

**Features**

- Independent 6-Channel H-Bridge
- Built-in 4 constant voltage drivers, two of those drivers with brake function.
- Built-in 2 constant current drivers.
- Low on-resistance <math>< 1.2 \Omega</math> (typ.)
- Built-in charge pump(to drive the upside NMOS of H-bridge drivers)
- Low Voltage operation
- Built-in Thermal Shutdown Function
- LQFP-48 Package

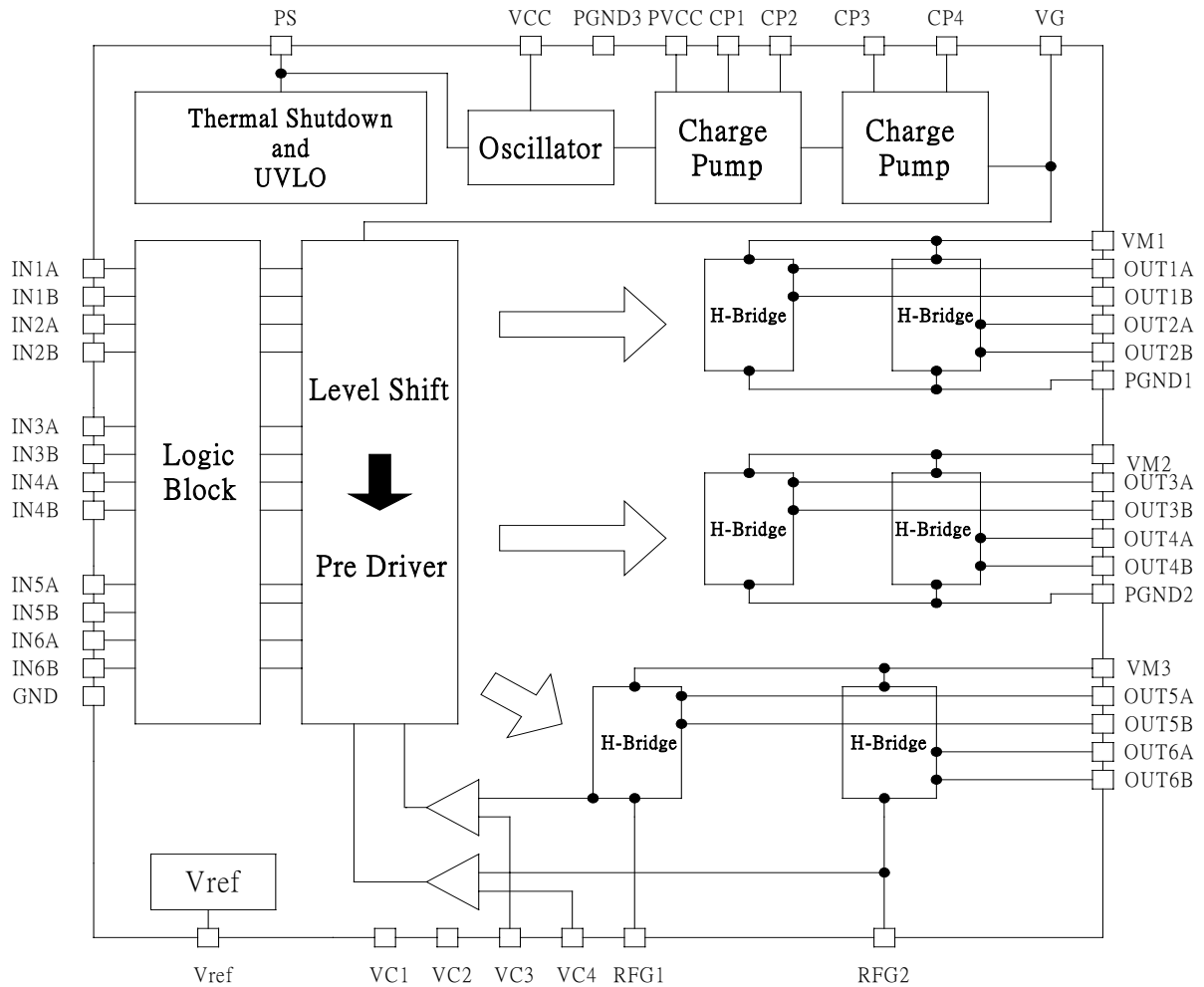
**General Description**

The AT5556 is a 6-channel H-bridge drivers IC for DSC motor application. It built in with 4 constant voltage drive and 2 constant current blocks to drive auto-focus, zoom, shutter, auto-exposure motors.

