MOTOROLA

Product Preview

SMARTMOS®

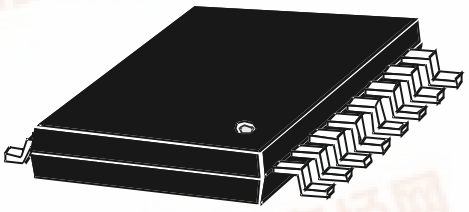
2 Channel H-Bridge Driver IC

MPC17533

MPC17533 is a monolithic type SMOS5AP SMARTMOS IC built in 2 channel H-Bridge Driver constituted LDMOSFET, input section can be directly interfaced from the MCU.

This IC can control 4 mode output function (Forward, Reverse, Brake, Open) by input logic.

This IC can drive various type of micro motor and low loss by parallel drive because each block is very accurate for high speed drive and independent input/output circuit.

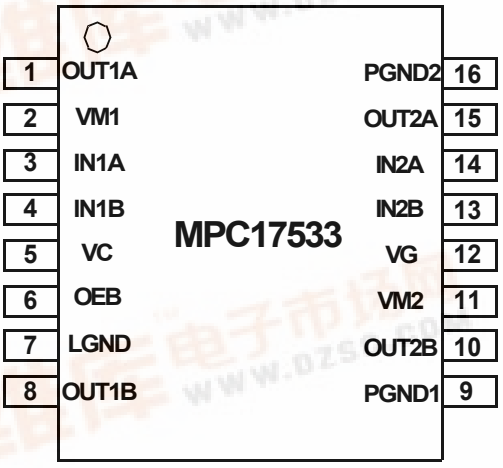


16PIN SVMFP

Features

- Manufactured by SMOS5AP process technology
- Built in 2 Channel Circuit of H-Bridge Driver
- 4 Mode Drive(Forward, Reverse, Brake, Open)
- Direct Interface from the MCU
- Low ON-Resistance Ron=0.8 ohm(typ)
- Dual Channel Parallel Drive (Ron=0.8 ohm:typ)
- IDR=0.7A (Cont.)
- Low Consumption Power
- Built in Shoot Through Current Prevention Circuit
- Built in Low Voltage Shutdown Circuit
- PWM Control frequency 200kHz(Max.)
- Comes in 16-pin Very Fine Mini-flat Package (pin pitch : 0.65mm)

