

# AN6718N

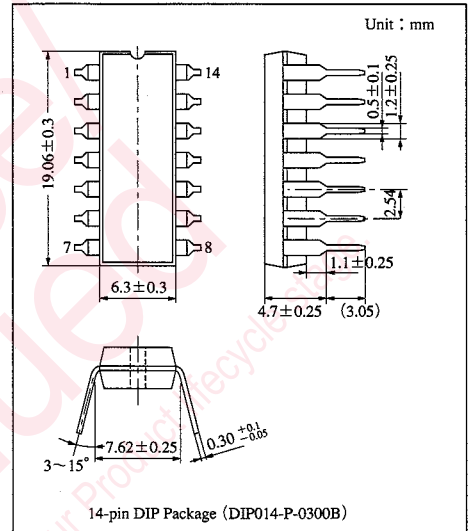
## Microwave Oven Inverter Control IC

### Overview

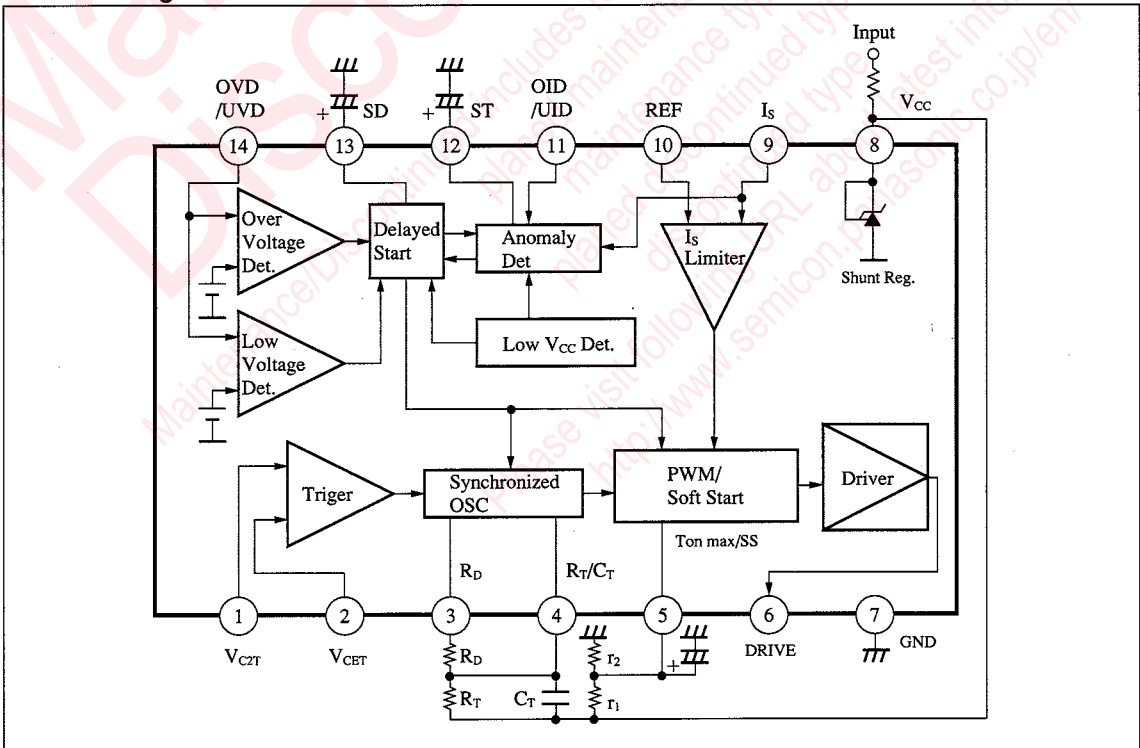
The AN6718N is an IC for resonance type inverter control of microwave oven. It can directly control the IGBT (Insulated Gate Bipolar Transistor) and incorporates the various protective functions.

### Features

- Resonance type inverter control by synchronous oscillator and pulse width modulator
- Shunt regulator built-in the power supply block
- Soft start function built-in
- Abnormality detection function built-in
- Output circuit directly driving the IGBT



### Block Diagram



Others

### ■ Absolute Maximum Rating (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage <sup>Note 1)</sup>	V <sub>CC</sub>	—	V
Supply current	I <sub>CC</sub>	40	mA
Power dissipation	P <sub>D</sub>	430 (Ta=85°C)	mW
Operating ambient temperature	T <sub>opr</sub>	-20 to +85	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

Note 1) The supply voltage value is limited by shunt regulator.

