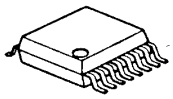
PWM 3-PHASE DC BRUSHLESS MOTOR CONTROL IC

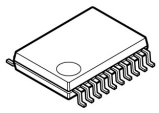
GENERAL DESCRIPTION

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.

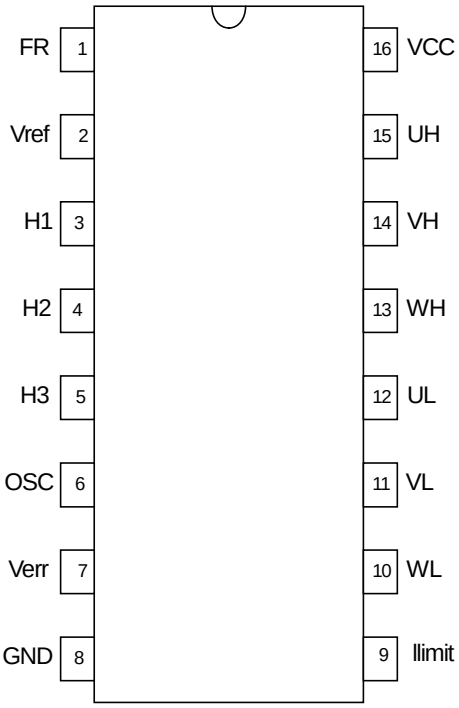
■ HALL INPUT vs HALL OUTPUT TRUTH TABLE

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

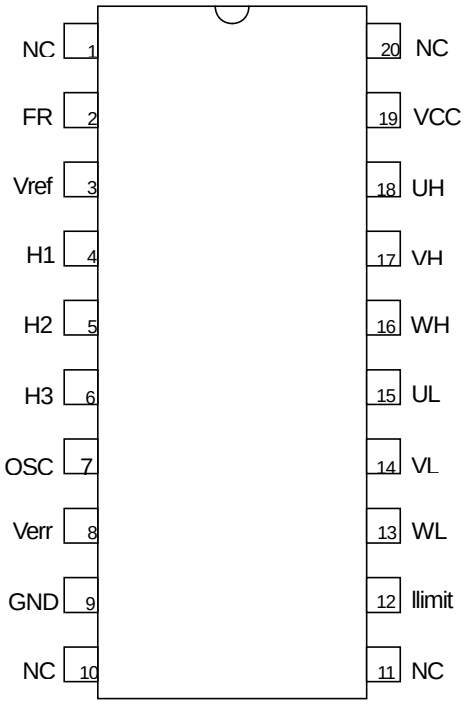