**Applications**

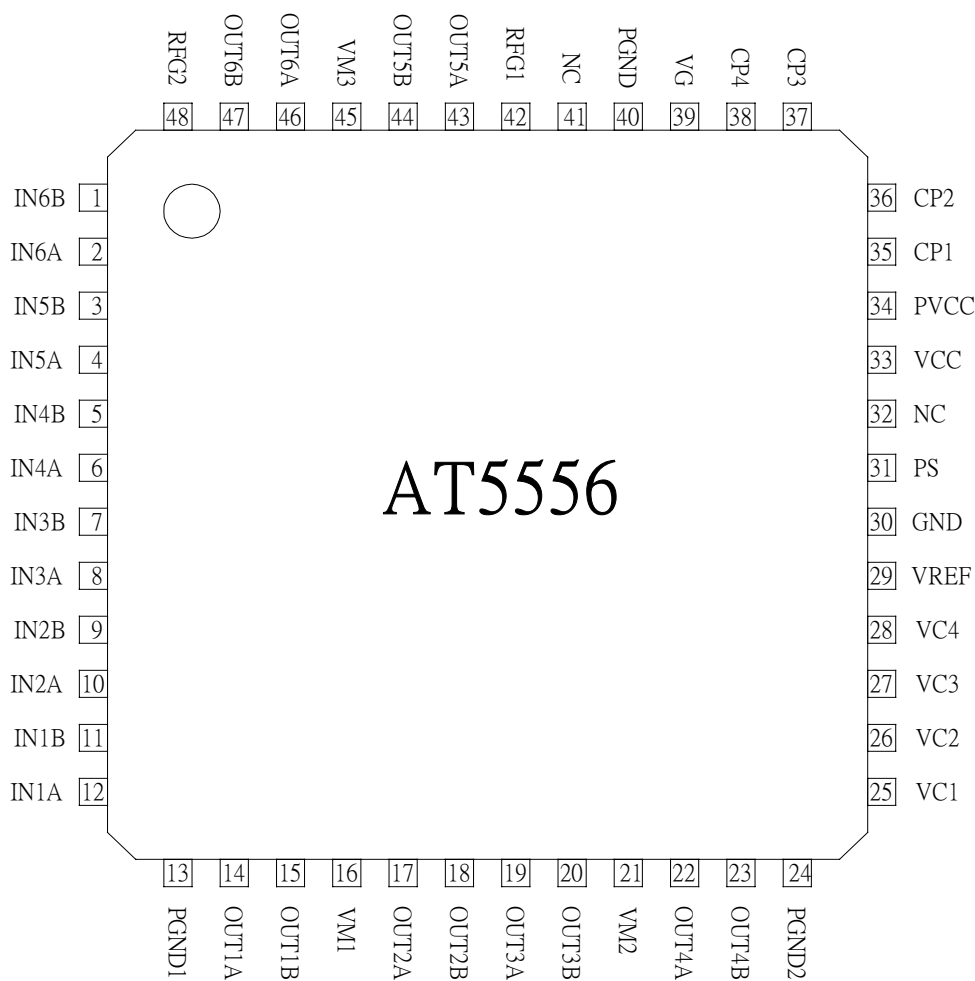
- DSC motor Driver

**Block Diagram**



**Aimtron reserves the right without notice to change this circuitry and specifications.**

**Pin Configuration**



**Ordering Information**

Part number	Package	Marking
AT5556F	LQFP48	AT5556F
AT5556F_PBF	LQFP48, PB-Free	AT5556F, date code with one bottom line
AT5556F_GRE	LQFP48, Green	AT5556F, date code with two bottom line
AT5556N_GRE	QFN48, Green	AT5556N

**Pin Description**

Pin NO.	Symbol	I/O	Description
1	IN6B	I	It combines IN6A to decide the state of the constant current driver6
2	IN6A	I	It combines IN6B to decide the state of the constant current driver6
3	IN5B	I	It combines IN5A to decide the state of the constant current driver5
4	IN5A	I	It combines IN5B to decide the state of the constant current driver5
5	IN4B	I	It combines IN4A to decide the state of the constant voltage driver4
6	IN4A	I	It combines IN4B to decide the state of the constant voltage driver4
7	IN3B	I	It combines IN3A to decide the state of the constant voltage driver3
8	IN3A	I	It combines IN3B to decide the state of the constant voltage driver3
9	IN2B	I	It combines IN2A to decide the state of the constant voltage driver2
10	IN2A	I	It combines IN2B to decide the state of the constant voltage driver2
11	IN1B	I	It combines IN1A to decide the state of the constant voltage driver1
12	IN1A	I	It combines IN1B to decide the state of the constant voltage driver1
13	PGND1	P	GND1
14	OUT1A	O	H-bridge output terminal 1A of the constant voltage driver1
15	OUT1B	O	H-bridge output terminal 1B of the constant voltage driver1
16	VM1	P	Power supply for Motor1, 2
17	OUT2A	O	H-bridge output terminal 2A of the constant voltage driver2
18	OUT2B	O	H-bridge output terminal 2B of the constant voltage driver2
19	OUT3A	O	H-bridge output terminal 3A of the constant voltage driver3
20	OUT3B	O	H-bridge output terminal 3B of the constant voltage driver3
21	VM2	P	Power supply for Motor3, 4
22	OUT4A	O	H-bridge output terminal 4A of the constant voltage driver4
23	OUT4B	O	H-bridge output terminal 4B of the constant voltage driver4
24	PGND2	P	GND2
25	VC1	I	It is used to control the output voltage of constant voltage driver1~2
26	VC2	I	It is used to control the output voltage of constant voltage driver3~4
27	VC3	I	Voltage for current limit control of the constant current driver5
28	VC4	I	Voltage for current limit control of the constant current driver6
29	VREF	I	Reference voltage being divided for VC1~4 to individually use
30	GND	P	GND
31	PS	I	Power save which can force all outputs to become open state
32	NC		
33	VCC	P	Power supply
34	PVCC	P	Power supply for input voltage of charge pump
35	CP1	I	Capacitor terminal 1 for charge pump
36	CP2	I	Capacitor terminal 2 for charge pump
37	CP3	I	Capacitor terminal 3 for charge pump
38	CP4	I	Capacitor terminal 4 for charge pump
39	VG	P	Output voltage of charge pump
40	PGND	P	GND
41	NC		
42	RFG1		Current detection terminal for the constant current driver5
43	OUT5A	O	H-bridge output terminal 5A of the constant current driver5
44	OUT5B	O	H-bridge output terminal 5B of the constant current driver5
45	VM3	P	Power supply for Motor5, 6
46	OUT6A	O	H-bridge output terminal 6A of the constant current driver6
47	OUT6B	O	H-bridge output terminal 6B of the constant current driver6
48	RFG2		Current detection terminal for the constant current driver6

**Absolute Maximum Ratings**

Item	Symbol	Ratings	Unit
Supply voltage VCC	VCC	-0.5 ~ +5.5	V
Supply voltage VM	VM	-0.5 ~ +5.5	V
Supply voltage PVCC	PVCC	-0.5 ~ +5.5	V
Charge pump voltage	VG	12	V
Control input voltage	VIN	-0.5 ~ VCC	V
Power dissipation	Pd	1000	mW
Operating temperature	Topr	-20 ~ +85	°C
Junction temperature	Tj	~ +150	°C
Storage temperature range	Tstg	-55 ~ +150	°C
Maximum output current	Iout	800	mA

