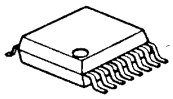
PWM 3-PHASE DC BRUSHLESS MOTOR CONTROL IC

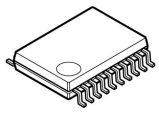
GENERAL DESCRIPTION

The NJM2626 is a 3-phase DC brush less motor control pre-driver IC with PWM control.
It takes hall IC inputs and generates motor driving waveform.
Output pre-driver is optimized to work with external power MOS transistors for better power handling.
The NJM2626 can easily implement 3-phase DC motor application with speed control feature.

Package Outline



NJM2626V



NJM2626VC3

- Operating Voltage — Vcc= 6V to 26V
- Pre-driver circuit
  - -Lower arm: Iout=+30mA/-30mA TYP.
  - -Upper arm: Iout=30mA TYP.
- Current limit sensing voltage — Current limit=0.5V±10%
- Internal Oscillator
  - -Frequency control by external capacitor
- Forward or Reverse direction — Internal pull-up resistor 10kΩ
- Internal Soft Start
  - -External capacitor to Verr pin
- Internal ON/OFF Circuit
  - -No-output is Verr pin to GND
- Bipolar Technology
- Package Outline — SSOP-16/ SSOP20-C3

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYNBOL	RATINGS		UNIT
Logic Supply Voltage	V_{CC}	28		V
Maximum Output Current	Io_{MAX}	40		mA
Power Dissipation (SSOP-16)	P_D	Without Board	300	mW
		(*1) Mounted on the 2 layered PCB	640	
Power Dissipation (SSOP20-C3)	P_D	(*1) Mounted on the 2 layered PCB	1000	mW
		(*1) Mounted on the 4 layered PCB	1500	
Operating Temperature Range	Topr	-40 ~ +85		°C
Storage Temperature range	Tstg	-50 ~ +150		°C

(*1): Mounted on the glass epoxy board based on EIA/JEDEC. (114.3x76.2x1.6mm: 2Layer/4Layer)

■ **ELECTRICAL CHARACTERISTICS** (V_{CC}=12V, Ct=1000pF, Cref=1μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
■ General						
Operation Supply Voltage	V_{CC}	-	6.0	-	26.0	V
Under Voltage Sense Voltage	UVLO	Output Enable V_{CC} Decreasing	4.5	5.0	5.5	V
Hysteresis Voltage (Under Voltage Lock Out)	ΔUVLO	-	0.35	0.45	0.55	V
Supply Current	I_{CC}	RL=∞	-	12.0	18.0	mA
■ Reference Voltage Section						
Reference Voltage Output	Vref	Iref=1.0mA	3.6	4.0	4.4	V
Line Regulation	$\Delta Vref_{LI}$	V_{CC}=6V ~ 18V	-	50	100	mV
Load Regulation	$\Delta Vref_{LO}$	Iref=1.0mA ~ 20.0mA	-	10	50	mV
■ Hall Amplifier Section						
Input H Level Voltage	V_{hH}	-	V_{CC}-0.8	-	-	V
Input L Level Voltage	V_{hL}	-	-	-	0.8	V
Input Bias Voltage	I_{ho}	Vin=0.8V	-	-	-400	nA
Pull-up Resistance	R_{PUH}	Vin=0.8V	7	10	13	kΩ
■ Output Section						
Under Arm Output Voltage 1	V_{OH}(D)	Isource=30mA	10	10.3	-	V
Under Arm Output Voltage 2	V_{OL}(D)	Isink=30mA	-	0.5	1.0	V
Output Clamp Voltage	V_{CL}(D)	V_{CC}=26V	-	18	20	V
Upper Arm Output Voltage	V_{OL}(U)	Isink=30mA	-	0.5	1.0	V
Output Leak Current	Io_{LEAK}	-	-	-	1.0	uA
■ Over Current Sense Section						
Sense Voltage	V_{TH}	-	0.45	0.50	0.55	V
Hysteresis Voltage	V_{THhys}	-	-	0.1	-	V
Input Voltage Ratio	V_{IN}	-	-	-	3.0	V
Input Bias Current	I_{IB}	V_{IN}=0V	-	-0.9	-5.0	μA
■ Oscillator Section						
Oscillation Frequency	f_{osc}	-	22	27	33	kHz
Supply Voltage Change Ratio	$\Delta f_{osc}/\Delta V$	V_{CC}=6V ~ 18V	-	1	5	%
PWM0% Sense Voltage	PWM0	PWM DUTY=0%	-	-	0.35	V
PWM100% Sense Voltage	PWM1	PWM DUTY=100%	3.5	-	-	V
Saw Wave Peak Voltage	Vp_{fosc}	-	2.4	2.8	3.2	V
Saw Wave Bottom Voltage	Vb_{fosc}	-	0.75	0.9	1.05	V

