

TECHNICAL DATA
DATASHEET 4311, Rev-

BRUSHLESS DC MOTOR CONTROLLER

DESCRIPTION: INTEGRATED CIRCUIT ELECTRICALLY EQUIVALENT TO Unitrode UC1625J
PACKAGE: HERMETIC CERAMIC 28 PIN DIP

ABSOLUTE MAXIMUM RATINGS

Vcc Supply Voltage	+20V
Pwr Vcc Supply Voltage	+20V
PWM In	-0.3 to 6V
E/A IN(+), E/A IN(-)	-0.3 to 12V
ISENSE1, ISENSE2	-1.3 to 6V
OV-Coast, Dir, Speed-In, SSTART, Quad Sel	-0.3 to 8V
H1, H2, H3	-0.3 to 12V
PU Output Voltage	-0.3 to 50V
PU Output Current	+200 mA continuous
PD Output Current	±200 mA continuous
E/A Output Current	±10 mA
ISENSE Output Current	-10 mA
Tach Out Output Current	±10 mA
VREF Output Current	-50 mA continuous
Operating Temperature Range	-55°C to 110°C

PINOUT

1	E/A In (+)	28	E/A In (-)
2	Vref	27	E/A Out
3	Isense	26	PWM In
4	Isense 1	25	RC-Osc
5	Isense 2	24	Sstart
6	Dir	23	OV-Coast
7	Speed-In	22	Quad Sel
8	H1	21	RC-Brake
9	H2	20	Tach-Out
10	H3	19	Vcc
11	PWR Vcc	18	PUA
12	PDC	17	PUB
13	PDB	16	PUC
14	PRA	15	Gnd

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, these specifications apply for: TA = 25°C; Pwr Vcc = Vcc = 12V; ROSC = 20k to VREF; COSC = 2nF; RTACH = 33k; CTACH = 10nF; and all outputs unloaded. TA = TJ.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Overall					
Supply current*	Over Operating Range		14.5	30.0	mA
Vcc Turn-On Threshold*	Over Operating Range	8.65	8.95	9.45	V
Vcc Turn-Off Threshold*	Over Operating Range	7.75	8.05	8.55	V
Overvoltage/Coast					
OV-Coast Inhibit Threshold*	Over Operating Range	1.65	1.75	1.85	V
OV-Coast Restart Threshold*		1.55	1.65	1.75	V
OV-Coast Hysteresis		0.05	0.10	0.15	V
OV-Coast Input Current		-10	-1	0	µA
Logic Inputs					
H1, H2, H3 Low Threshold	Over Operating Range	0.8	1.0	1.2	V
H1, H2, H3 High Threshold	Over Operating Range	1.6	1.9	2.0	V
H1, H2, H3 Input Current	Over Operating Range, to 0V	-400	-250	-120	µA
Quad Sel, Dir Thresholds	Over Operating Range	0.8	1.4	2.0	V
Quad Sel Hysteresis			70		mV
Dir Hysteresis			0.6		V
Quad Sel Input Current		30	50	150	µA
Dir Input Current		30	-1	30	µA
PWM Amp/Comparator					
E/A In(+), E/A In(-) Input Current*	To 2.5V	-5.0	-0.1	5.0	µA
PWM In Input Current	To 2.5V	0	3	30	µA
Error Amp Input Offset*	0V < V _{COMMON-MODE} < 3V	-10		10	mV
Error Amp Voltage Gain		70	90		dB
E/A Out Range		0.25		3.50	V
SSTART Pull-up Current	To 0V	-16	-10	-5	µA