**Recommended Operating Conditions(Ta=25°C)**

Item	Symbol	Ratings	Unit
Supply voltage VCC	VCC	+2.5 ~ +5.5	V
Supply voltage VM1,2,3	VM1,2,3	+1.9 ~ +5.5	V
Charge pump voltage	VG	+7.5~ +10.0	V
Control input voltage	VIN	0 ~ VCC	V
H Bridge output current	Iout	-400 ~ +400	mA
Logic input frequency	Fin	0 ~ 100	kHz
Capacitor for Charge pump	CCP	0.01 ~ 0.1	μF

**Electrical Characteristic**

( $T_a=25^\circ\text{C}$ ,  $V_{CC}=PV_{CC}=3.0\text{V}$ ,  $V_M=2.5\text{V}$ ,  $R_{L1} = R_{L2} = R_{L3} = R_{L4} = 7.5\Omega$ ,  $R_{L5} = R_{L6} = 5\Omega$ )

Parameter	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
<b>Whole circuits</b>						
Circuit current at standby	ICCST	PS=L	-	0	10	$\mu\text{A}$
Circuit current1	ICC1	PS=H, IN1A1B~6A6B=L	-	1.5	3	mA
Circuit current2	ICC2	PS=H, IN1A or IN1B or IN2A or IN2B=H	-	2.65	4.7	mA
Circuit current3	ICC3	PS=H, IN3A or IN3B or IN4A or IN4B=H	-	2.65	4.7	mA
Circuit current4	ICC4	PS=H, IN5A or IN5B or IN6A or IN6B=H	-	2.65	4.7	mA
Circuit current5	ICC5	PS=H, IN1A=IN2A=IN3A=IN4A=IN5A=IN6A=H or IN1B=IN2B=IN3B=IN4B=IN5B=IN6B=H	-	4.90	5.5	mA
<b>Power save</b>						
H level input voltage	VPSH		2.0	-	-	V
L level input voltage	VPSL		-	-	0.8	V
H level input voltage	IPSH	PS=3V	-	5	20	$\mu\text{A}$
L level input voltage	IPSL	PS=0V	-1	0	-	$\mu\text{A}$
Pull-down resistance	RIN		-	1.5	-	$\text{M}\Omega$
<b>Control input</b>						
H level input voltage	VINH		2.0	-	-	V
L level input voltage	VINL		-	-	0.8	V
H level input voltage	IINH	VIN=3V	-	5	20	$\mu\text{A}$
L level input voltage	IINL	VIN=0V	-1	0	-	$\mu\text{A}$
Pull-down resistance	RIN		-	1.5	-	$\text{M}\Omega$
<b>Charge Pump</b>						
Charge pump voltage	VCP	PVCC=5V, VG=PVCC*2	9	10	-	V
<b>UVLO</b>						
UVLO voltage	VUVLO		1.8	2.0	2.2	V
<b>Vref</b>						
VREF output voltage	VREF	I <sub>out</sub> =0 ~ 1mA	0.88	0.90	0.92	V
<b>Constant voltage driver1,2(For AF/STP)</b>						
Output ON Resistance	RON	I <sub>o</sub> =+-200mA, Sum of on-resistance		1.20	1.50	$\Omega$
Output constant voltage	VO1	VC1=0.3V, R <sub>load</sub> =7.5 $\Omega$	1.40	1.50	1.60	V
<b>Constant voltage driver3,4(For ZOOM)</b>						
Output ON Resistance	RON	I <sub>o</sub> =+-200mA, Sum of on-resistance		1.20	1.50	$\Omega$

Output constant voltage	VO2	VC2=0.3V, Rload=7.5Ω	1.40	1.50	1.60	V
<b>Constant current driver5,6</b>						
Output ON Resistance	RON	Io=+-300mA, Sum of on-resistance	-	1.00	1.25	Ω
Output Limit voltage	VOL	RFG=1Ω, VC3=VC4=0.3V	287	300	313	mV

**Input-output logic table**

Driver1,2: Stepping motor constant-voltage control for AF

Input				Output				Mode
IN1A	IN1B	IN2A	IN2B	OUT1A	OUT1B	OUT2A	OUT2B	
L	L	L	L	Z	Z	Z	Z	Standby
H	L	L	L	H	L	Z	Z	1,2 phase excitation
H	L	H	L	H	L	H	L	
L	L	H	L	Z	Z	H	L	
L	H	H	L	L	H	H	L	
L	H	L	L	L	H	Z	Z	
L	H	L	H	L	H	L	H	
L	L	L	H	Z	Z	L	H	
H	L	L	H	H	L	L	H	BRAKE
H	H			H	H			
		H	H			H	H	