■ FR INPUT TERMINAL

Terminal Voltage	Direction
L input	F
H input	R

■ PIN CONFIGURATION

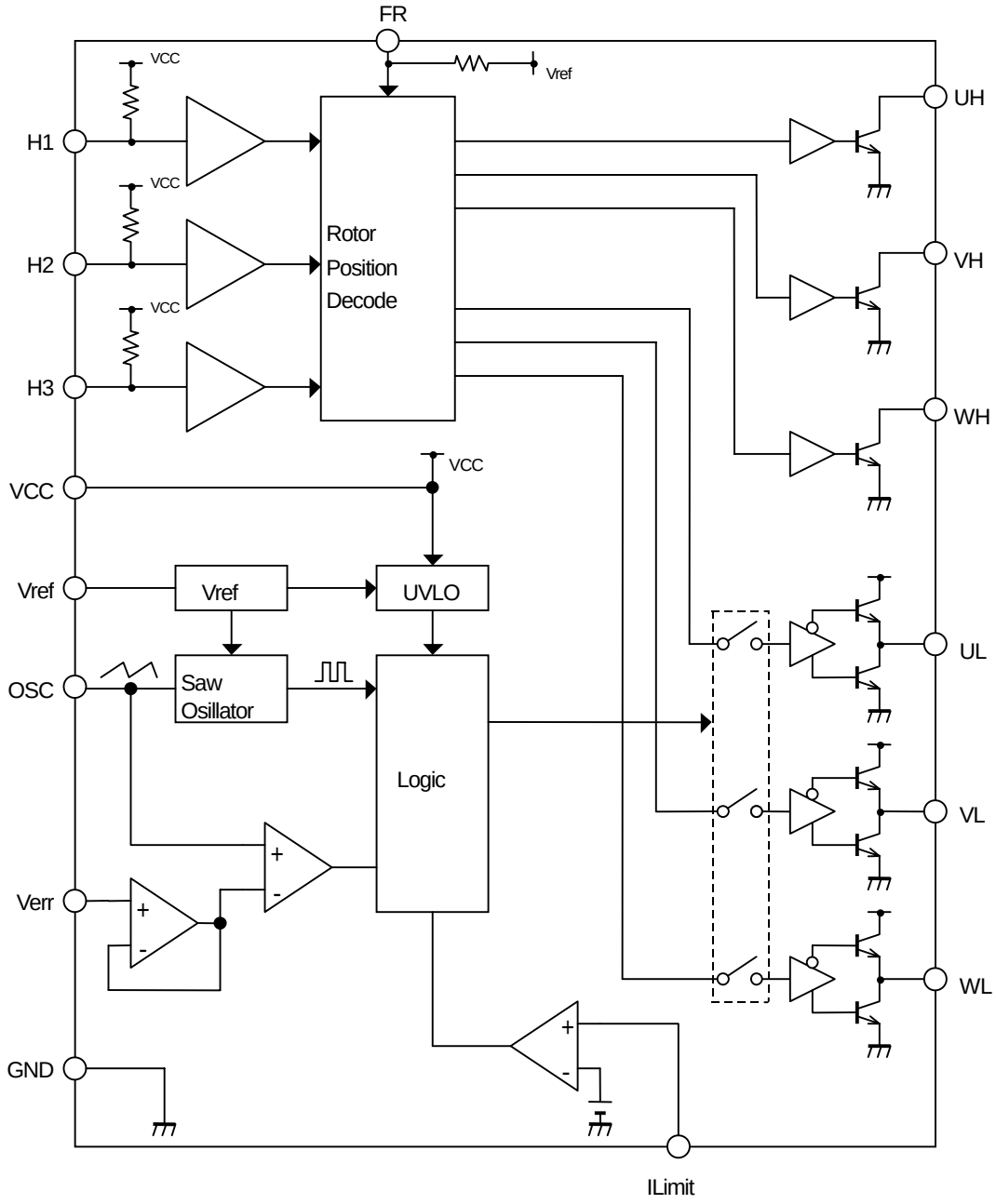


SSOP-16



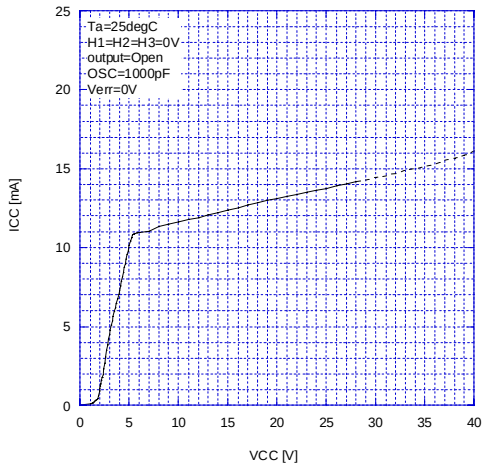
SSOP20-C3

BLOCK DIAGRAM

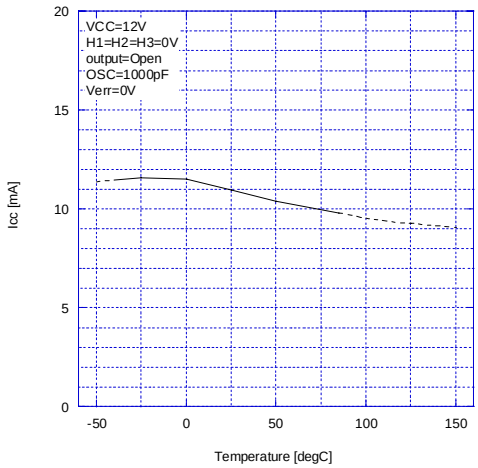


■ TYPICAL CHARACTERISTICS

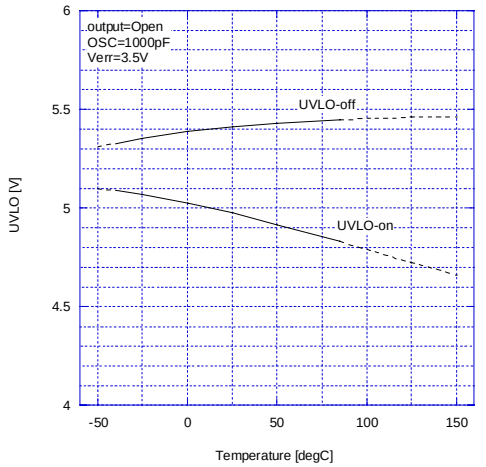
ICC vs. VCC