Pin Connections

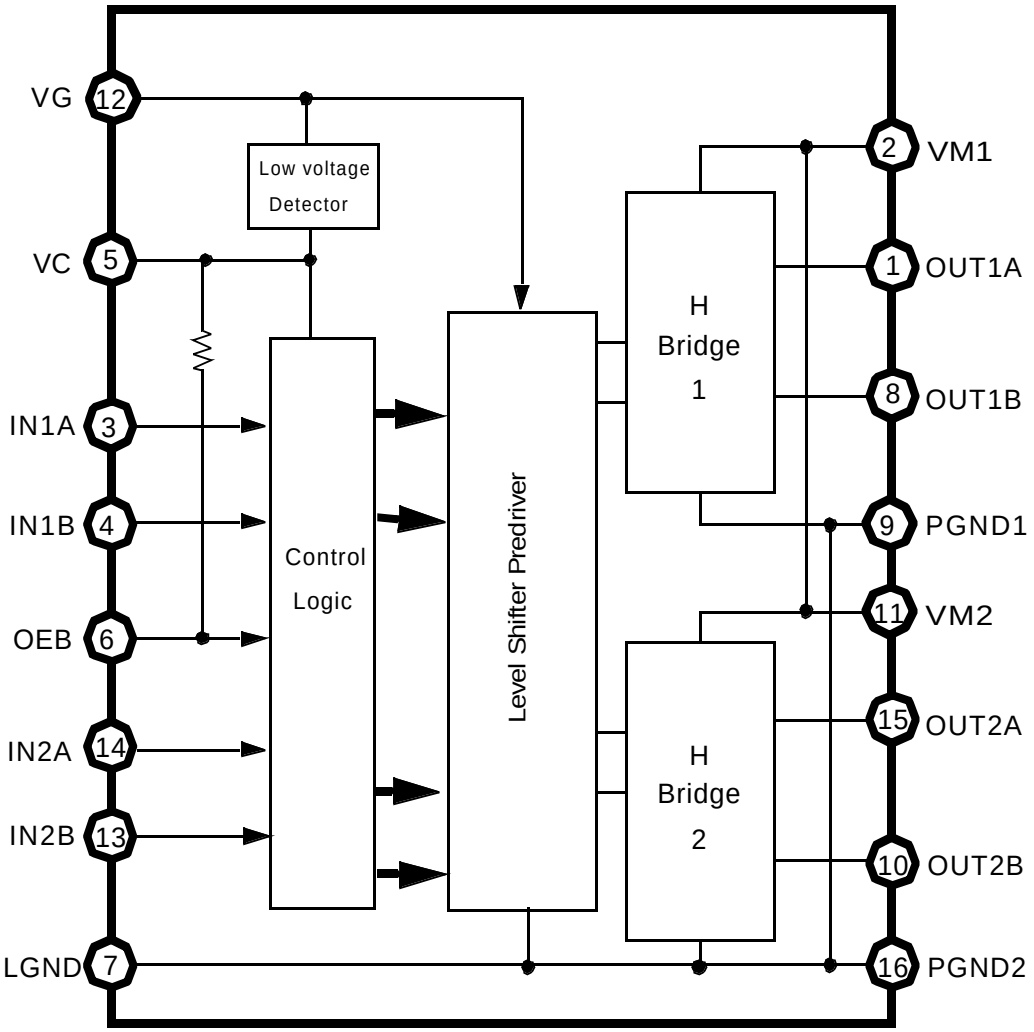


(Top View)

*SMARTMOS is a registered trademark of Motorola Inc.

*Specifications in this data sheet may be changed without prior notice.

Block Diagram



Each GND pin are connected by Metal line

Function Table

Input			Output	
OEB	IN1A IN2A	IN1B IN2B	OUT1A OUT2A	OUT1B OUT2B
L	L	L	L	L
L	H	L	H	L
L	L	H	L	H
L	H	H	Z	Z
H	X	X	Z	Z

Z : High impedance

X : Don't care

Pin6(OEB) is Pull-Up by internal resistance.

Maximum Ratings *1

Rating	Symbol	Min.	Max.	Unit
Driver Circuit Power Supply Voltage	VM	- 0.5	8.0	V
Pre-Driver Circuit Power Supply Voltage	VG	- 0.5	14.0	V
Control Circuit Power Supply Voltage	VC	- 0.5	7.0	V
Singnal Input Voltage	VIN	- 0.5	VC+0.5	V
Driver Output Current (continuous)	IDR	---	0.7	A
Driver Output Current (pulsed) *2	IDRp	---	1.4	A
Operating Junction Temperature	Tj	- 55	150	degC
Storage Temperature Range	Tstg	---	150	degC
Thermal Resistance *3	RΘja	150		degC./W
Power Dissipation *4	PD	---	830	mW

*1) Device may be damaged when used over the ratings.
*2) Ta=25C, Peak time is within 10ms at intervals 0.2seconds.
*3) 37 X 50 X 1.6[mm] Glass EPOXY Board mount.
*4) Ta=25C

Recommended Operating Condition

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Driver Circuit Power Supply Voltage	VM	2.0	5.0	6.8	V
Control Circuit Power Supply Voltage	VC	2.7	5.0	5.7	V
Signal Input Voltage	VIN	0	---	VC	V
Pulse Input Frequency	FIN	---	---	200	kHz
Input Pulse Rise Time	TR	---	---	1.0	us
Input Pulse Fall Time	TF	---	---	1.0	us
Operating Ambient Temperature	Topr	-20	25	65	degC
Capacitor for Charge Pump	C1,C2,C3	0.01	0.1	1.0	uF
Pre-Driver Circuit Power Supply Voltage	VG	12	13	13.5	V