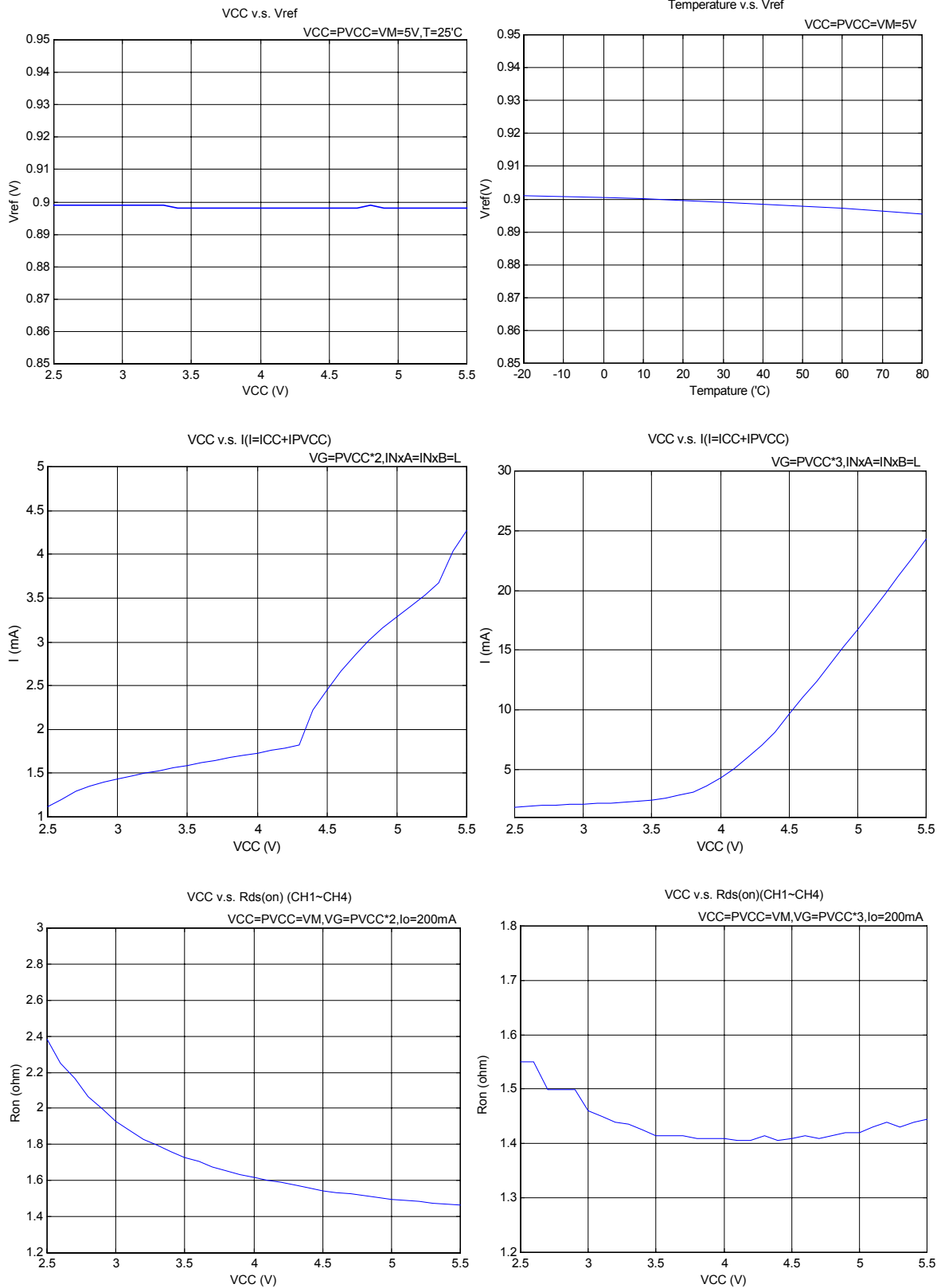
Stepping motor constant-voltage control for ZOOM or DC motor drive

Input				Output				Mode
IN3A	IN3B	IN4A	IN4B	OUT3A	OUT3B	OUT4A	OUT4B	
L	L	L	L	Z	Z	Z	Z	Standby
H	L	L	L	H	L	Z	Z	1,2 phase excitation
H	L	H	L	H	L	H	L	
L	L	H	L	Z	Z	H	L	
L	H	H	L	L	H	H	L	
L	H	L	L	L	H	Z	Z	
