DRV2624 Qualification Data

DRV2624 | Logic Input Level

	Test items		VIH/VIL or result
Test result VIN=VDDmin	VIH(V)↑	trig pin	1.33
		rst pin	1.33
	VIL(V)↓	trig pin	0.560
		rst pin	0.560
	VOL_INT(mV)	Isink=3mA，INTN pin Vol	231.74
	VOL_SDA(mV)	Isink=3mA，SDA pin Vol	290
Test result VIN=3.8	VIH(V)↑	trig pin	1.33
		rst pin	1.33
	VIL(V)↓	trig pin	0.560
		rst pin	0.560
	VOL_INT(mV)	Isink=3mA，INTN pin Vol	231.74
	VOL_SDA(mV)	Isink=3mA，SDA pin Vol	290
Test result VIN=VDDmax	VIH(V)↑	trig pin	1.33
		rst pin	1.33
	VIL(V)↓	trig pin	0.560
		rst pin	0.560
	VOL_INT(mV)	Isink=3mA，INTN pin Vol	231.74
	VOL_SDA(mV)	Isink=3mA，SDA pin Vol	290

DRV2624 | OCP Function Test

Test items	Output resistant when the OCP happed(Ω) *	OCP current （mA）	If the interruption was triggered	Design Spec (typical)
HDP short to GND	3.8	951	Yes	800 +/-25%
HDN short to GND	3.95	935	Yes	800 +/-25%
HDN short to HDP	3.8	951	Yes	800 +/- 25%

Design spec (typical):

HDP short to GND: 800 mA
HDN short to GND: 800 mA
HDP short to HDN: 800 mA

* Theoretical output resistance calculated by: output voltage / OCP current

6.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

		MIN	NOM	MAX	UNIT
V_{DD}	Supply voltage	2.7		5.5	V
R_L	Load impedance	8			Ω
C_L	Load capacitance			100	pF
$f_{(LRA)}$	LRA frequency	45		300	Hz

DRV2624 | F0 track accuracy

Test time	Real F0*	Test 1s(short), F0 result	Cont mode, F0	Short test F0 error	Cont mode, F0 error
1# LRA	205.176 Hz	207.135 Hz	207.135 Hz	-1.959 Hz	-1.959 Hz
2# LRA	237.572 Hz	239.040 Hz	239.040 Hz	-1.468 Hz	-1.468 Hz
3# LRA	206.217 Hz	207.258 Hz	207.258 Hz	1.041 Hz	1.041 Hz

*Real F0 are measured by DATS V3 Speak T/S Parameter Measurement Equipment.

DRV2624 | F0 track accuracy

There are many factors that affect the resonant frequency of an LRA including: manufacturing, how it is mounted, how it is held and rated voltage. Because of these factors, actuators typically have a resonance frequency "range" specified in the datasheet, instead of a single resonant frequency, which can sometimes be as high as +/- 10Hz. If a driver without auto-resonance outputs a frequency at the center of this range (for example 205Hz), but the actuator has a resonance at 215 Hz, then the acceleration will be very weak. This is a problem that can be solved with the auto-resonance tracking feature of the DRV2624.

The DRV2624 auto-resonance tracking algorithm doesn’t have a specific tracking accuracy number due to this LRA behavior. But it effectively adjusts the frequency in real-time to reach the optimal acceleration.

DRV2624 | F0 track accuracy (LRA #1 screenshot)