DC CHARACTERISTICS (Ta=25C, VC=VM=5.0V, GND=0V)

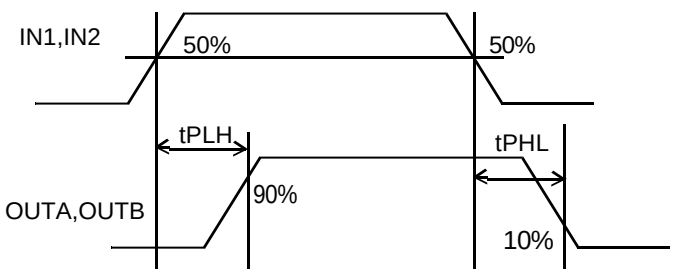
Characteristics	Symbol	Min.	Typ.	Max.	Unit	Test circuit	
Quiescent Power Supply Current							
Driver Circuit Power Supply Current	IMO	---	---	1.0	uA	A	*1
Control Circuit Power Supply Current	ICO	---	---	20	UA		
Pre-Driver CircuitPower Supply Current	IGO	---	---	150	UA		
Active Power Supply Current							
Control Circuit Power Supply Current	IC	---	---	3.0	mA	E	*2
Pre-Driver Circuit Power Supply Current	IG	---	---	0.7	mA		
Logic Input Function							
High Level Input Voltage	VIH	VCx0.7	---	---	V	B	*3
Low Level Input Voltage	VIL	---	---	VCx0.3	V		
High Level Input Current	IIH	---	---	1.0	uA		
Low Level Input Current	IIL	- 1.0	---	---	uA		
OEB pin	IIL	---	50	100	uA		
Driver Output ON Resistance	RON	---	0.8	1.2	ohm	C	*4
Low Voltage Detection Circuit Detection Voltage	VCDET	1.5	2.0	2.5	V	D	*6

*1) ICO includes current to the pre-driver circuit.
*2) IC includes current to the pre-driver circuit. IC:Fin100kHz. IG:Fin20kHz.
*3) 2.7V < VC < 5.7V
*4) IDR=0.7[A] source+sink
*5) When no input logic signal.
*6) Detection voltage is defined output become High-impedance when VC voltage is dropped.
When the gate voltage VG is applied from an external source, VG=7.5[V]

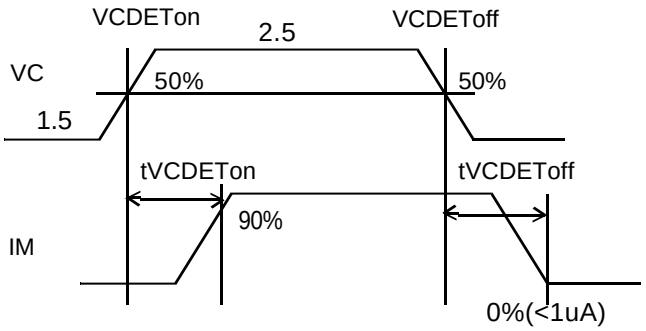
AC CHARACTERISTICS (Ta=25C, VC=VM=5.0V, GND=0V)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Test circuit	
Output Propagation Delay Time							
Turn-ON time	tPLH	---	0.1	0.5	us	C	
Turn-Off time	tPHL	---	0.1	0.5	us		
Low Voltage Detection Circuit Detection time	tVCDET	---	---	10	ms	D	