L	H	L	H	L	H	L	H	
L	L	L	H	Z	Z	L	H	
H	L	L	H	H	L	L	H	BRAKE
H	H			H	H			
		H	H			H	H	

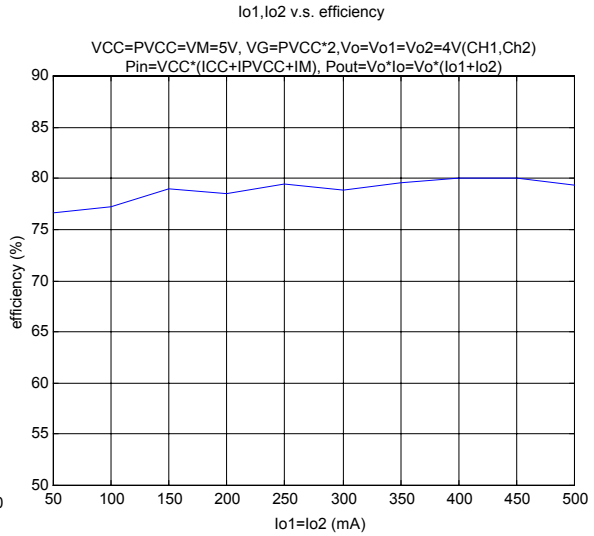
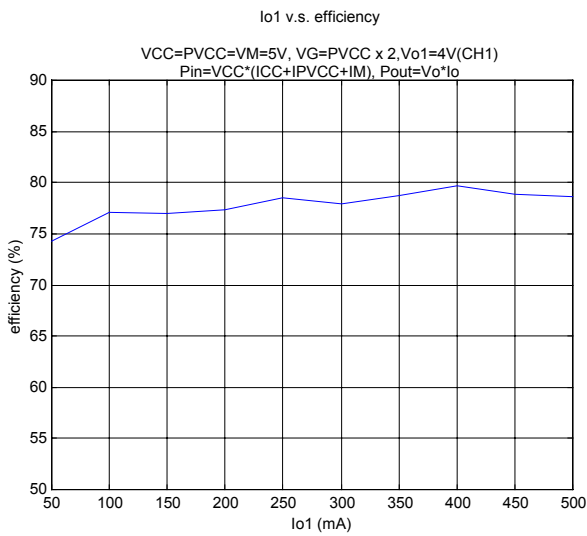
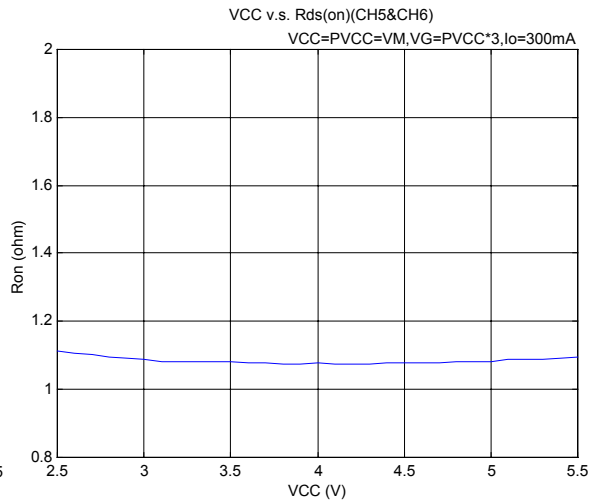
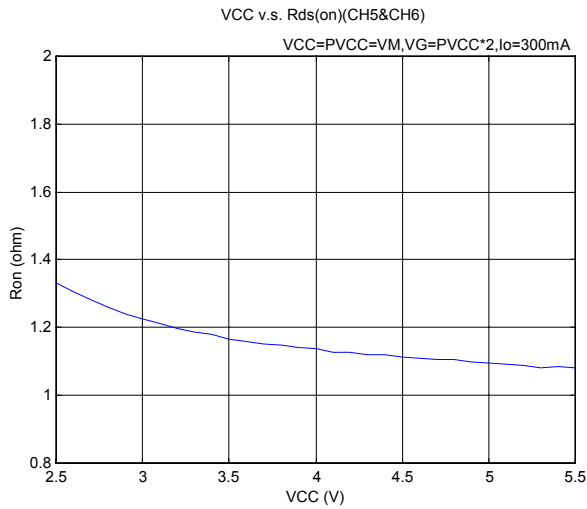
VCM constant-current control for SH/AE or stepping motor drive

