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## HS8108 DATASHEET

### DESCRIPTION:

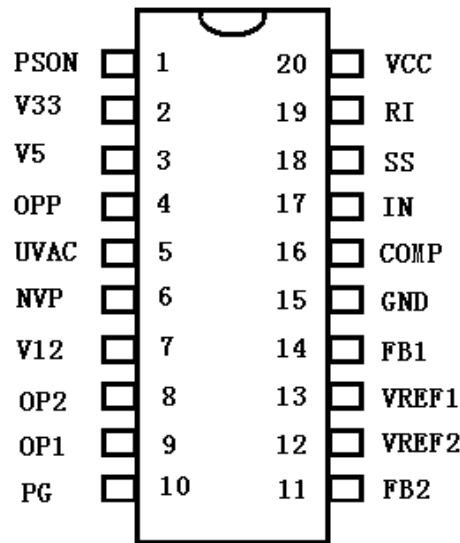
HS8108 is a power supply switching mode controller IC for desktop PCs. It provides all the functions necessary to monitor and control the output of the power supply. Remote ON/OFF control, power good circuitry, some protection features against over-voltage and over-power are implemented. It directly senses all the output rails for OVP without the need of external dividers. A built-in timer generates accurate timing for control circuit including the PS-off delay. The cycle-by-cycle PWM switching prevents the power transformer from saturation and ensure the fastest response for the short-circuit protection which greatly reduce the stress for power transistors. Two internal precise 431 shunt regulators provide stable reference voltage and driver for 3.3V and 5V-standby regulation. Utilizing minimum number of external components, the HS8108 includes all of the functions for push-pull and/or half-bridge topology, decreasing the production cost and PCB space, and increasing the MTBF for power supply.

### FEATURES:

- PC half-bridge (or 494) power supply supervisor + two 431 + PWM
- Remote ON/OFF function
- Power-down warning circuitry & Power good circuitry
- Delay time for PSON and PG signal
- Over-voltage protection for 3.3V, 5V and 12V
- Under-voltage protection for 3.3V, 5V, 12V, -12V and/or -5V
- Push-pull PWM operation and totem pole outputs
- Over-power and short-circuit protection
- Two shunt regulator for 3.3V and 5V Sb
- Soft-start and maximum 93% duty cycle
- On-chip oscillator and error amplifier