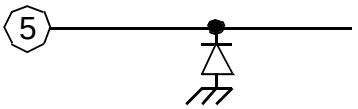
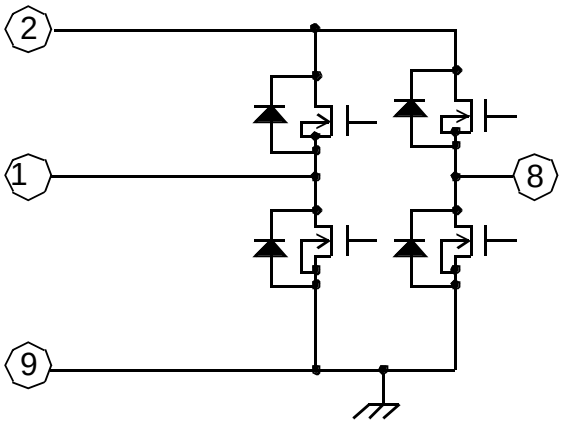
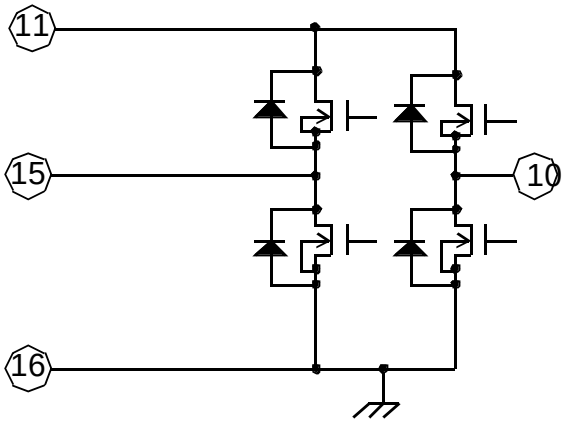
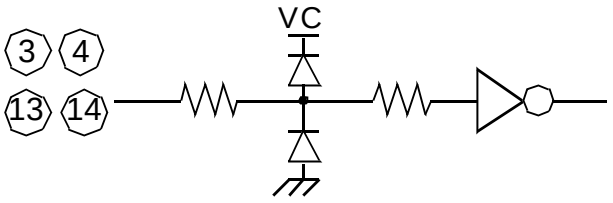
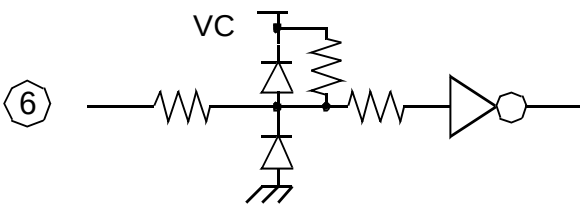
tPLH,tPHL Timing Chart