Input				Output				Mode
IN5A	IN5B	IN6A	IN6B	OUT5A	OUT5B	OUT6A	OUT6B	
L	L	L	L	Z	Z	Z	Z	Standby
H	L			H	L			SH&AE
L	H			L	H			
		H	L			H	L	
		L	H			L	H	
H	H			L	L			BRAKE
		H	H			L	L	

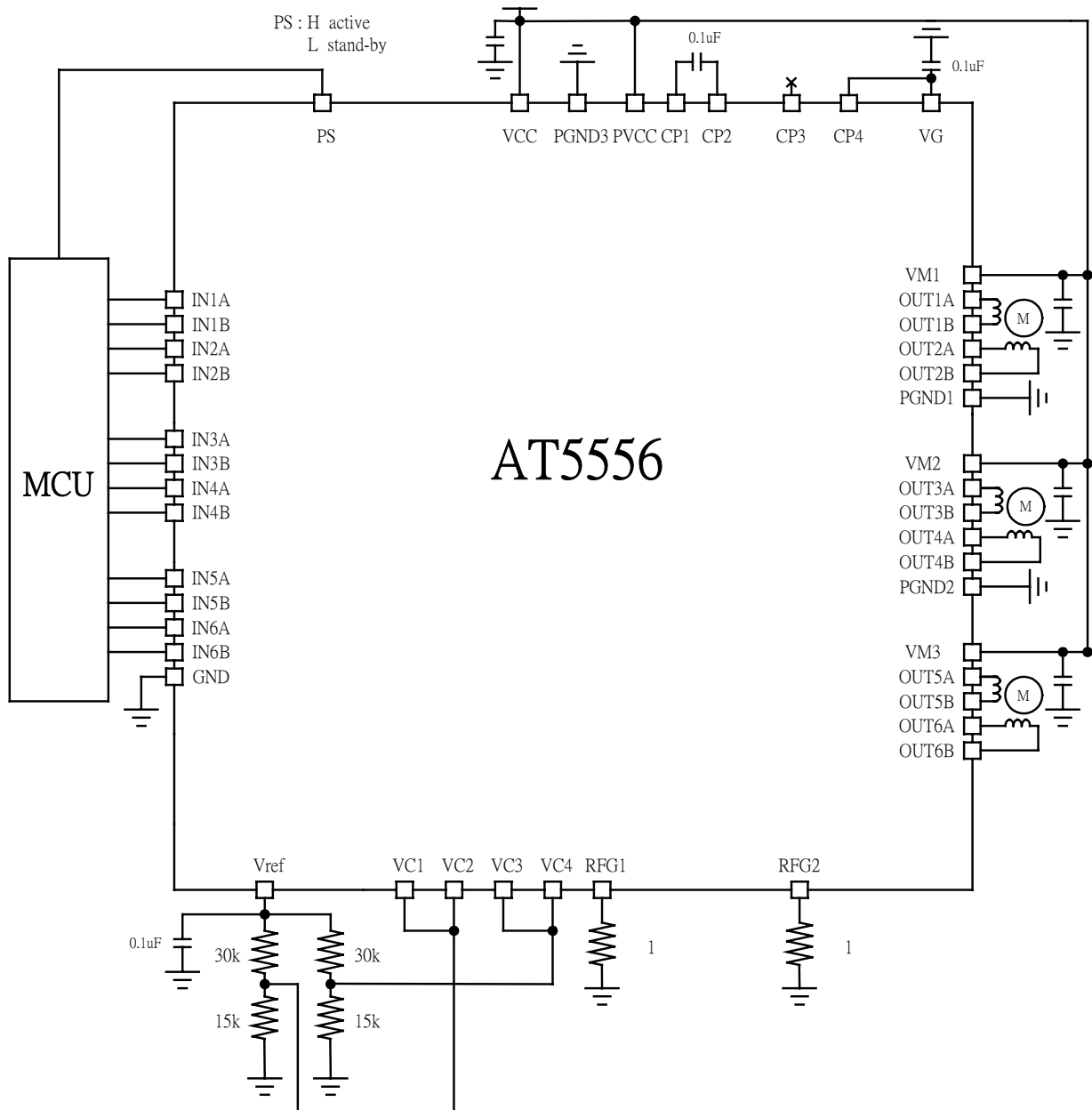
**Typical Characteristics**







**Application reference 1**



**Output voltage of charge pump(two times PVCC) :**  $VG = PVCC \times 2$

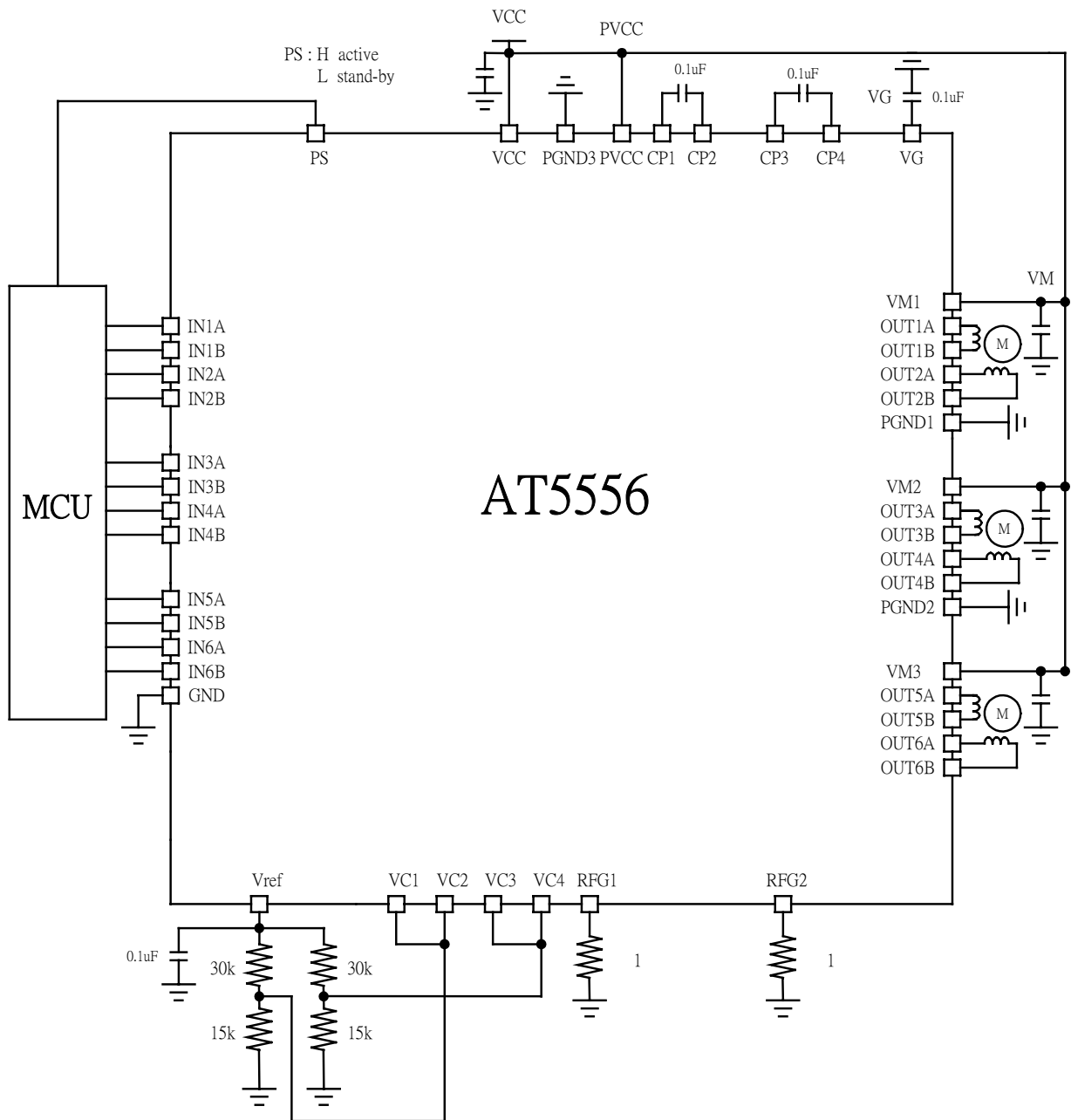
**Constant voltage :** CH1&CH2  $\rightarrow V_o = V_{C1} \times 5 - V_{SAT}$