□ ELECTRICAL CHARACTERISTICS (V_{CC}=12V, Ct=1000pF, Cref=1μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
□ Error Amplifier Section						
Input Offset Voltage	V_{IO}	-	-	7	-	mV
Input Bias Current	I_{IBRR}	-	-	-46	-	nA
Input Common Mode Voltage Range	V_{ICMRR}	-	0	-	Vref	V
□ Forward/ Reverse Direction Section (FR input terminal)						
Output Forward Direction	V_F	-	Vref-0.8	-	Vref	V
Output Reverse Direction	V_R	-	-	-	0.8	V
Hysteresis Voltage Ratio	ΔV_{FR}	-	-	0.5	-	V
Pull-Up Resistance	RPU_{FR}	-	7	10	13	kΩ

Note: Output switch test are performed under pulsed conditions to minimize power dissipation.

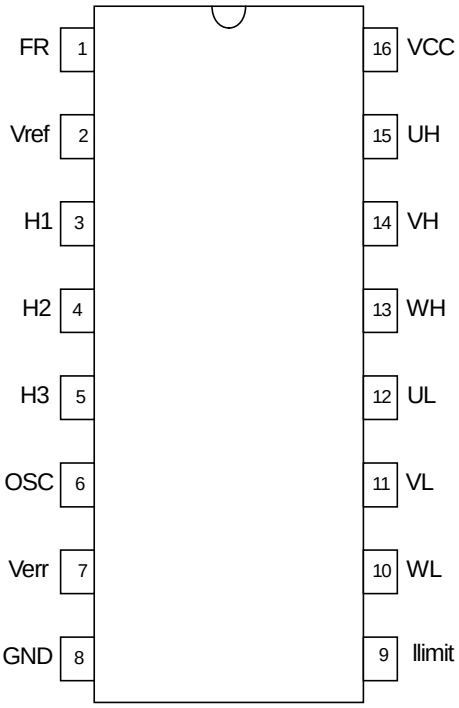
■ HALL INPUT vs HALL OUTPUT TRUTH TABLE

FR=L			FR=H			H:Source, L:Sink, X:Hi-Z					
H1	H2	H3	H1	H2	H3	UH	VH	WH	UL	VL	WL
H	L	H	L	H	L	X	L	X	H	L	L
H	L	L	L	H	H	X	X	L	H	L	L
H	H	L	L	L	H	X	X	L	L	H	L
L	H	L	H	L	H	L	X	X	L	H	L
L	H	H	H	L	L	L	X	X	L	L	H
L	L	H	H	H	L	X	L	X	L	L	H