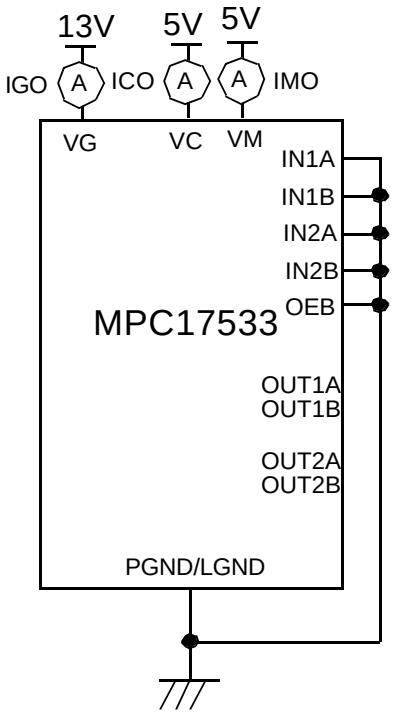
tVCDET Timing Chart



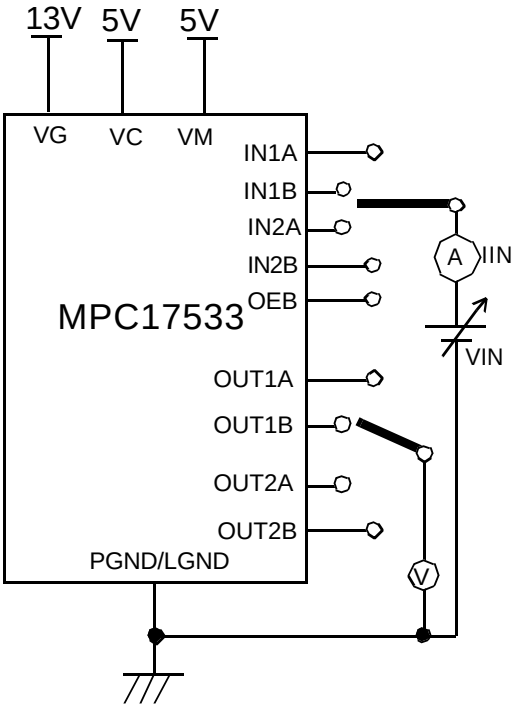
Pin Description

Symbol	PIN No.	Simplified Circuit Schematic	Function
VC	5		Control Circuit Power Supply Pin
VM1	2		Driver Power Supply Voltage Input Pin
OUT1A	1		Driver Output Pin
OUT1B	8		Driver Output Pin
PGND1	9		Power GND Pin
VM2	11		Driver Power Supply Voltage Input Pin
OUT2A	15		Driver Output Pin
OUT2B	10		Driver Output Pin
PGND2	16		Power GND Pin
IN1A	3		Control Signal Input Pin
IN1B	4		
IN2A	14		
IN2B	13		
OEB	6		Enable Control Signal Input Pin
VG	12	Pre-Driver Circuit Power Supply Pin	
LGND	7	ControlCircuit GND Pin	