SEMCO 1030 – Unit S3 New
Device 1F01

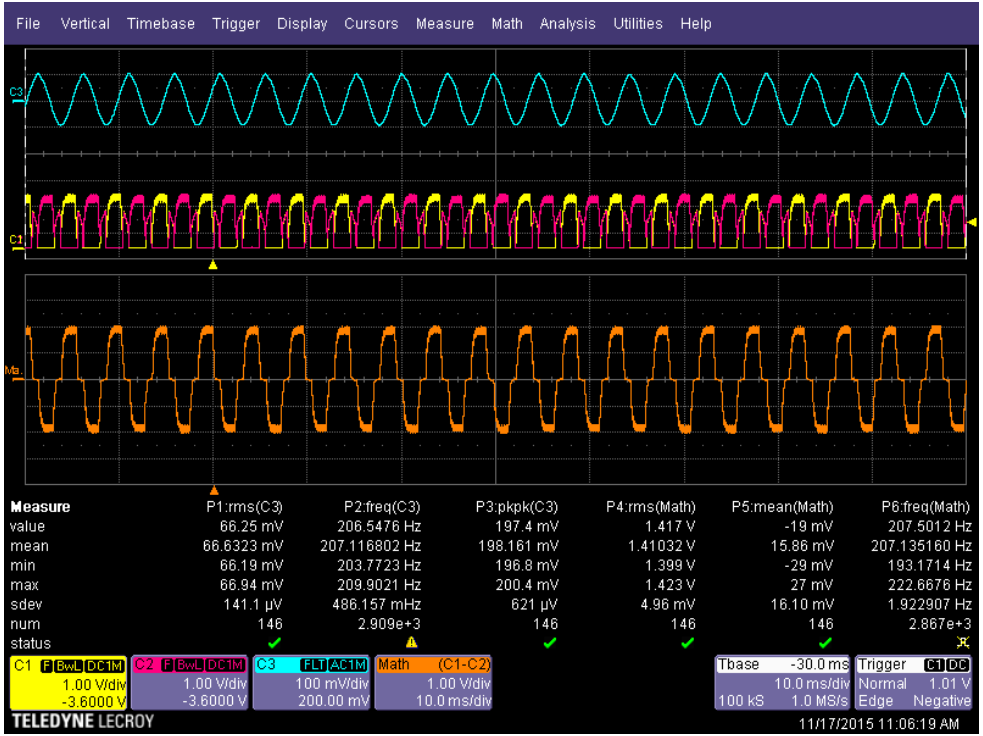
VDD = 3.6V

SEMCO 1030 – S3 NEW

Freq Monitor = 205.176Hz

Mean Freq = 207.135Hz

% Error = 0.945%



DRV2624 | F0 track accuracy (LRA #2 screenshot)

SEMCO 0825 – Unit 1
Device 1F01

VDD = 3.6V

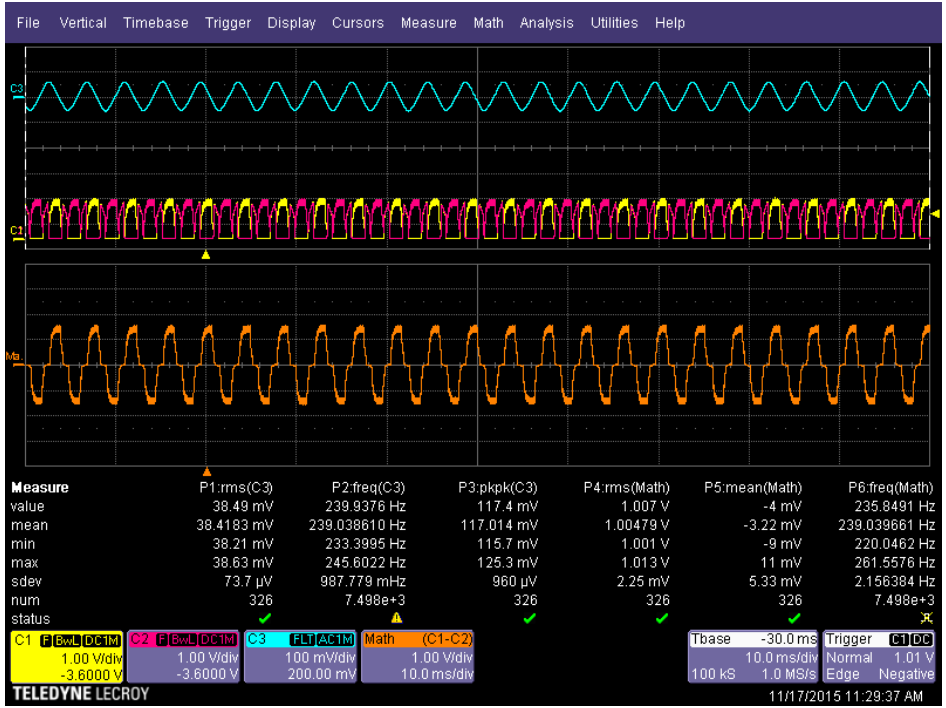
SEMCO 0825 – Unit 1

240Hz

Freq Monitor = 237.572Hz

Mean Freq = 239.0397Hz

% Error = 0.614%



DRV2624 | F0 track accuracy (LRA #3 screenshot)