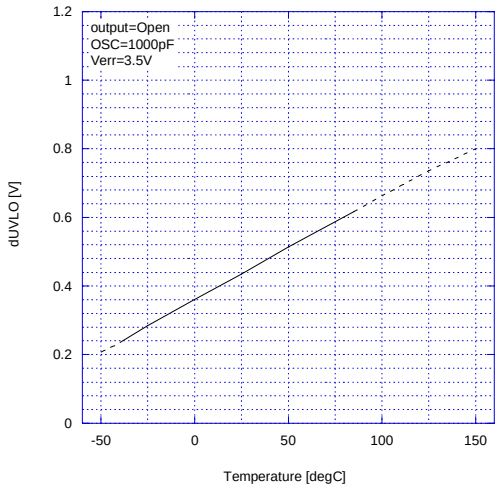
ICC vs. Temperature



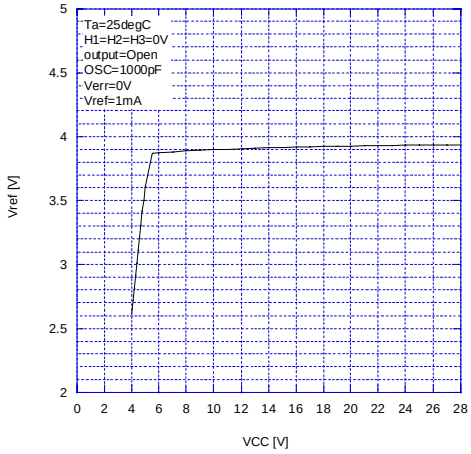
UVLO vs. Temperature



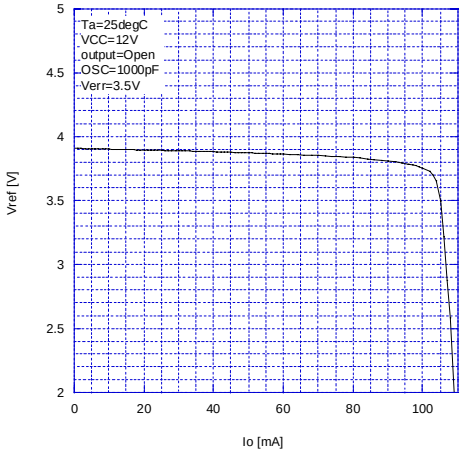
dUVLO vs. Temperature



Vref vs. VCC

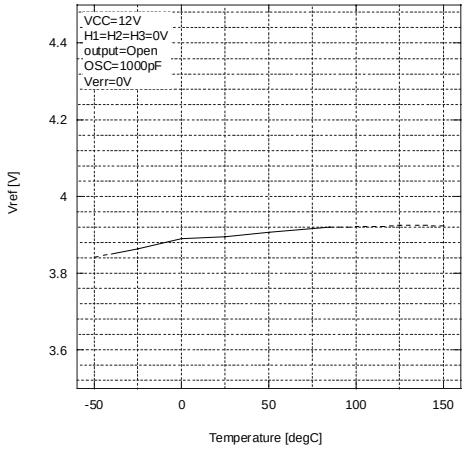


Vref vs. Io

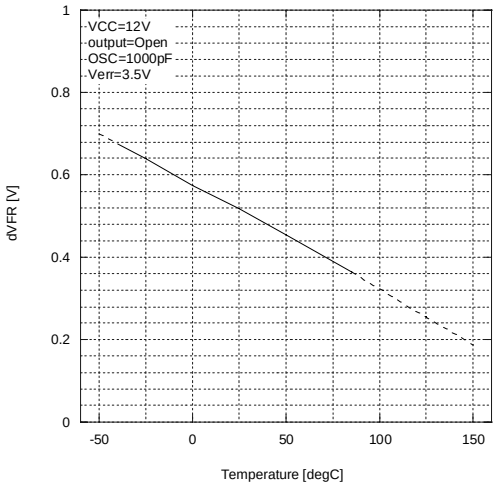


■TYPICAL CHARACTERISTICS

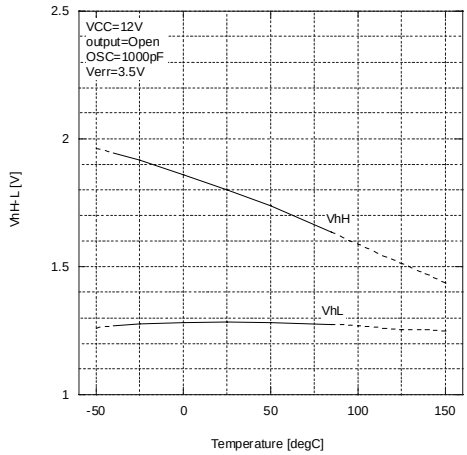
