

LTC4366

ELECTRICAL CHARACTERISTICS The ● denotes the specifications which apply over the full operating temperature range, otherwise specifications are at $T_A = 25^\circ\text{C}$. All voltages relative to V_{SS} , unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{DD} Regulator				11	11.7		
$V_Z(V_{DD})$	V _{DD} Shunt Regulator Voltage	$I = 1\text{mA}$	●	11.5	12	12.5	V
$\Delta V_Z(V_{DD})$	V _{DD} Shunt Regulator Load Regulation	$I = 1\text{mA to } 5\text{mA}$	●		30	90	mV
			●		30 60	130	mV
V_{DD}	V _{DD} Supply Voltage (Note 3)		●	4.5		$V_Z(V_{DD})$	V
$I_{VDD}(STLO)$	V _{DD} Pin Current – Start-Up, Gate Low	GATE = 0V, $V_{DD} = 7\text{V}$, OUT = 0V	●		15	23	μA
$I_{VDD}(STHI)$	V _{DD} Pin Current – Start-Up, Gate High	GATE Open, $V_{DD} = 7\text{V}$, OUT = 0V	●		9 8	13	μA
$I_{VDD}(SD)$	V _{DD} Pin Current – Shutdown	$V_{DD} = 7\text{V}$, OUT = 0V	●		5	8	μA
OUT Regulator							
$V_Z(OUT)$	OUT Shunt Regulator Voltage	$I = 1\text{mA}$, BASE = 0V	●	5.0	5.7 5.5	6.0	V
$\Delta V_Z(OUT)$	OUT Shunt Regulator Load Regulation	$I = 1\text{mA to } 5\text{mA}$	●		30	70	mV
OUT	OUT Supply Voltage (Note 3)		●	3.0		$V_Z(OUT)$	V
V_{UVLO1}	OUT Undervoltage Lockout 1	Rising	●	2.42	2.55	2.75	V
			●	2.42	2.55 2.6	2.80	V
ΔV_{UVH1}	OUT Undervoltage Lockout 1 Hysteresis		●	0.2	0.28	0.4	V
V_{UVLO2}	OUT Undervoltage Lockout 2	Rising	●	4.5	4.75	4.9	V
ΔV_{UVH2}	OUT Undervoltage Lockout 2 Hysteresis		●	0.3	0.4	0.5	V
$I_{OUT}(AMP)$	OUT Pin Current – Regulation Amplifier On		●		37	54	μA
$I_{OUT}(CP)$	OUT Pin Current – Charge Pump On		●		150	220	μA
$I_{OUT}(SD)$	OUT Pin Current – Shutdown		●		3	6	μA
BASE, V_{SS}							
$V_Z(BASE)$	BASE Shunt Regulator Voltage (OUT – BASE)	$I = -10\mu\text{A}$, OUT = 4.5V	●	5.5	6.2 6.1	6.6	V
$\Delta V_Z(BASE)$	BASE Shunt Regulator Load Regulation	$I = -10\mu\text{A to } -80\mu\text{A}$, OUT = 4.5V	●		125	200	mV
I_{BASE}	BASE Pin Leakage Current	OUT = 4.5V, BASE = -0.5V	●	-0.1	-0.8	-5.5	μA
$I_{VSS}(AMP)$	V _{SS} Pin Current – Regulation Amplifier On		●	-30	-45	-72	μA
$I_{VSS}(CP)$	V _{SS} Pin Current – Charge Pump On		●	-108	-160	-230	μA
$I_{VSS}(SD)$	V _{SS} Pin Current – Shutdown		●		-7	-12	μA
GATE Drive					11.75		
ΔV_{GATE}	External N-Channel Gate Drive (GATE – OUT)	OUT = 4.9V, $I = 0$, -1μA	●	11.2	12	12.5	V
$I_{GATE}(ST)$	GATE Pin Current – Start-Up	GATE = OUT = 0V	●	-4.5	-7.5	-11	μA
		LTC4366C/I/H	●	-3.2	-7.5	-11	μA
		LTC4366MP	●				
$I_{GATE}(CP)$	GATE Pin Current – Charge Pump On	GATE = 5V, OUT = 4.9V	●	-14	-20	-28	μA
$I_{GATE}(FD)$	GATE Pin Current – Fast Discharge	GATE = 10V, OUT = 4.9V	●	122	200	300	mA
$I_{GATE}(FLT)$	GATE Pin Current – Fault	GATE = 10V, OUT = 4.9V	●	0.3	0.25	0.7	mA
						1.25	

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SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
FB, $\overline{\text{SD}}$, TIMER							
$V_{\text{FB(REG)}}$	3% FB pin Regulation Threshold (OUT – FB)		●	1.193	1.23	1.267	V
I_{FB}	FB Pin Leakage Current	OUT – FB = 1.2V	●		0	±1	μA
$V_{\overline{\text{SD}}(\text{TH})}$	$\overline{\text{SD}}$ Pin Threshold Voltage ($V_{\text{DD}} - \overline{\text{SD}}$)	Falling	●	1.0	1.5	2.3	V
$V_{\overline{\text{SD}}}(\text{HYST})$	$\overline{\text{SD}}$ Pin Hysteresis		●	147	280	530	mV
			●	129	280 260	530	mV
$I_{\overline{\text{SD}}}$	$\overline{\text{SD}}$ Pin Input Pull-Up Current	$V_{\text{DD}} - \overline{\text{SD}} = 0.7\text{V}$	●	0.7	1.6	3.5	μA
			●	–0.5	–1.6	–3.5	μA
$V_{\text{TIMER(H)}}$	TIMER Pin Threshold	TIMER Rising, $V_{\text{DD}} = 7\text{V}$, OUT = $V_{\text{Z(OUT)}}$	●	2.6	2.5	2.8 2.7	V
$I_{\text{TIMER(UP)}}$	TIMER Pin Pull-Up Current	TIMER = 1V	●	–5.1	–9	–13	μA
		LTC4366C/I/H	●	–4	–9	–13	μA
$I_{\text{TIMER(DN)}}$	TIMER Pin Pull-Down Current	TIMER = 1V	●	0.9	1.8	2.8	μA
			●	0.7	1.8	2.8	μA
$I_{\text{TIMER(RATIO)}}$	TIMER Pin Current Ratio $I_{\text{TIMER(DN)}}/I_{\text{TIMER(UP)}}$		●	15	20	25	%
AC Characteristics							
$t_{\text{DLY}} - \overline{\text{SD}}$	$\overline{\text{SD}}$ Low to Gate Low Filter Time	Step $V_{\text{DD}} - \overline{\text{SD}}$ from 0V to 3V	●	420	700	1200	μs
$t_{\text{DLY}} - \text{FAST}$	FB Low to Gate Low Delay Time	Step OUT – FB from 0V to 1.3V	●	60	150	300	ns
$t_{\text{D(COOL)}}$	Cool-Down Timer (Internal)	$V_{\text{DD}} = V_{\text{Z(VDD)}}$	●	5.9	9	16	Seconds
			●	5.9	9 10	19	Seconds

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

Note 2: All currents into pins are positive.

Note 3: Limits on the maximum rating is defined as whichever limit occurs first. An internal clamp limits the GATE pin to a maximum of 12V above source. Driving this pin to voltages beyond the clamp may damage the device.

Note 4: T_J is calculated from the ambient temperature, T_A , and power dissipation, P_D , according to the formula:

$$T_J = T_A + (P_D \cdot \theta_{JA})$$