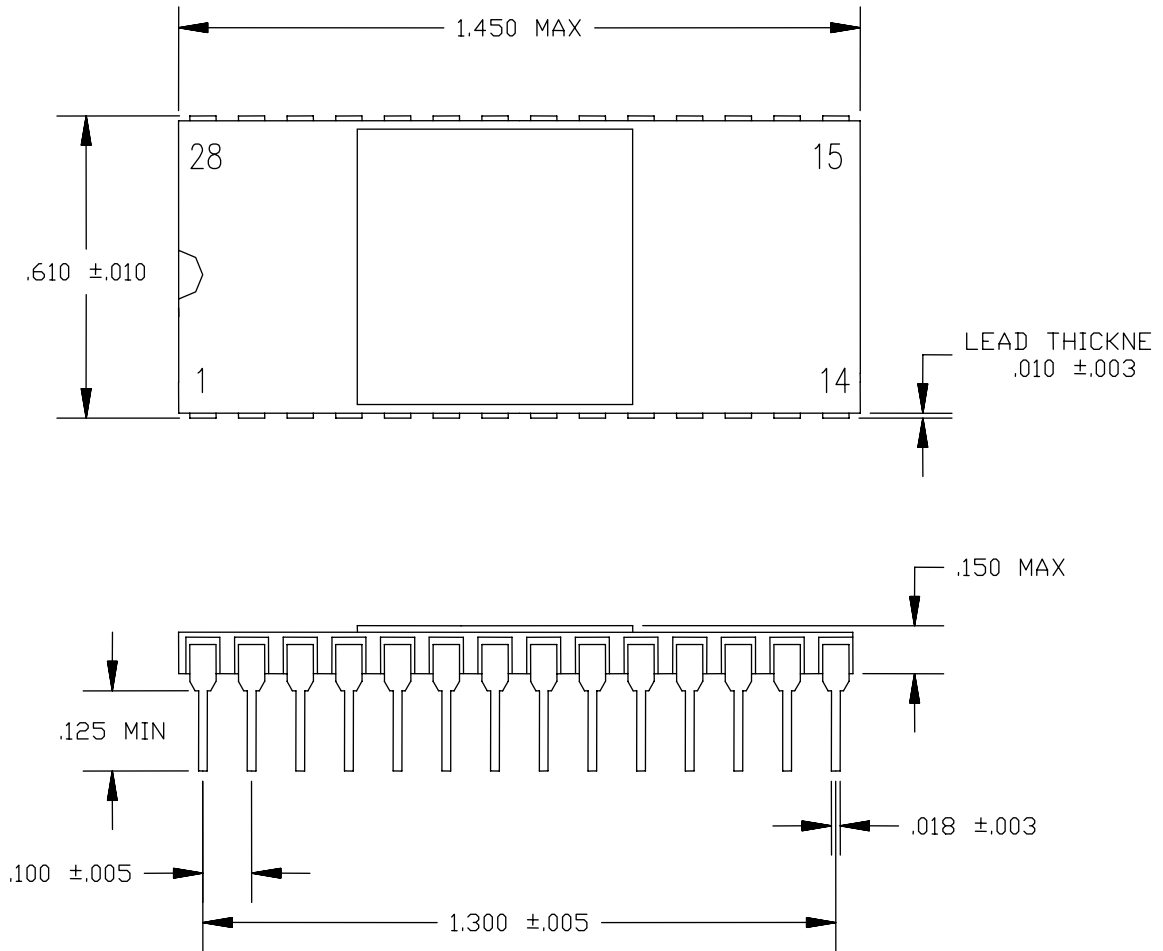
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PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
SSTART Discharge Current	To 2.5V	0.1	0.4	3.0	mA
SSTART Restart Threshold		0.1	0.2	0.3	V
Current Amp					
Gain	I _{SENSE1} = .3V, I _{SENSE2} = .5V to .7V	1.75	1.95	2.15	V/V
Level Shift*	I _{SENSE1} = .3V, I _{SENSE2} = .3V	2.4	2.5	2.65	V
Peak Current Threshold*	I _{SENSE1} = 0V, Force I _{SENSE2}	0.14	0.20	0.26	V
Over Current Threshold*	I _{SENSE1} = 0V, Force I _{SENSE2}	0.26	0.30	0.36	V
I _{SENSE1} , I _{SENSE2} Input Current	To 0V		320	0	μA
I _{SENSE1} , I _{SENSE2} Offset Current	To 0V		±2	±12	μA
Range I _{SENSE1} , I _{SENSE2}		-1		2	V
Tachometer/Brake					
Tach-Out High Level	Over Operating Range, 10k to 2.5V	4.7	5	5.3	V
Tach-Out Low Level	Over Operating Range, 10k to 2.5V			0.2	V
On Time		170	220	280	μs
On Time Change With Temp	Over Operating Range		0.1		%
RC-Brake Input Current	To 0V	-4.0	-1.9		mA
Threshold to Brake, RC-Brake	Over Operating Range	0.8	1.0		V
Brake Hysteresis, RC-Brake			0.09		V
Speed-In Threshold	Over Operating Range	220	257		mV
Speed-In Input Current		-30	-5		μA
Low-Side Drivers					
V _{oh} , -1mA, Down From V _{cc} *	Over Operating Range		1.60	2.1	V
V _{oh} , -50mA, Down From V _{cc} *	Over Operating Range		1.75	2.2	V
V _{ol} , 1mA*	Over Operating Range		0.05	0.4	V
V _{ol} , 50mA*	Over Operating Range		0.36	0.8	V
Rise/Fall Time	10% to 90% Slew Time, into 1nF		50		ns
High-Side Drivers					
V _{ol} , 1mA	Over Operating Range		0.1	0.4	V
V _{ol} , 50mA	Over Operating Range		1.0	1.8	V
Leakage Current	Output Voltage = 50V			25	μA
Fall Time	10% to 90% Slew Time, 50mA Load		50		ns
Oscillator					
Frequency		40	50	60	kHz
Frequency	Over Operating Range	35		65	kHz
Reference					
Output Voltage*		4.9	5.0	5.1	V
Output Voltage*	Over Operating Range	4.7	5.0	5.3	V
Load Regulation	0mA to -20mA Load	-40	-5		mV
Line Regulation	10V to 18V V _{cc}	-10	-1	10	mV
Short Circuit Current	Over Operating Range	50	100	150	mA
Miscellaneous					
Output Turn-On Delay			1		μs
Output Turn-Off Delay			1		μs

*only the parameters with an asterisk are tested

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MECHANICAL DRAWING – CERAMIC 28 PIN DIP (inches)



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