SEMCO 0934 – Unit S3
Device 1F01

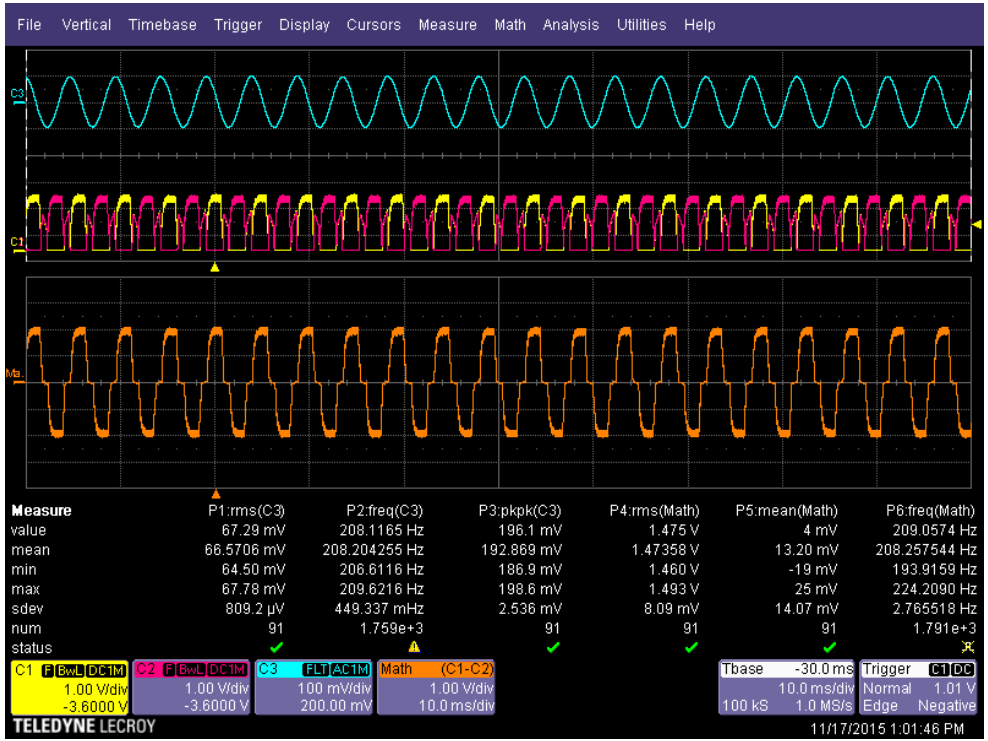
VDD = 3.6V

SEMCO 0934 – S8

Freq Monitor = 206.217Hz

Mean Freq = 208.258Hz

% Error = 0.98%



DRV2624 | AMR Test

Test item	Leakage current on test start @Vmax	Leakage current on test start @Vmin	Leakage current on test finish @Vmax	Leakage current on test finish @Vmin
VDD	1.1uA	-7.7uA	0.9uA	-7.8uA
REG *	3 mA	3 mA	3mA	3mA
OUT- *	0.33 mA	0.33 mA	0.33 mA	0.33 mA
OUT+ *	0.33 mA	0.33 mA	0.33 mA	0.33 mA
SDA	0.01uA	-0.01 uA	0.01uA	-0.01 uA
SCL	0.01uA	-0.01 uA	0.01uA	-0.01 uA
TRIG	0.01uA	-0.01 uA	0.01uA	-0.01 uA
NRST	0.01uA	-0.01 uA	0.01uA	-0.01 uA
IQ_VDD	2.6 mA	2.6 mA	2.6 mA	2.6 mA

* Output pins. Applied a 5V level at OUT+ and OUT- pins in shutdown mode. Applied a 5V level at REG pin in shutdown mode.

DRV2624 | Vreg accuracy

Test Conditions: 8 ohms load, open-loop, STANDBY mode, 0% line compensation, T = 25°C, LRA mode.