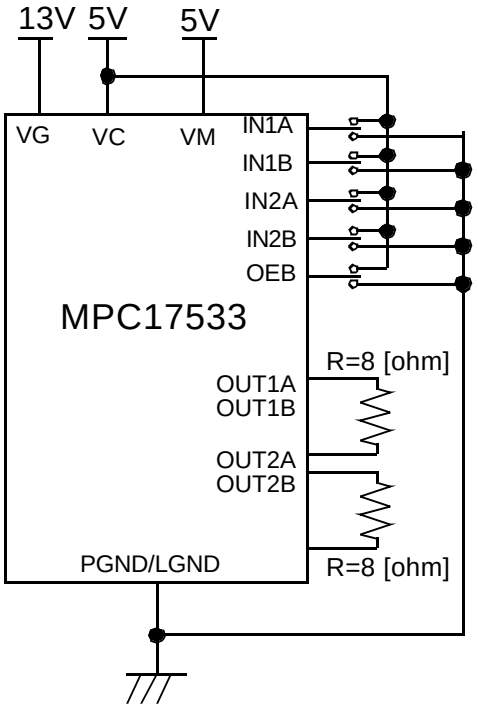
Test Circuit



Test Circuit A

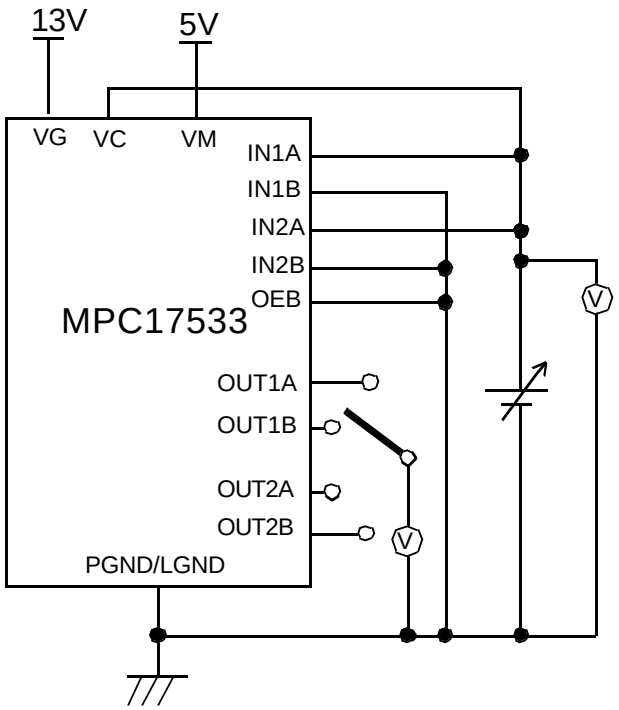


Test Circuit B

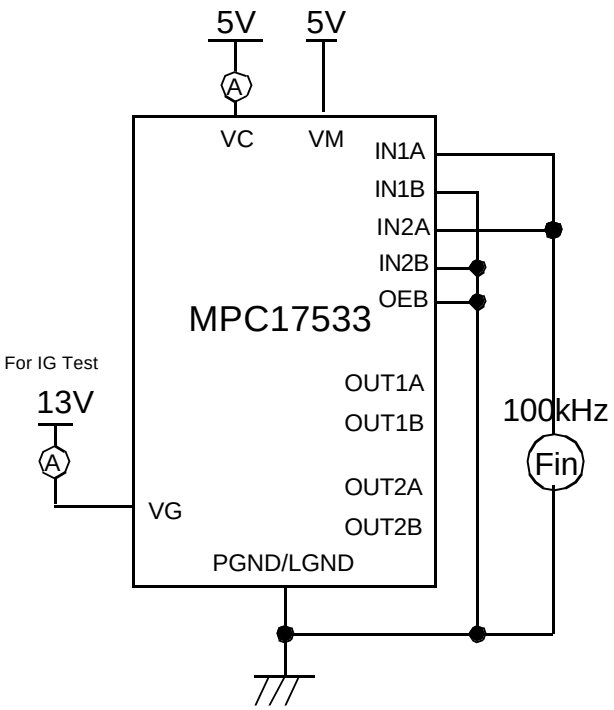


Test Circuit C

Test Circuit



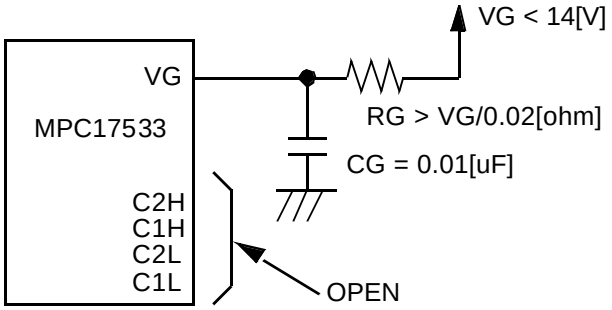
Test Circuit D



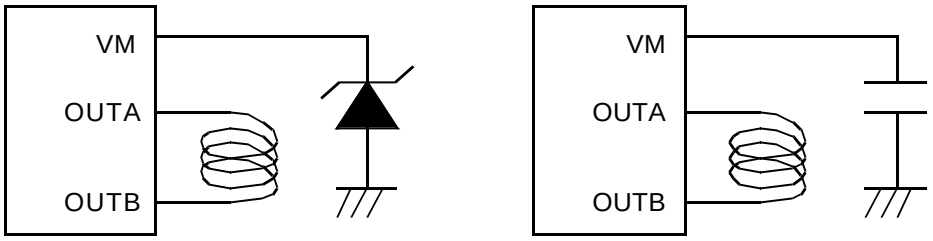
Test Circuit E

Precautions on Application

(1)When applying the gate voltage VG from an external source, be sure to connect it via a resistor equal to or greater than RG=VG/0.02[ohm]. However, this resistance is unnecessary if you are connecting a charge pump output from a SMARTMOS product.