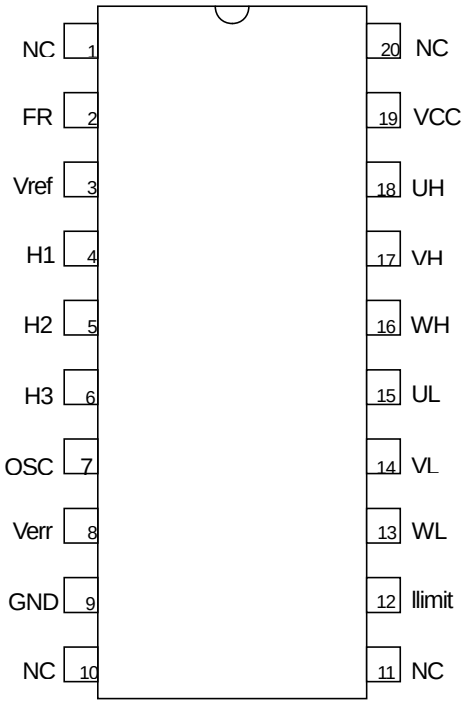
■ FR INPUT TERMINAL

Terminal Voltage	Direction
L input	F
H input	R

■ PIN CONFIGURATION

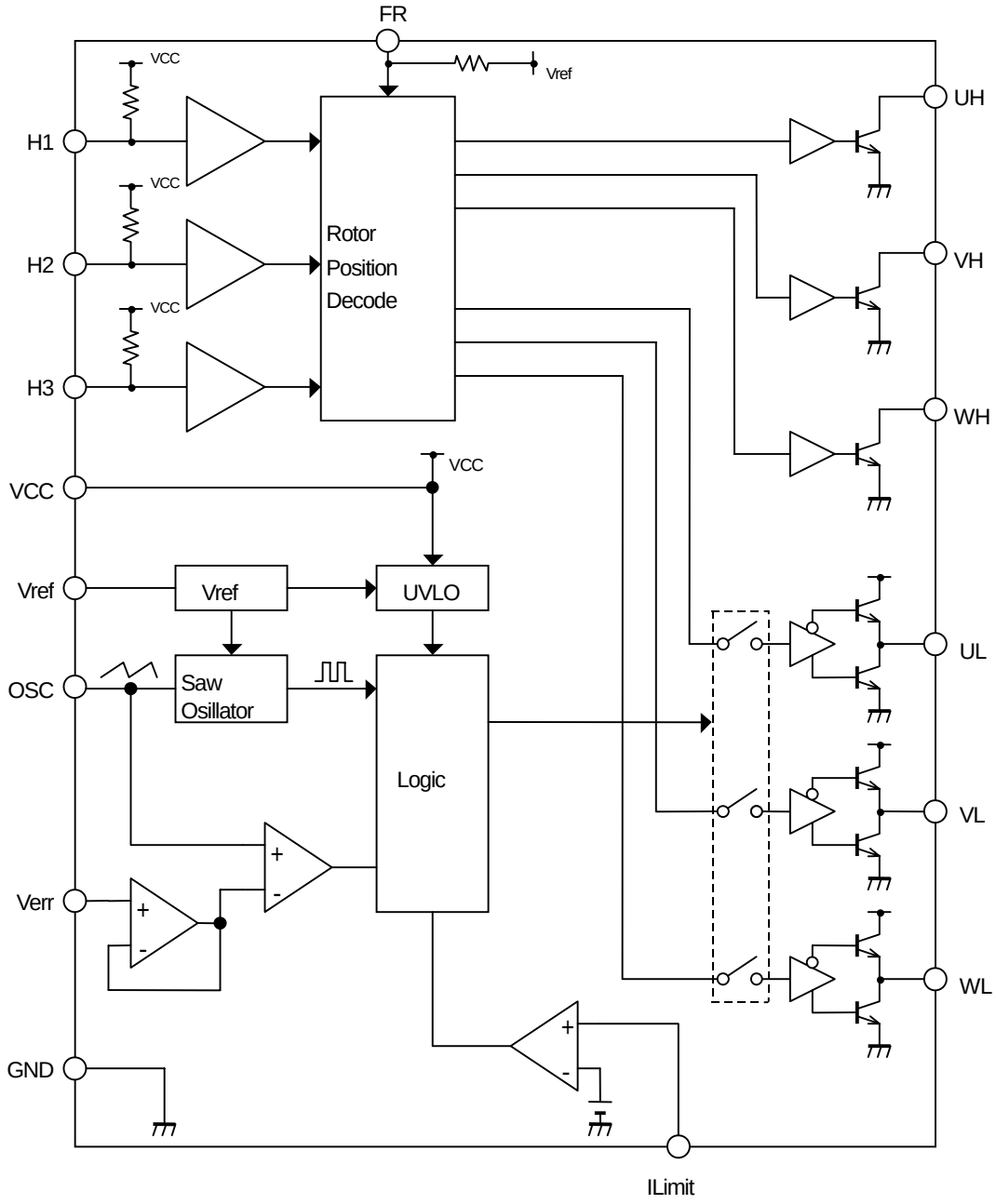


SSOP-16



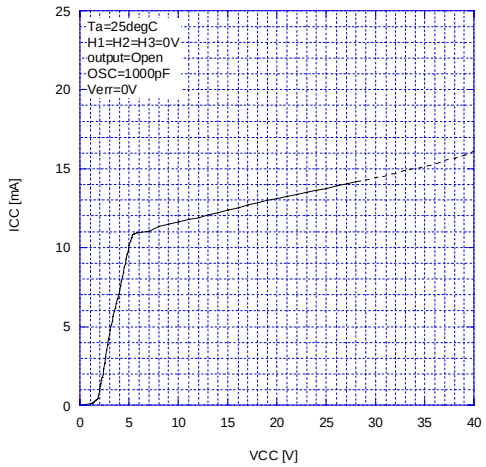
SSOP20-C3

BLOCK DIAGRAM

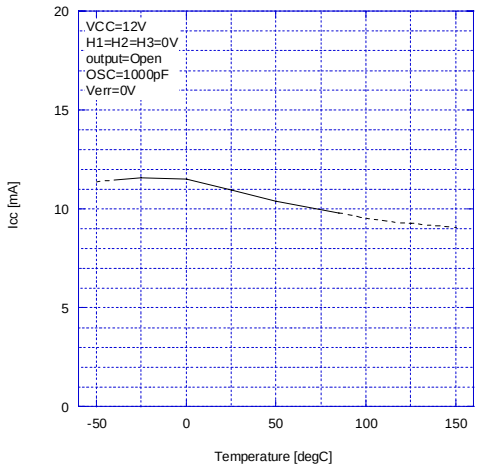


■ TYPICAL CHARACTERISTICS

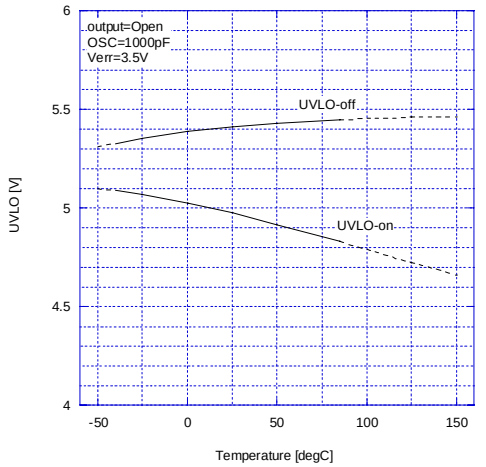