Design spec: Vreg = 1.84V+/-2%

Items	Value						
Supply voltage(V)	2.5	3	3.4	3.8	4.35	5	5.5
Vreg（V）	1.81	1.81	1.82	1.82	1.83	1.84	1.84

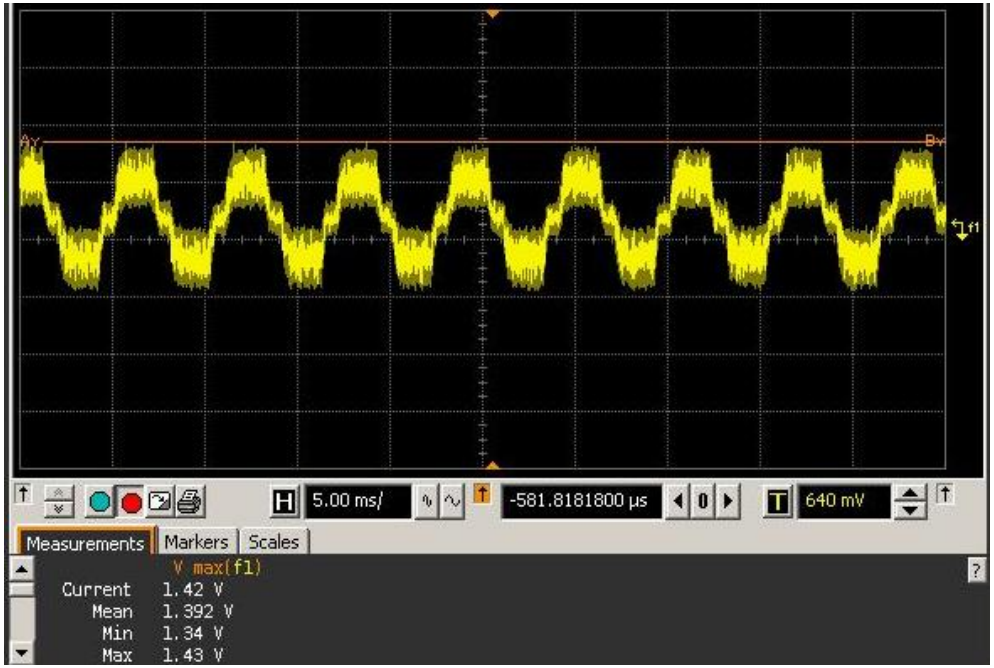
DRV2624 | Output accuracy

Test conditions: Overdrive Voltage = 1.5V, Open-loop mode
Accuracy: 3.3~5.5V +/-2%; 2.8V~53.3V +/-5%

VBAT(V)	Waveform amplitude (V)	Accuracy
2.8	1.43	-4.6%
3.3	1.47	-2.0%
3.6	1.47	-2.0%
4	1.49	-0.66%
4.2	1.51	0.66%
5	1.51	0.66%
5.5	1.52	1.33%