Vref vs. Temperature



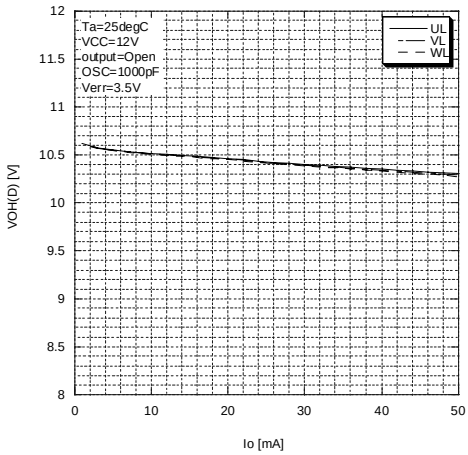
dVFR vs. Temperature



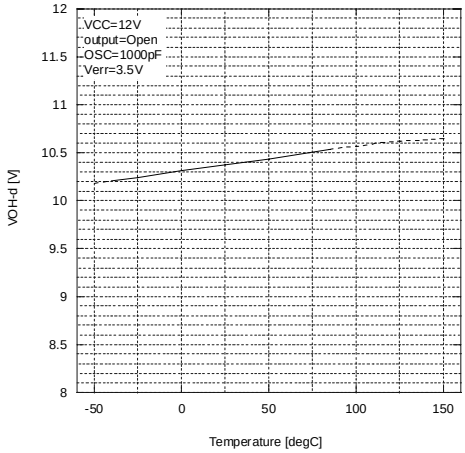
VhH-L vs. Temperature



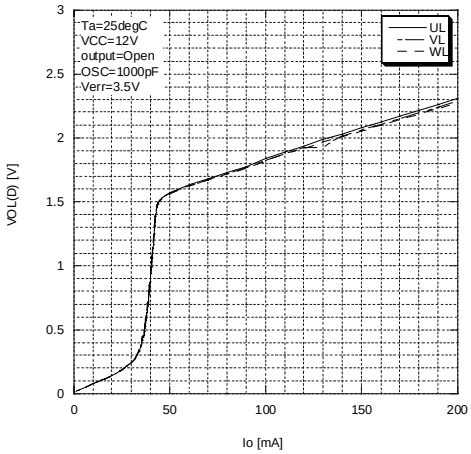
VOH(D) vs. Io



VOH-d vs. Temperature

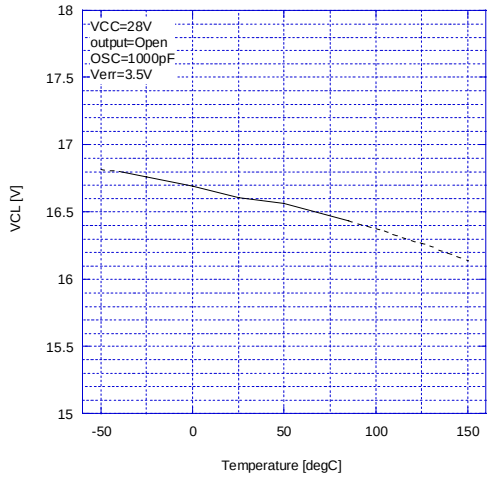


VOL(D) vs. Io

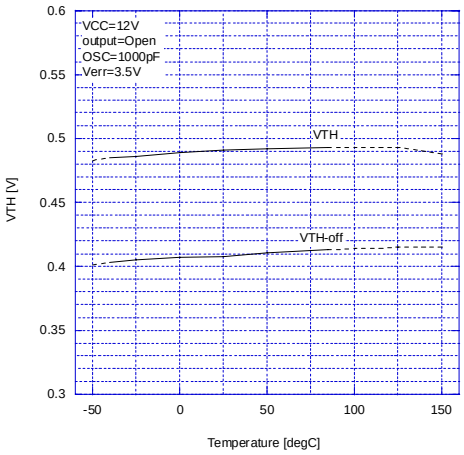


■ TYPICAL CHARACTERISTICS