## PIN CONFIGURATION: (DIP20)

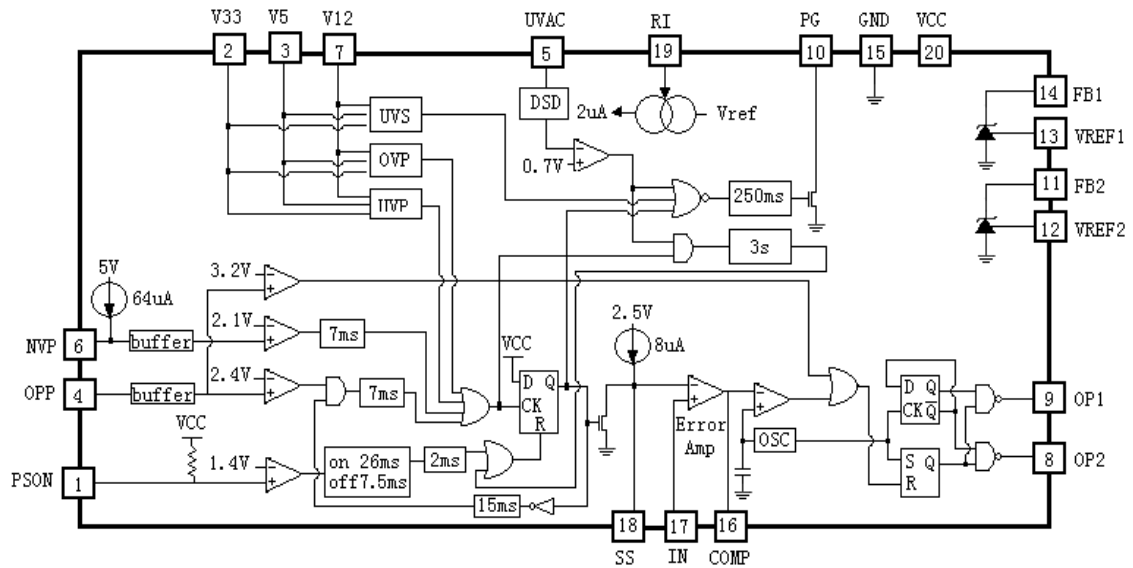


## PIN DESCRIPTIONS:

Pin	Name	Type	Function
1	PSON	Logic input	Remote On/Off logic input for CPU or controller. PSON = 0 means that the main SMPS is operational. PSON = 1 means that the main SMPS is off and the latch is reset.
2	V33	Analog input	3.3V over-voltage/under-voltage control sense input.
3	V5	Analog input	5V over-voltage/under-voltage control sense input.
4	OPP	Analog input	Over-power sense input. When not in use, this pin should be grounded.
5	UVAC	Analog input	AC fail detection, detect main AC voltage under-voltage and/or failure.
6	NVP	Analog input	The protection input for negative output
7	V12	Analog input	12V over-voltage/under-voltage control sense input.
8	OP2	Analog output	The totem-pole output drivers of push-pull PWM, the maximum duty cycle on an output (OP1 or OP2) is 46%.
9	OP1	Analog output	
10	PG	Logic output	Power Good logic output, 0 or 1 (open-collector). PG = 1 means that the power is good for operation.
11	FB2	Analog output	Output for second converter regulation loop.
12	VREF2	Analog input	Reference comparison input for second converter regulation loop. 2.5V.
13	VREF1	Analog input	Reference comparison input for first converter regulation loop. 2.5V.
14	FB1	Analog output	Output for first converter regulation loop.
15	GND	supply	Ground.
16	COMP	Analog output	amplifier output and the input of the PWM comparator.
17	IN	Analog input	The negative input of error amplifier. The positive input of error amplifier is a 2.5V reference voltage.
18	SS	Analog input	The soft-start. It is settable through external capacitor. The current source output at this pin is 8uA and the voltage is clamped at 2.5V.
19	RI	Analog input	Connected to external resistor for the reference setting. RI = 75k ohms.
20	VCC	supply	Supply voltage. 4.5V ~ 6.5V. It is connected to 5V-standby.



**BLOCK DIAGRAM:**



**ABSOLUTE MAXIMUM RATINGS:**

Symbol	Parameter	Value	Unit
VCC	DC Supply Voltage at Pin 20	11	V
VFB	Shunt Regulator Output at Fb1, Fb2 Pins	16	V
IOUT	Output Current at PG, Fb1, Fb2 Pins	30	mA
PD,25°C	Power Dissipation (TA=25°C)	1.5	W
PD,90°C	Power Dissipation (TA=90°C)	0.5	W
TSTG	Storage Temperature Range	-55~+150	°C
TA,MAX	Operating Ambient Temperature	-30~+125	°C

**RECOMMENDED OPERATING CONDITIONS:**

Symbol	Parameter	Value	Unit
VCC	DC Supply Voltage at Pin 20	4.5~6.5	V
VFB	Shunt Regulator Output at Fb1, Fb2 Pins	4~16	V
TOPER	Operating Ambient Temperature Range	-25~+85	°C



### ELECTRICAL CHARACTERISTICS (VCC = 5V, TA = 25° C)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	unit
ICC	Total Supply Current	PG High	---	5	10	mA
Vovp1	Over-Voltage Protection 3.3V	---	3.9	4.1	4.3	V
Vovp2	Over-Voltage Protection 5V	---	5.8	6.1	6.5	V
Vovp3	Over-Voltage Protection 12V	---	13.9	14.5	14.9	V
Vuvp1	Under-Voltage Protection 3.3V	---	2.0	2.6	2.8	V
Vuvp2	Under-Voltage Protection 5V	---	3.0	3.6	3.9	V
Vuvp3	Under-Voltage Protection 12V	---	6.0	7.2	8.0	V
Vuvs1	Under-Voltage Sense 3.3V for PG Low	---	2.5	2.8	3.0	V
Vuvs2	Under-Voltage Sense 5V for PG Low	---	4.0	4.3	4.5	V
Vuvs3	Under-Voltage Sense 12V for PG Low	---	9.4	10.1	10.4	V
Vopps*1	Over-Power Protection. VUVAC	Vuvac=1.5V	2.02	2.4	2.66	V
Vnvp	Negative Voltage Protection: Voltage Level	---	2.0	2.1	2.2	V
Invp	Negative Voltage Protection: Source Current	RI=75KΩ	57	64	72	uA
tovp	Timing for Over-Voltage Protection	RI=75KΩ	0.37	0.7	1.35	ms
tuvp	Timing for Under-Voltage Protection	RI=75KΩ	0.8	2.4	3.75	ms
tUvs	Timing for Under-Voltage Sense for PG Low	RI=75KΩ	0.37	1.2	1.88	ms
topp	Timing for Over-Power-Protection	RI=75KΩ	3.3	7	11.3	ms
tnvp	Timing for Negative Voltage Protection	RI=75KΩ	3.3	7	10.2	ms