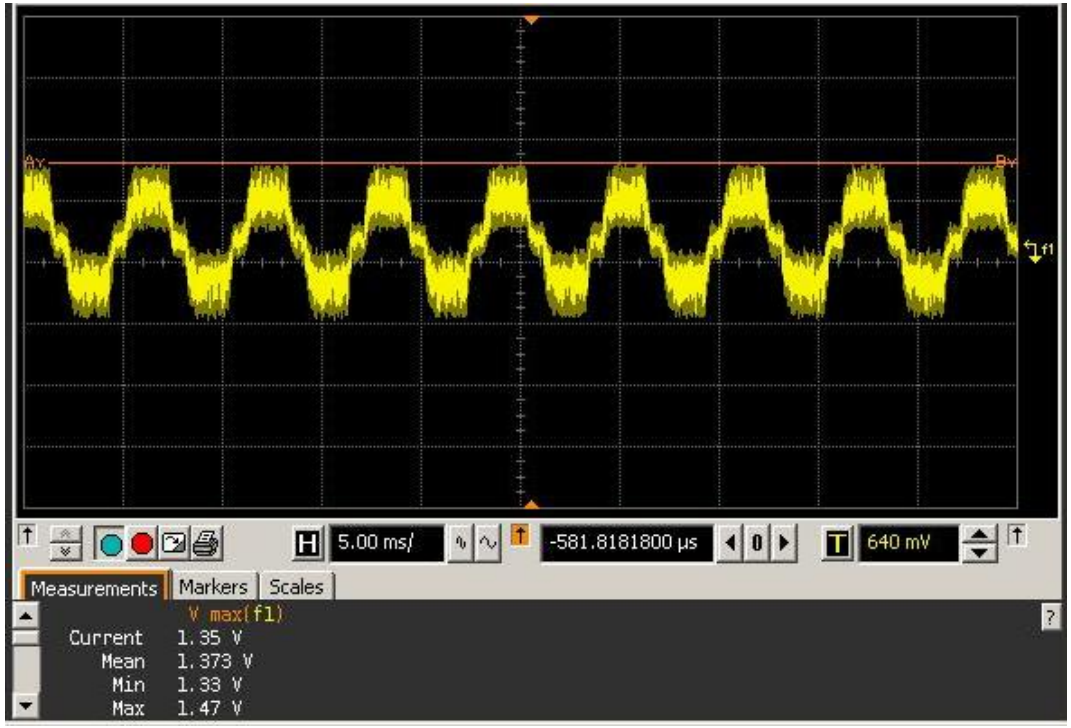
DRV2624 | Output accuracy

Test conditions: VBAT = 2.8V



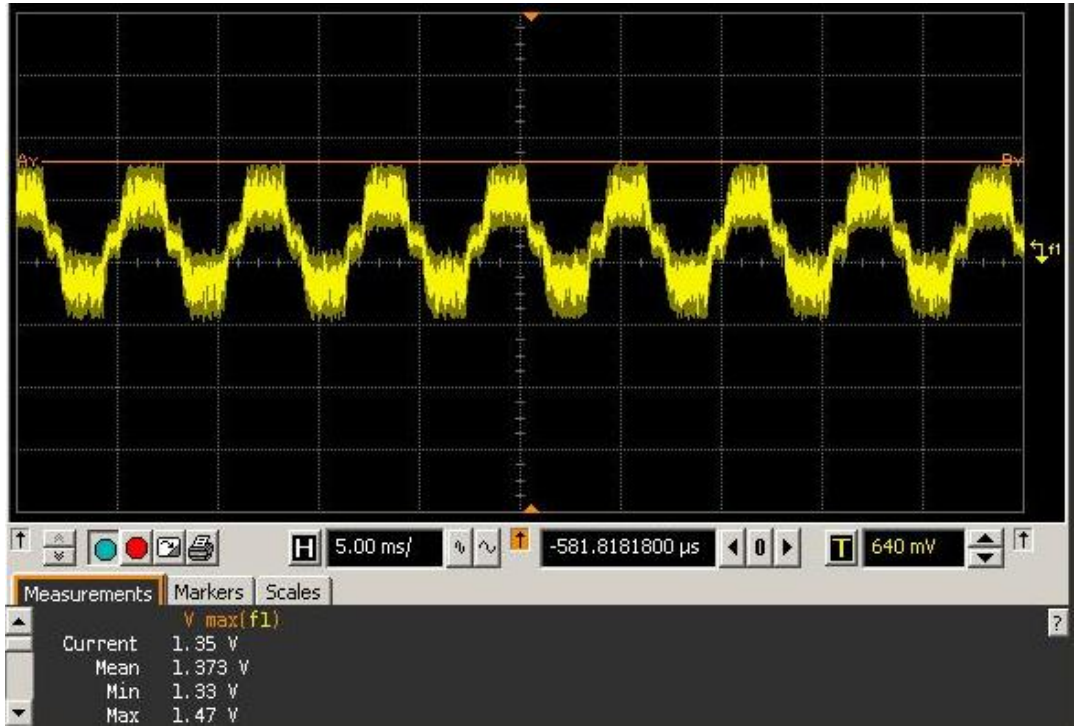
DRV2624 | Output accuracy

Test conditions: VBAT = 3.3V



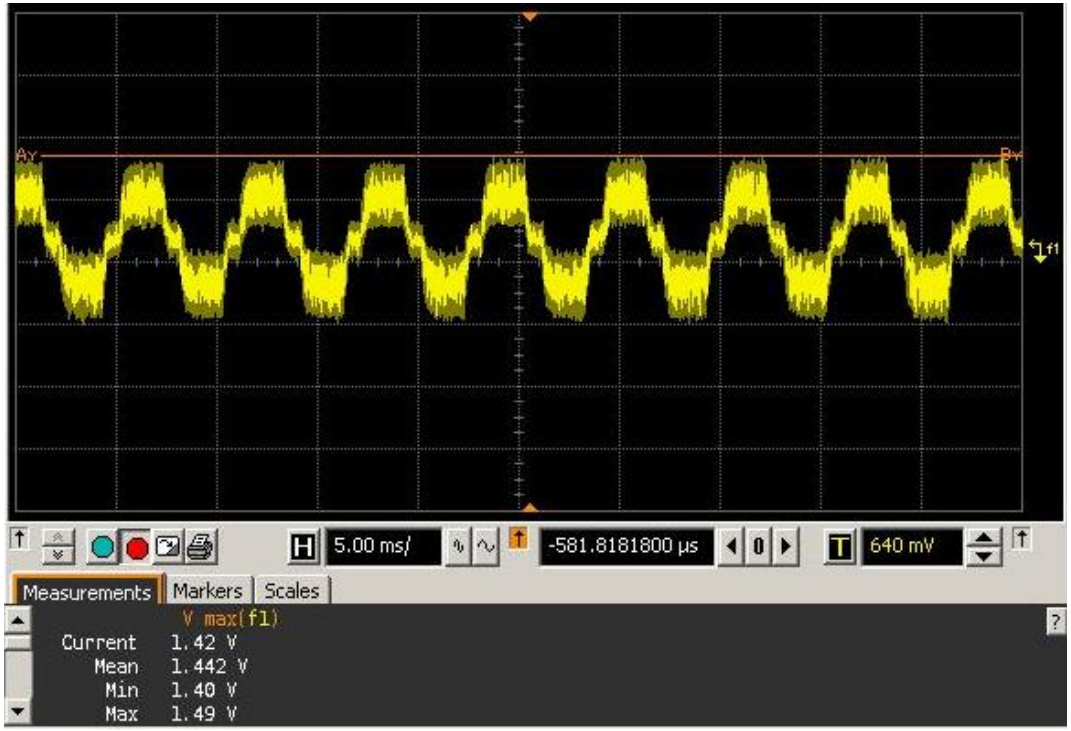
DRV2624 | Output accuracy

Test conditions: VBAT = 3.6V



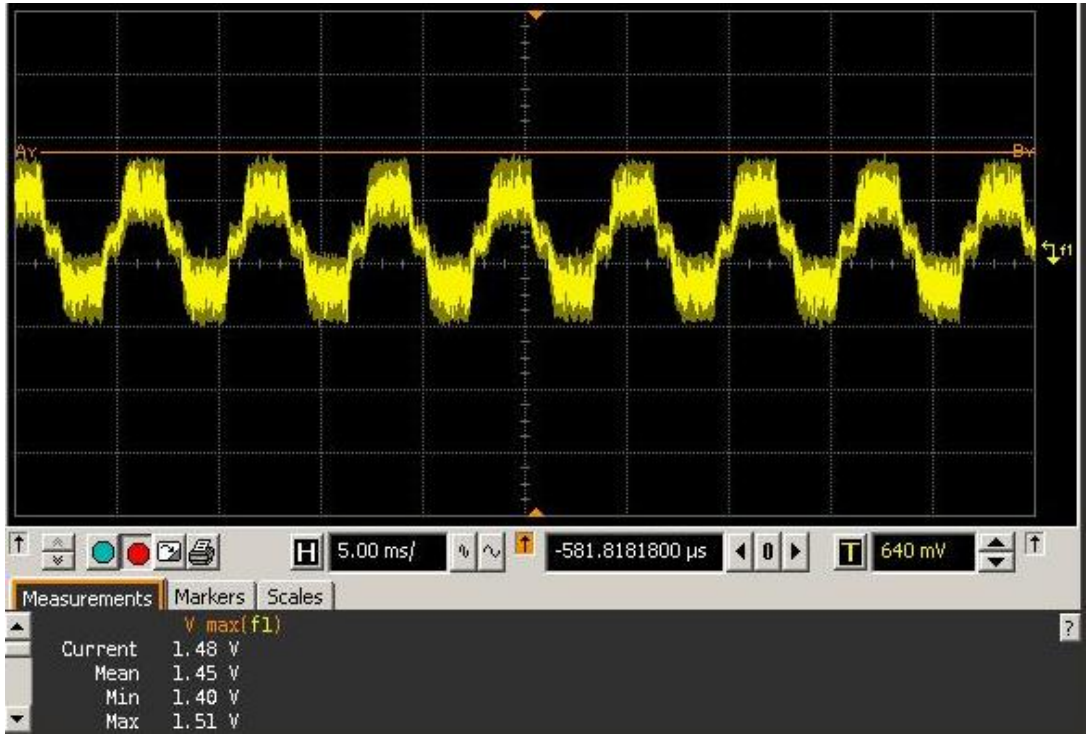
DRV2624 | Output accuracy

Test conditions: VBAT = 4.0V



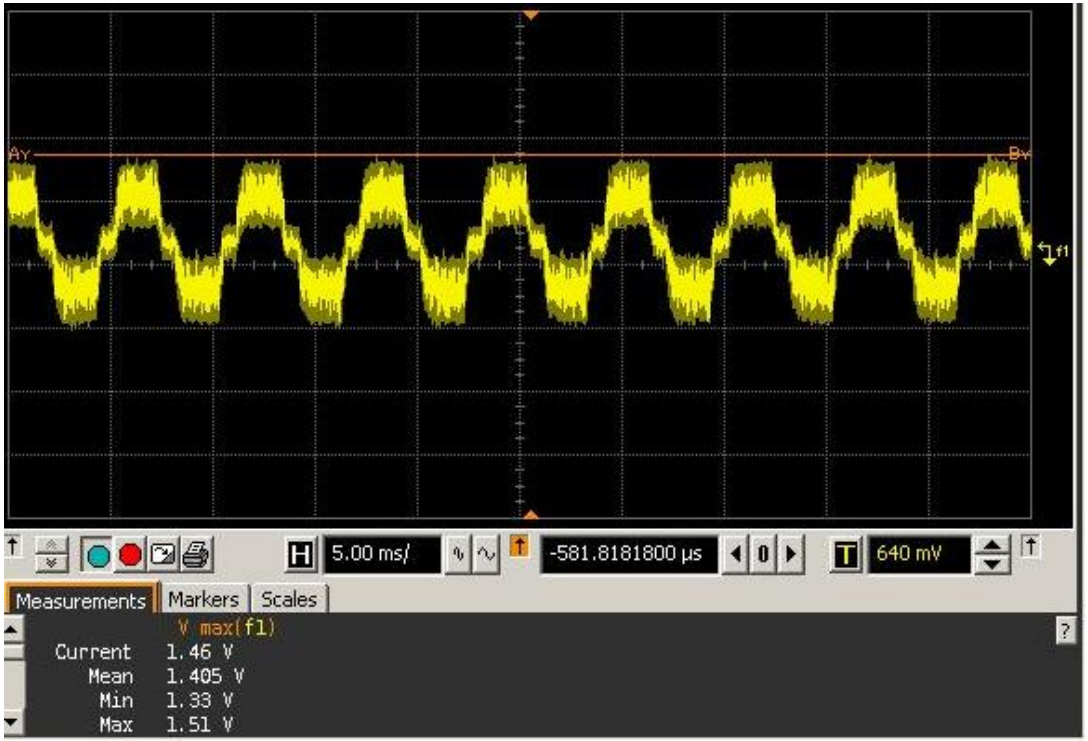
DRV2624 | Output accuracy

Test conditions: VBAT = 4.2V



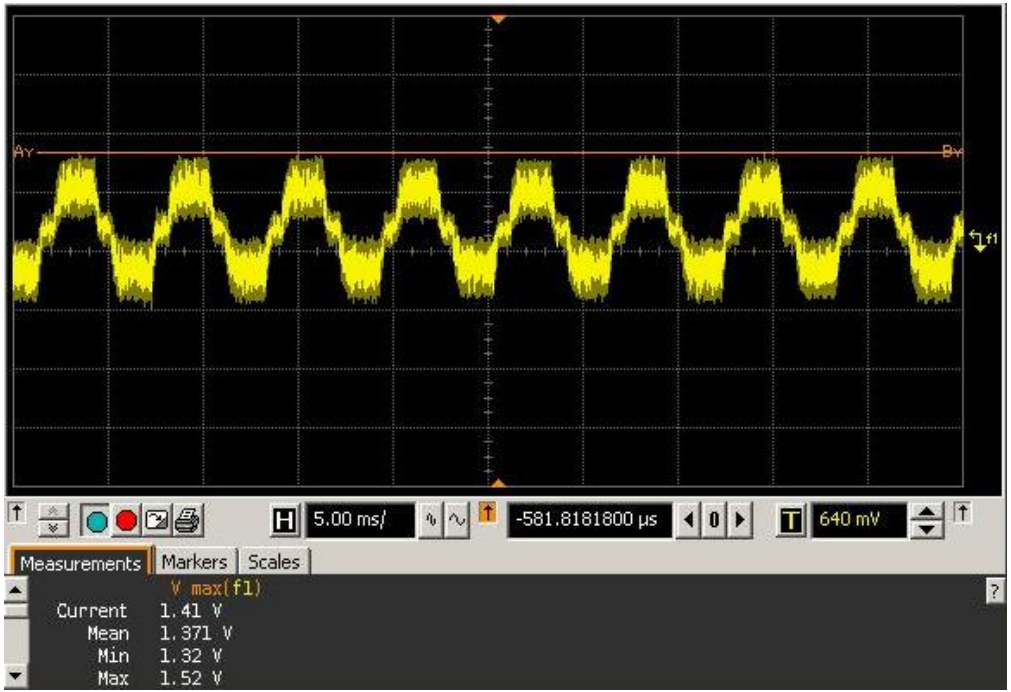