ICC vs. VCC



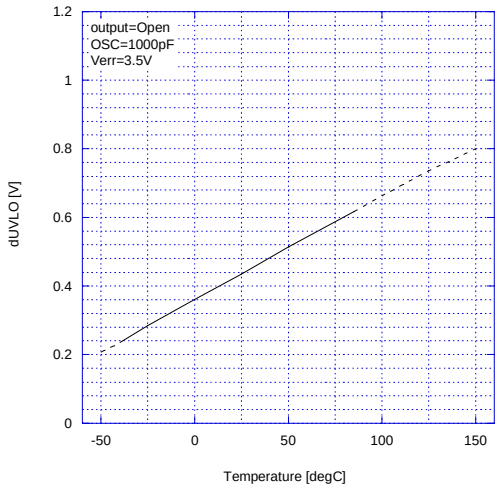
ICC vs. Temperature



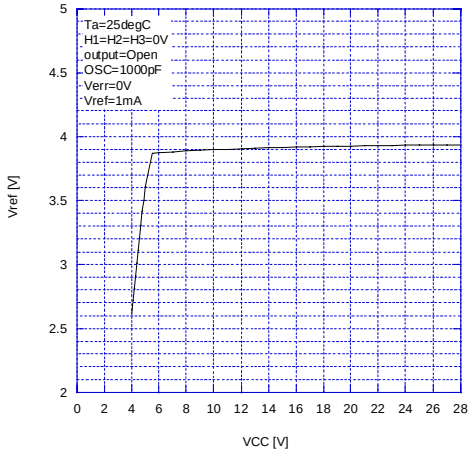
UVLO vs. Temperature



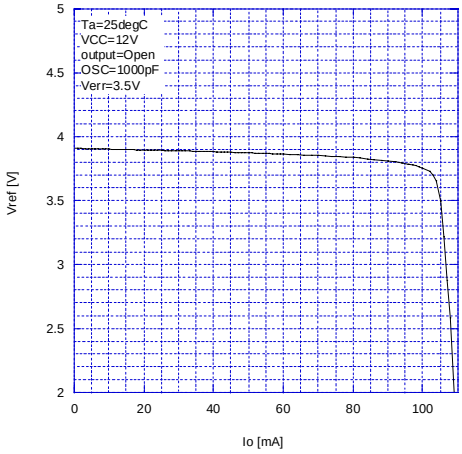
dUVLO vs. Temperature



Vref vs. VCC

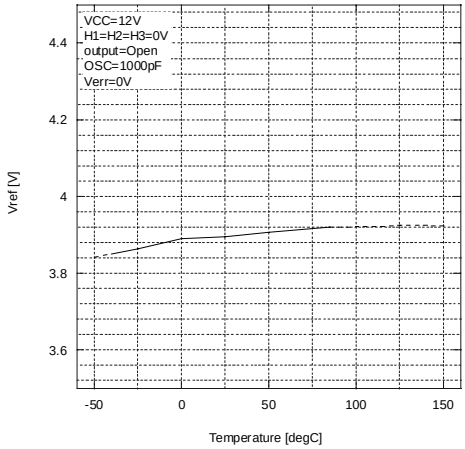


Vref vs. Io

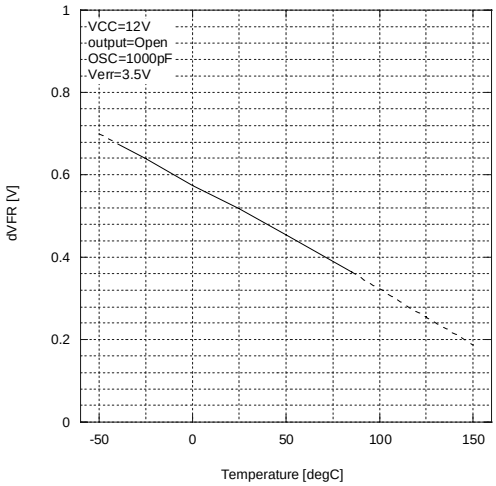


■TYPICAL CHARACTERISTICS