NOTE \*1: VOPPS=(2/3)Vopp+(1/3)Vuvac

### Shunt Regulator: (VREF1 FB1 VREF2 FB2)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	unit
VREF	Reference Voltage	IFB=0.5Ma, TA=25°C	2.475	2.5	2.525	V
VDEV, I	Deviation of VREF Over Load Current	IFB=0.5mA~10mA	---	---	20	mV
VDEV, T	Deviation of VREF Over Temperature	TA=-25~+85°C	---	10	30	mV
REGLI-FB	Line Regulation	4V<VFB<16V	---	1	---	mv/v
IOUT-FB	Output Sinking Current Capability	VFB>2V	10	---	---	mA

### Error Amplifier:

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	unit
V2.5	Reference Voltage	---	2.45	2.5	2.55	V
IB	Input Bias Current	---	---	---	0.1	uA
Avol	Open-Loop Voltage Gain	---	50	60	---	db
BW	Unity Gain Bandwidth	---	0.3	1	---	MHz
PSRR	Power Supply Rejection Ratio	---	50	---	---	db



### Remote On/Off:

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	unit
Vpson	PSON Input Threshold Level	---	1	1.4	2.0	V
Ipson	Remote Input Driving Current	---	---	---	0.5	mA
tpson(ON)	Timing PSON to On	RI=75K $\Omega$	17	26	45	ms
tpson(OFF)	Timing PSON to Off	RI=75K $\Omega$	5	7.5	28.8	ms
tpsoff	Timing PG low to Power Off	RI=75K $\Omega$	1.5	2	6.3	ms