CH3&CH4  $\rightarrow V_o = V_{C2} \times 5 - V_{SAT}$

**Constant current :** CH5  $\rightarrow I_o = V_{C3} / RFG1$

CH6  $\rightarrow I_o = V_{C4} / RFG2$

**Application reference 2**



**Output voltage of charge pump(three times PVCC) :**  $VG = PVCC \times 3$

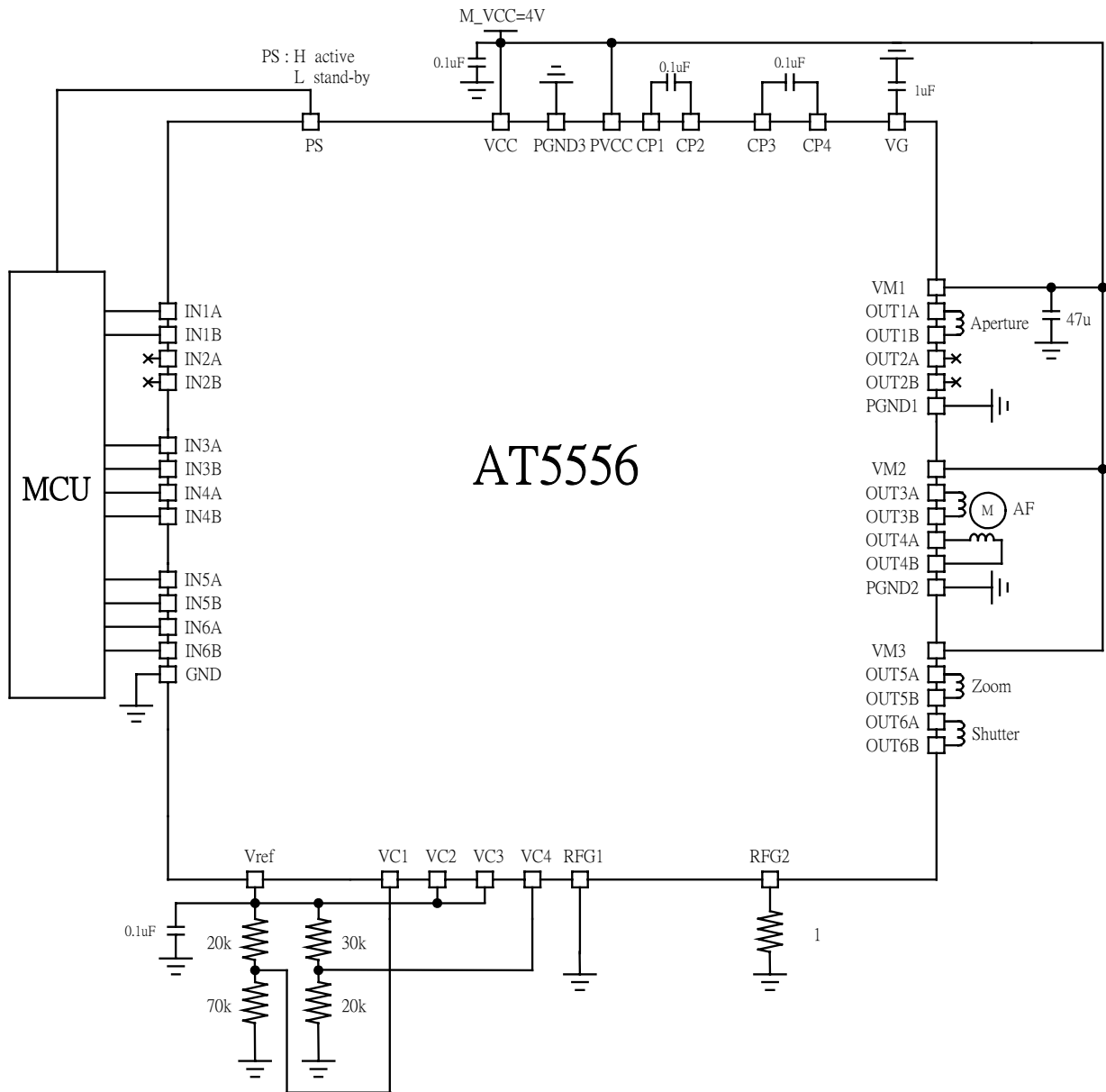
**Constant voltage :** CH1&CH2  $\rightarrow V_o = V_{C1} \times 5 - V_{SAT}$

CH3&CH4  $\rightarrow V_o = V_{C2} \times 5 - V_{SAT}$

**Constant current :** CH5  $\rightarrow I_o = V_{C3} / RFG1$

CH6  $\rightarrow I_o = V_{C4} / RFG2$

Application reference 3



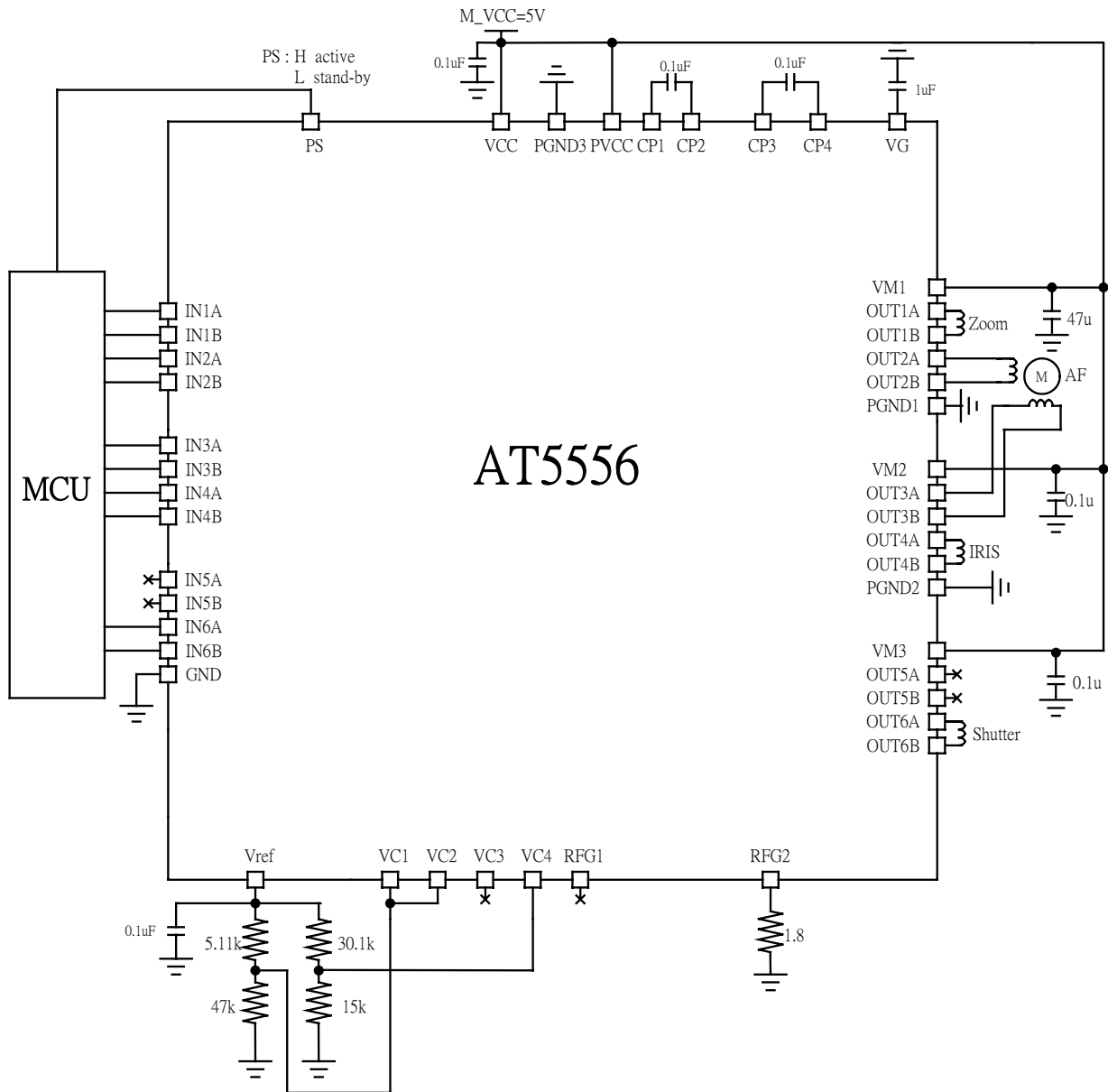
**Output voltage of charge pump(three times PVCC) :**  $V_G = PVCC \times 3$