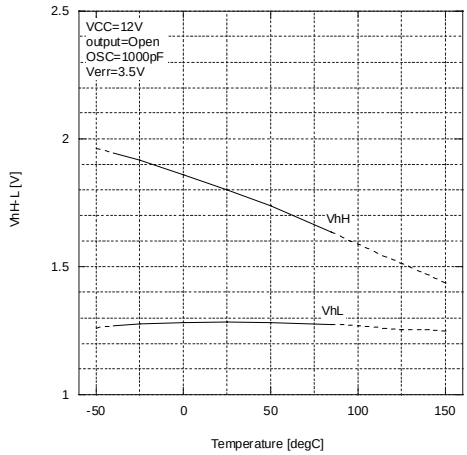
Vref vs. Temperature



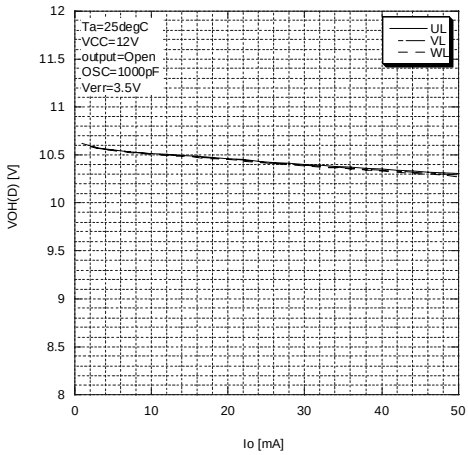
dVFR vs. Temperature



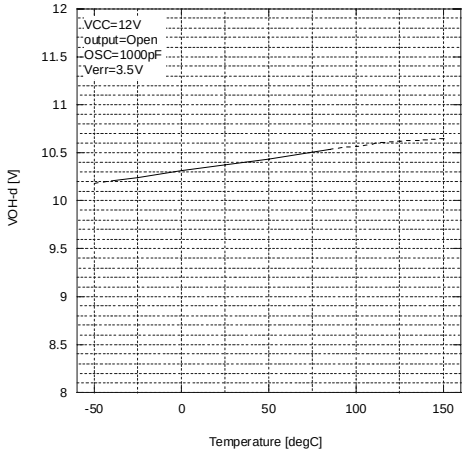
VhH-L vs. Temperature



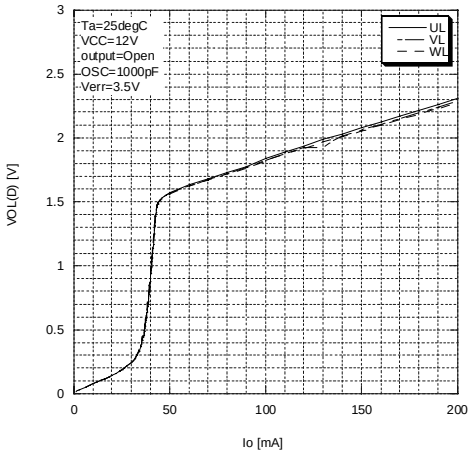
VOH(D) vs. Io



VOH-d vs. Temperature

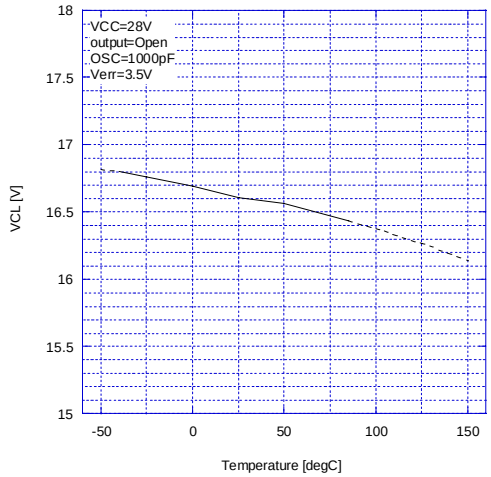


VOL(D) vs. Io