### Power Good Section(PG):

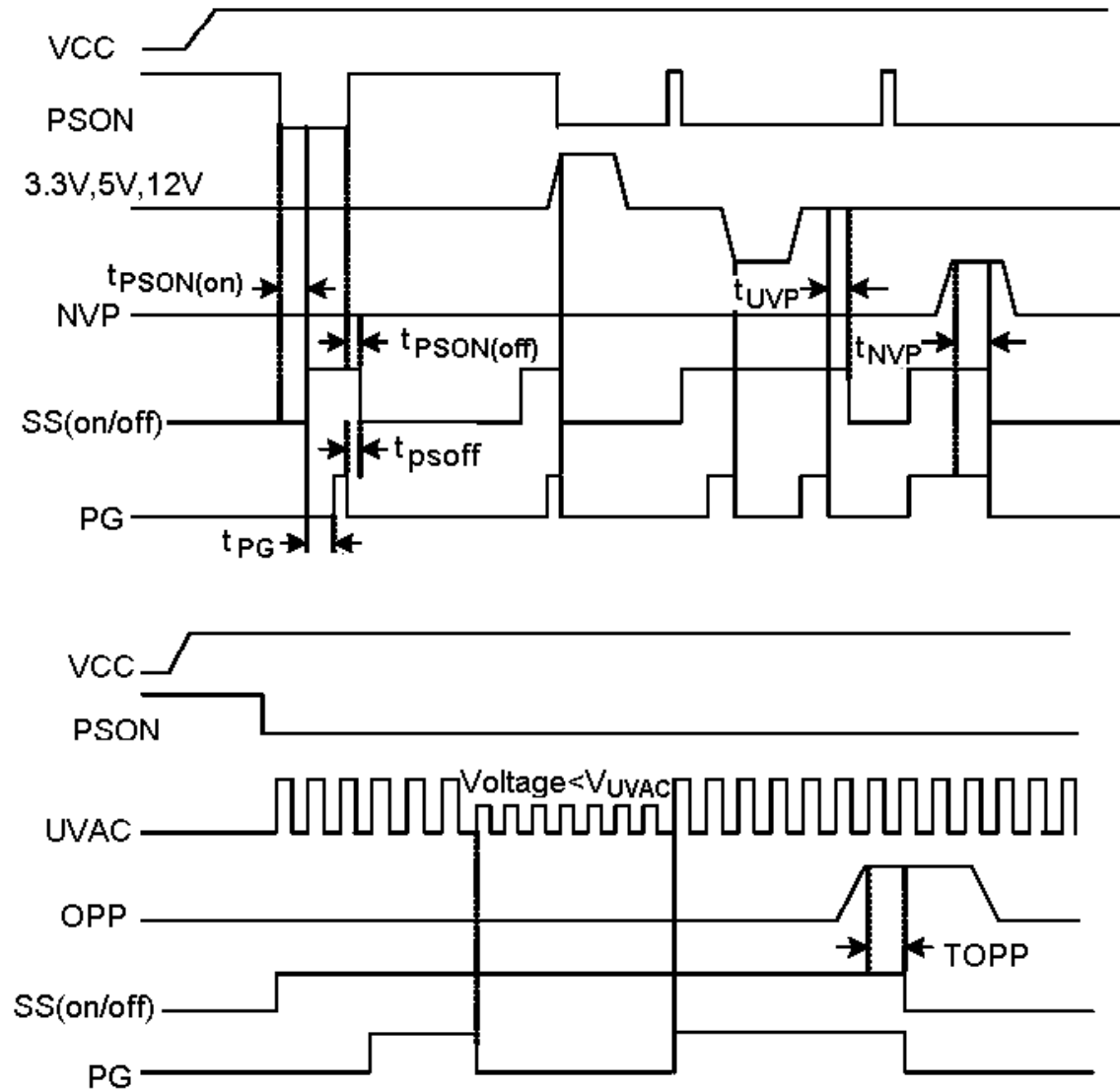
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	unit
tpg	Timing for PG Delay	RI=75K $\Omega$	200	300	400	ms
Vuvac	UVAC Voltage Sense for PG	---	0.65	0.7	0.75	V
tr	PG Good Output Rising Time	CL=100pF	---	1	---	us
tf	PG Good Falling Time	CL=100pF	---	300	---	ns
VOL2	Power Good Output Saturation Level	Ipg=5mA	---	---	0.5	V
ION2	Power Good Leakage Current Collector	Vpg=5V	---	---	1	uA

### PWM:

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	unit
<b>PWM Output Section (OP1, OP2)</b>						
Vol	Output Voltage Low	I <sub>o</sub> =5mA	---	---	0.5	V
Voh	Output Voltage High	V <sub>I2</sub> =12V	4	---	---	V
Ro	Output Impedance of VOH	---	1.5	---	3.3	K $\Omega$
<b>Oscillator Section</b>						
Fosc	PWM Frequency	RI=75K $\Omega$	60	65	70	KHz
<b>Soft-Start Section</b>						
I <sub>ss</sub>	Charge Current	RI=75K $\Omega$	6	8	9.3	uA
<b>Comparator Section</b>						
DC	Duty Cycle		85	---	93	%