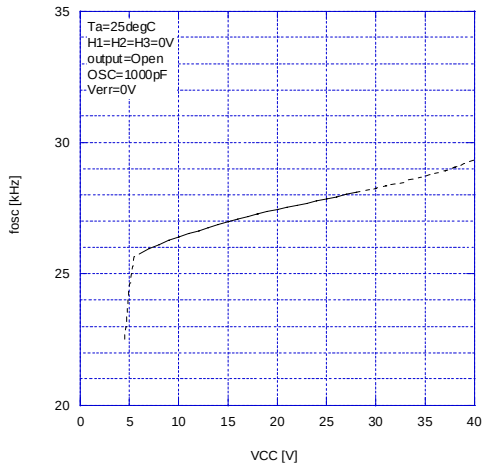
VCL vs. Temperature



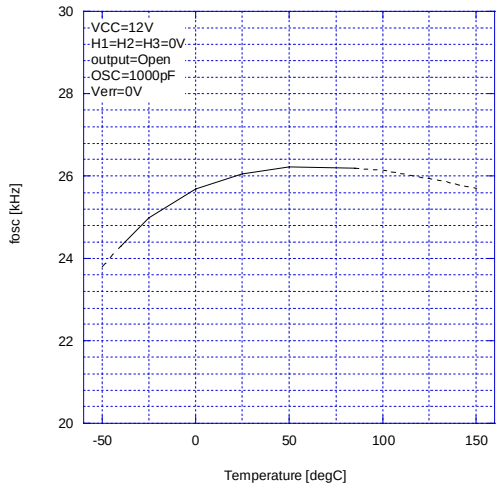
VTH vs. Temperature



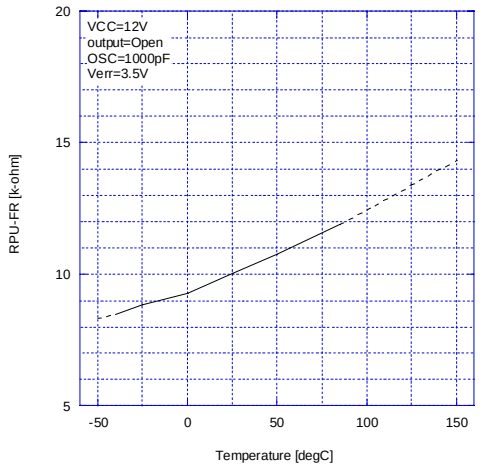
fosc vs. VCC



fosc vs. Temperature



RPU-FR vs. Temperature



[CAUTION]
The specifications on this databook are only given for information , without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.