**Constant voltage :** CH1&CH2  $\rightarrow V_o = V_{C1} \times 5 - V_{SAT}$

**Saturation mode :** CH3&CH4&CH5  $\rightarrow V_o = VM - 2V_{SAT}$

**Constant current :** CH6  $\rightarrow I_o = V_{C4} / RFG2$

Application reference 4



**Output voltage of charge pump(three times PVCC) :**  $V_G = PVCC \times 3$

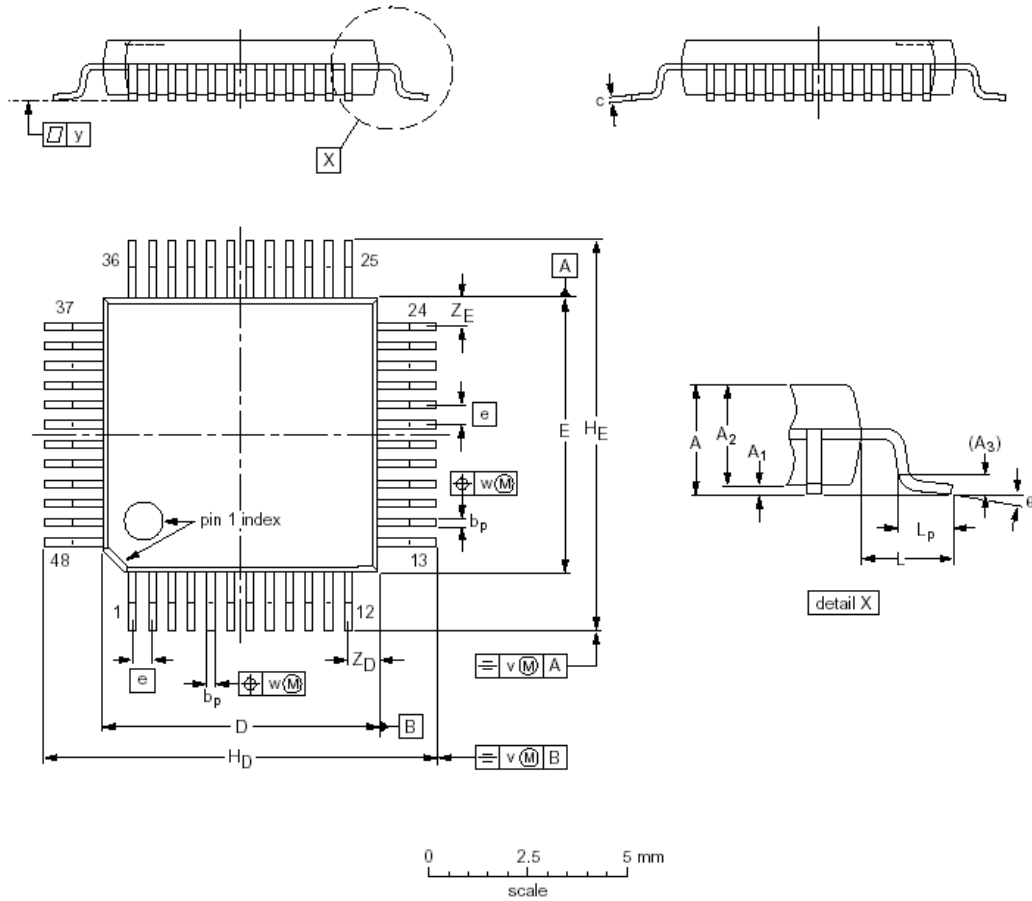
**Constant voltage :** CH1&CH2  $\rightarrow V_o = V_{C1} \times 5 - V_{SAT}$

CH3&CH4  $\rightarrow V_o = V_{C2} \times 5 - V_{SAT}$

**Constant current :** CH6  $\rightarrow I_o = V_{C4} / RFG2$

**Package Description**

LQFP48



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>D</sub>	H <sub>E</sub>	L	L <sub>p</sub>	v	w	y	Z <sub>D</sub> <sup>(1)</sup>	Z <sub>E</sub> <sup>(1)</sup>	θ
mm	1.60	0.20 0.05	1.45 1.35	0.25	0.27 0.17	0.18 0.12	7.1 6.9	7.1 6.9	0.5	9.15 8.85	9.15 8.85	1.0	0.75 0.45	0.2	0.12	0.1	0.95 0.55	0.95 0.55	7° 0°

QFN48