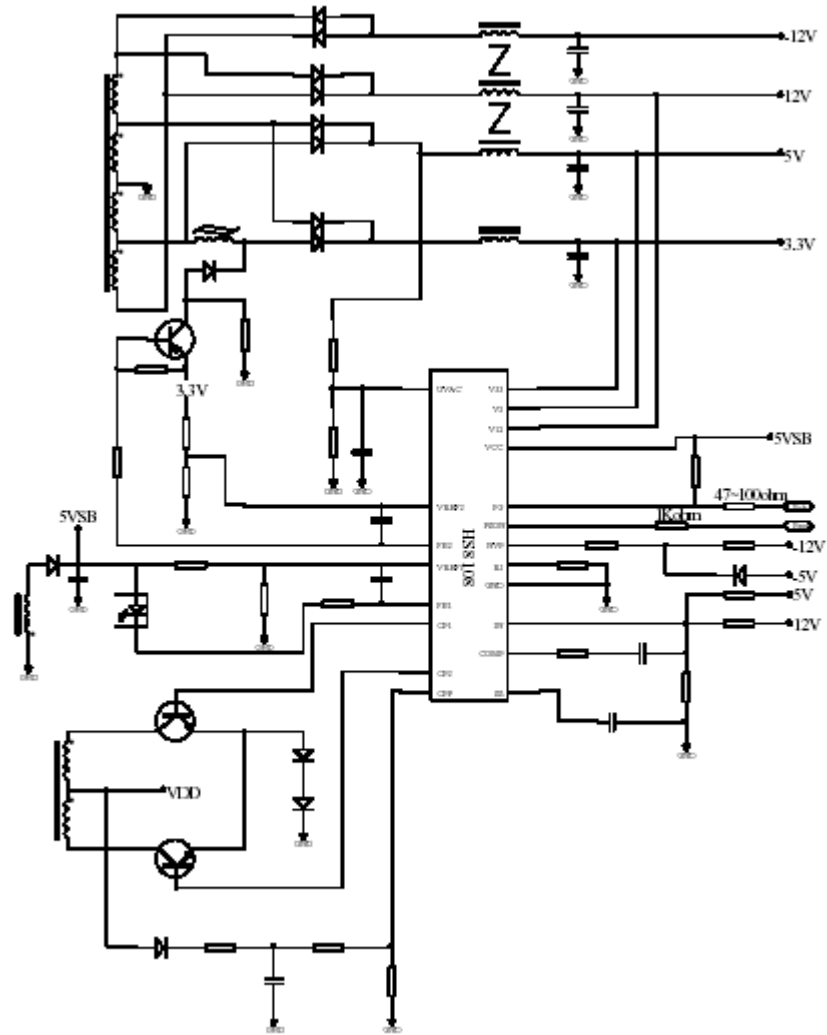


TIMING DIAGRAM:



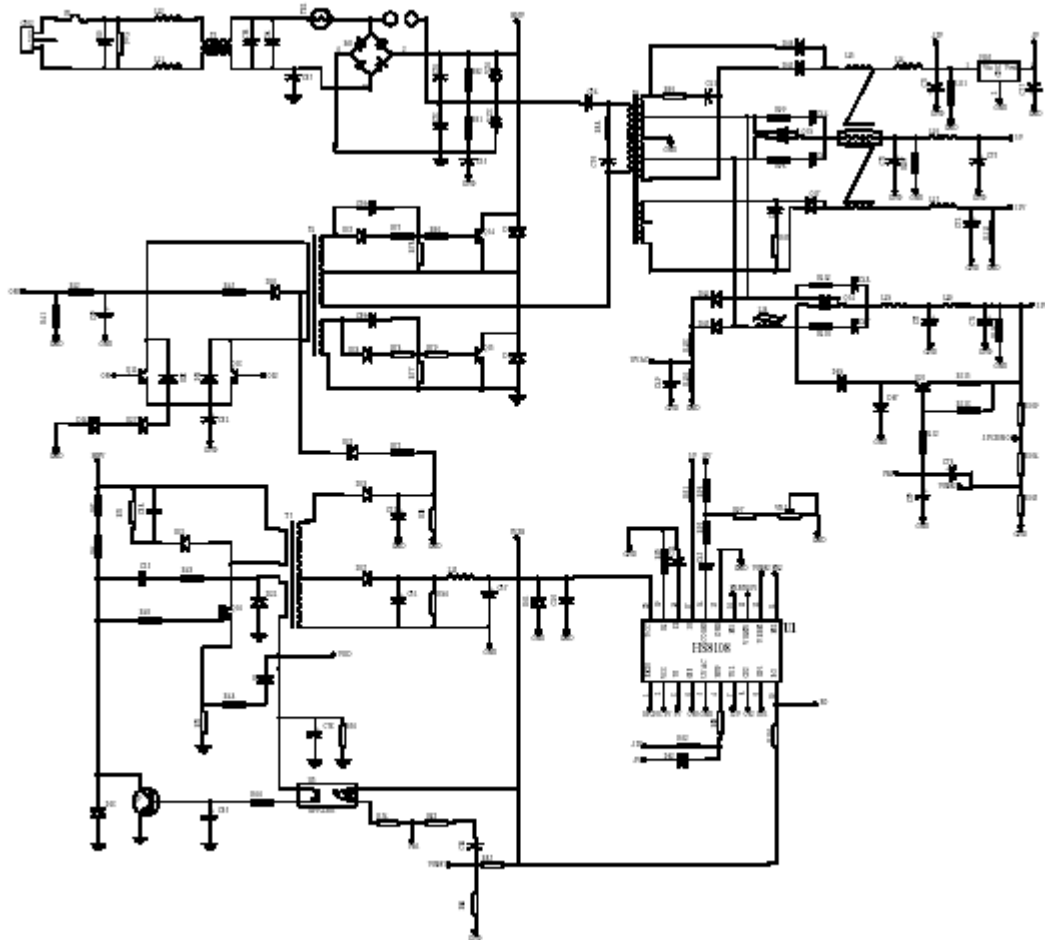


APPLICATION 1:





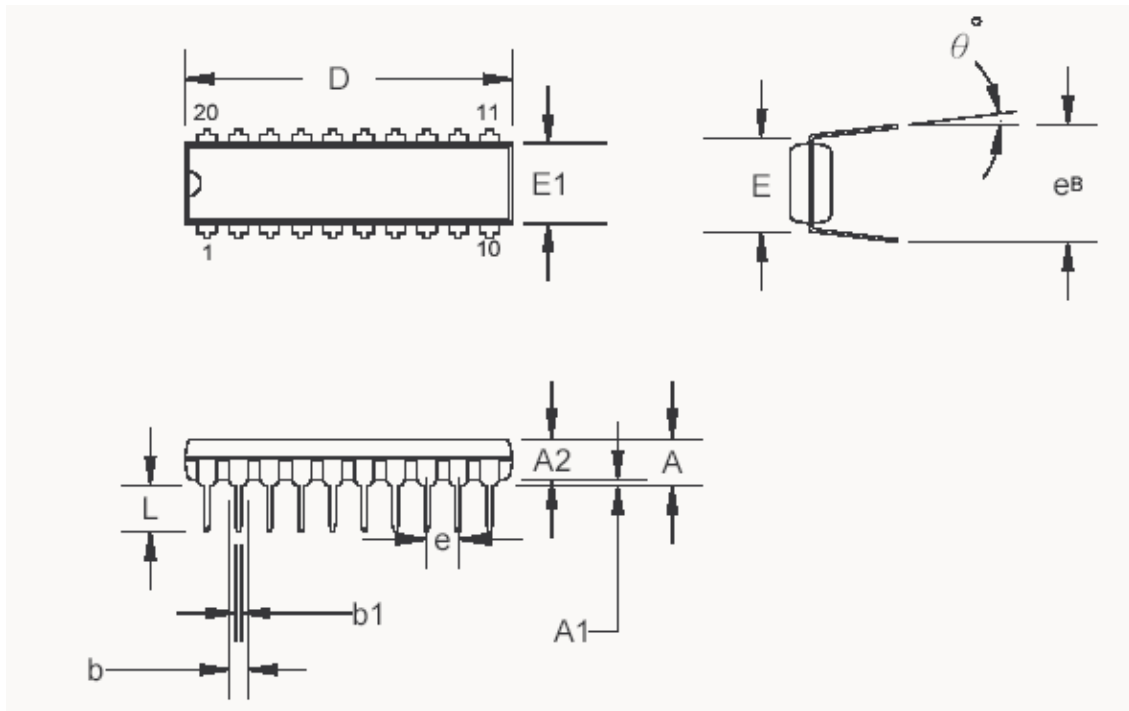
APPLICATION 2:







## MECHANICAL DIMENSIONS: DIP20



symbol	Millimeter			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.334			0.210
A1	0.381					
A2	3.175	3.302	3.429	0.125	0.130	0.135
b		1.524			0.060	
b1		0.457		0.018		
D	24.892	26.162	26.924	0.980	1.030	1.060
E		7.620			0.300	
E1	6.223	6.350	6.477	0.245	0.250	0.255
e		2.540			0.100	
L	2.921	3.302	3.810	0.115	0.130	0.150
eB	8.509	9.017	9.525	0.335	0.355	0.357
$\theta^\circ$	$0^\circ$	$7^\circ$	$15^\circ$	$0^\circ$	$7^\circ$	$15^\circ$