DRV2624 | Output accuracy

Test conditions: VBAT = 5V



DRV2624 | Output accuracy

Test conditions: VBAT = 5.5V



DRV2624 | Overdrive and brake parameters

- Set Up
- Closed Loop
- Open Loop

Loop	Overdrive/ Brake	Max Gp	Gp after waveform	Aftershock length (ms)
Closed	No	0.98	0.96	56.5
Closed	Yes	1.9	0.19	10.6
Open	No	1.05	1.02	57.0
Open – Sine	Yes	1.85	0.19	11.8
Open - Square	Yes	2.28	0.22	17.2

Note: Aftershock length measured to be end of drive waveform (before brake signal) to 10% of peak acceleration

Set Up

- DRV2624EVM
- AAC0619 LRA
  - Resonant frequency = 175 Hz
  - Rated voltage = 1.2 Vrms
- DRV-AAC16EVM (accelerometer)
  - 57 mVp = 1 Gp
- VDD = 5V (USB)
- Waveform duration = 20 ms

Close Loop | No Overdrive or Braking

- Rated voltage = 1.2 V rms
- Overdrive voltage = 1.7 Vp (no overdrive)
- Max Gp = 0.98
- Gp at end of waveform = 0.96
- Aftershock duration = 56.5 ms

Close Loop | 1V Overdrive + Braking

- Rated voltage = 1.2 V rms
- Overdrive voltage = 2.7 Vp
- Max Gp = 1.90
- Gp at end of waveform = 0.19
- Aftershock duration = 10.6 ms

Open Loop | No Overdrive or Braking

- Rated voltage = NA
- Overdrive voltage = 1.7 Vp (no overdrive)
- Max Gp = 1.05
- Gp at end of waveform = 1.02
- Aftershock duration = 57.0 ms

Open Loop Sine | 1V Overdrive + Braking

- Rated voltage = NA
- Overdrive voltage = 2.7 Vp
- Max Gp = 1.85
- Gp at end of waveform = 0.19
- Aftershock duration = 11.8 ms

Open Loop Square | 1V Overdrive + Braking

- Rated voltage = NA
- Overdrive voltage = 2.7 Vp
- Max Gp = 2.28
- Gp at end of waveform = 0.22
- Aftershock duration = 17.2 ms