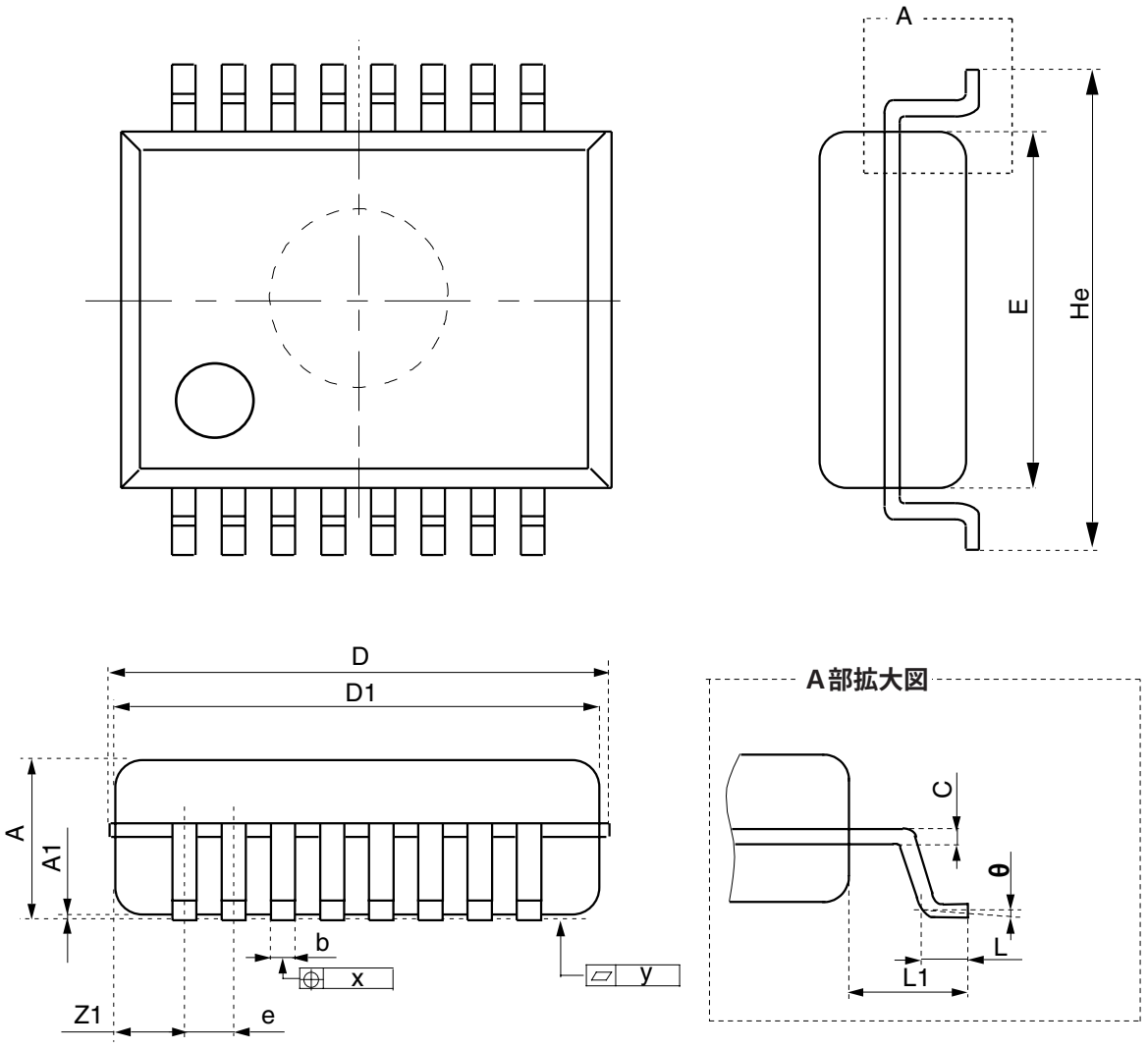
(2)Switching from the state of active current loading to high-impedance mode, indactance load and P.C.B. layout may induce over maximum ratings to a power supply pin. Zener diode or capacitor at VM pin will protect kick back voltage(it depends on the indactance load). The schottky diode at output pin will also protect it.



(3)Connect a capacitor of sufficient capacitance between the power supply and ground pins. For all large-current paths, use sufficiently wide copper conductor patterns and route them in the shortest distance possible.

(4)When using SMARTMOS products in your circuit design, make sure they are fully protected against static charge.

■ 16 ピン SVMFP 外形寸法図



	SPEC		
	MIN	TYP	MAX
A	*****	1.95	2.05
A1	0.10	0.15	0.20
b	0.25	0.30	0.35
C	0.18	0.20	0.25
D	*****	5.45 MAX	
D1	5.20	5.25	5.30
e	0.60	0.65	0.70
E	5.25	5.30	5.35
He	7.70	7.90	8.10
L	0.45	0.60	0.75
L1	1.20	1.30	1.40
x	*****	*****	0.12
y	0.05		
Z1	0.25	0.35	0.47
θ	0.0 °	4.0 °	9.8 °