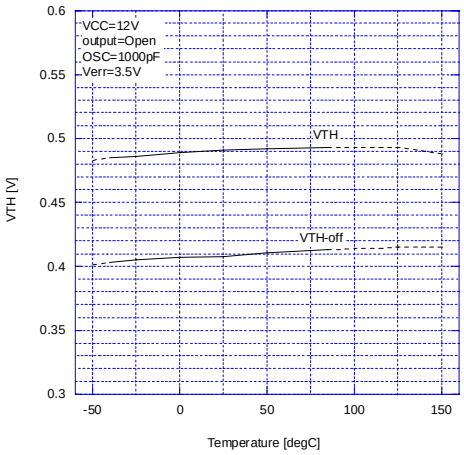


■ TYPICAL CHARACTERISTICS

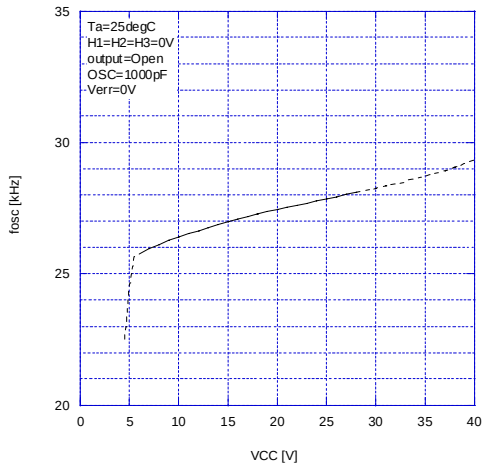
VCL vs. Temperature



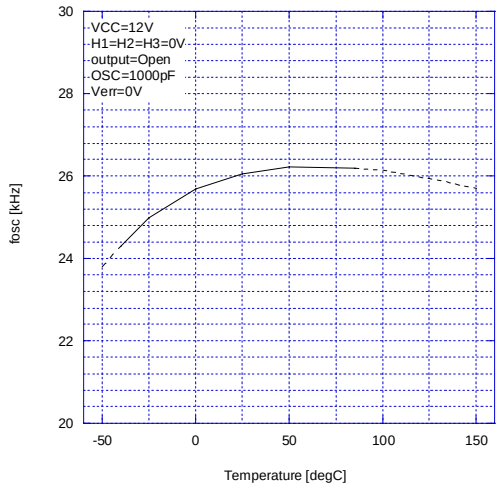
VTH vs. Temperature



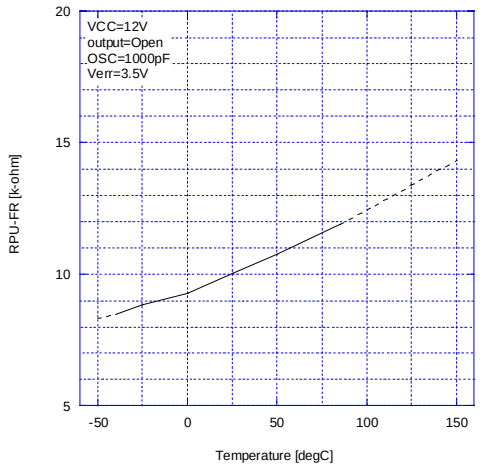
fosc vs. VCC



fosc vs. Temperature



RPU-FR vs. Temperature



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