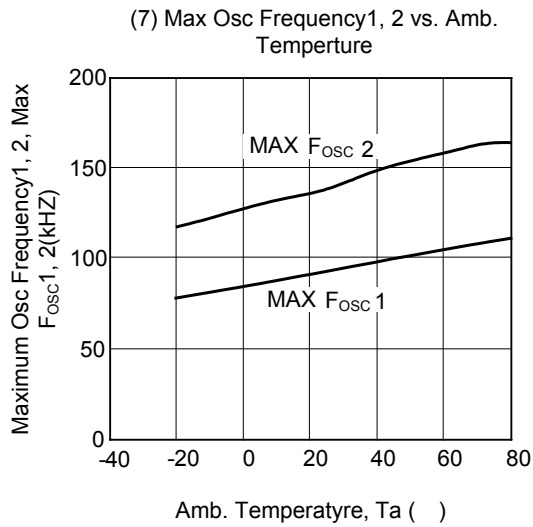
### (3) RIPPLE VOLTAGE vs. OUTPUT CURRENT



■ TYPICAL CHARACTERISTICS FOR L3383-5.0



■ TYPICAL CHARACTERISTICS FOR L3383-5.0V(cont.)



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