Note 2) Do not use the load larger than 8200 pF for the pulse output terminal.

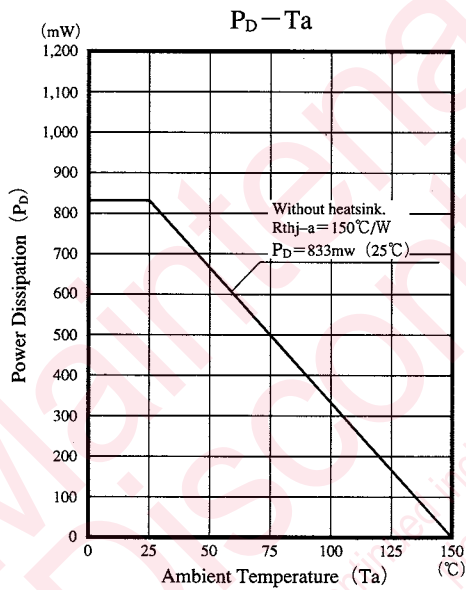
### ■ Electrical Characteristics (Ta=25±2°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Supply voltage	V <sub>CC</sub>		13.1	14.1	15.1	V
Supply current	I <sub>CC</sub>		21.5	29.0	36.8	mA
Constant current source (1)	I <sub>13</sub>		-280	-195	-125	μA
Constant current source (2)	I <sub>12</sub> <sup>H</sup>		-405	-280	-180	μA
Constant current source (3)	I <sub>12</sub> <sup>L</sup>		-12.0	-8.3	-5.4	μA
Low voltage detection threshold	V <sub>14-7</sub> (1)	Set it with Pin ⑭ detection condition.	3.4	4.2	5.0	V
Overvoltage detection threshold	V <sub>14-7</sub> (2)	Set it with Pin ⑭ detection condition.	5.8	7.3	8.7	V
Power control operation	V <sub>9-7</sub>	Set it with Pin ⑨ detection condition.	5.5	6.0	6.5	V
Low V <sub>CC</sub> detection threshold	V <sub>8-7</sub>	Set it with Pin ⑧ detection condition.	7.7	9.1	10.5	V
Abnormality voltage detection threshold (1)	V <sub>9-7</sub> <sup>H</sup>	Set it with Pin ⑨ detection condition.	8.9	9.3	9.7	V
Abnormality voltage detection threshold (2)	V <sub>9-7</sub> <sup>L</sup>	Set it with Pin ⑨ detection condition.	5.7	6.2	6.7	V
PWM circuit minimum pulse width	T <sub>6-M</sub>	V <sub>B</sub> =20V	1.35	1.9	2.45	μs
PWM circuit central pulse duty	D <sub>6-C</sub>	V <sub>B</sub> =20V	25.5	32.0	38.5	%
Oscillation circuit self-excitation cycle	T <sub>6</sub>	V <sub>B</sub> =20V	54	68	82	μs
Trigger circuit delay time	T <sub>D2-6</sub>	V <sub>B</sub> =20V	3.6	4.5	5.4	μs
Safety timer operation time (1)	T <sub>12</sub> (1)	V <sub>B</sub> =13.1V	5.0	9.0	13.0	ms
Safety timer operation time (2)	T <sub>12</sub> (2)	V <sub>B</sub> =13.1V	0.65	1.2	1.75	ms
Maximum output voltage (1)	V <sub>6-7</sub>		—	110	200	mV
Maximum output voltage (2)	V <sub>8-7</sub>		0.8	1.2	1.6	V
Source current peak value	I <sub>r</sub>	V <sub>B</sub> =20V	0.1	0.45	—	A
Sink current peak value	I <sub>f</sub>	V <sub>B</sub> =20V	0.2	0.55	—	A
Output pulse rise time	t <sub>r</sub>	V <sub>B</sub> =20V	0.1	0.2	0.4	μs
Output pulse fall time	t <sub>f</sub>	V <sub>B</sub> =20V	0.05	0.15	0.3	μs

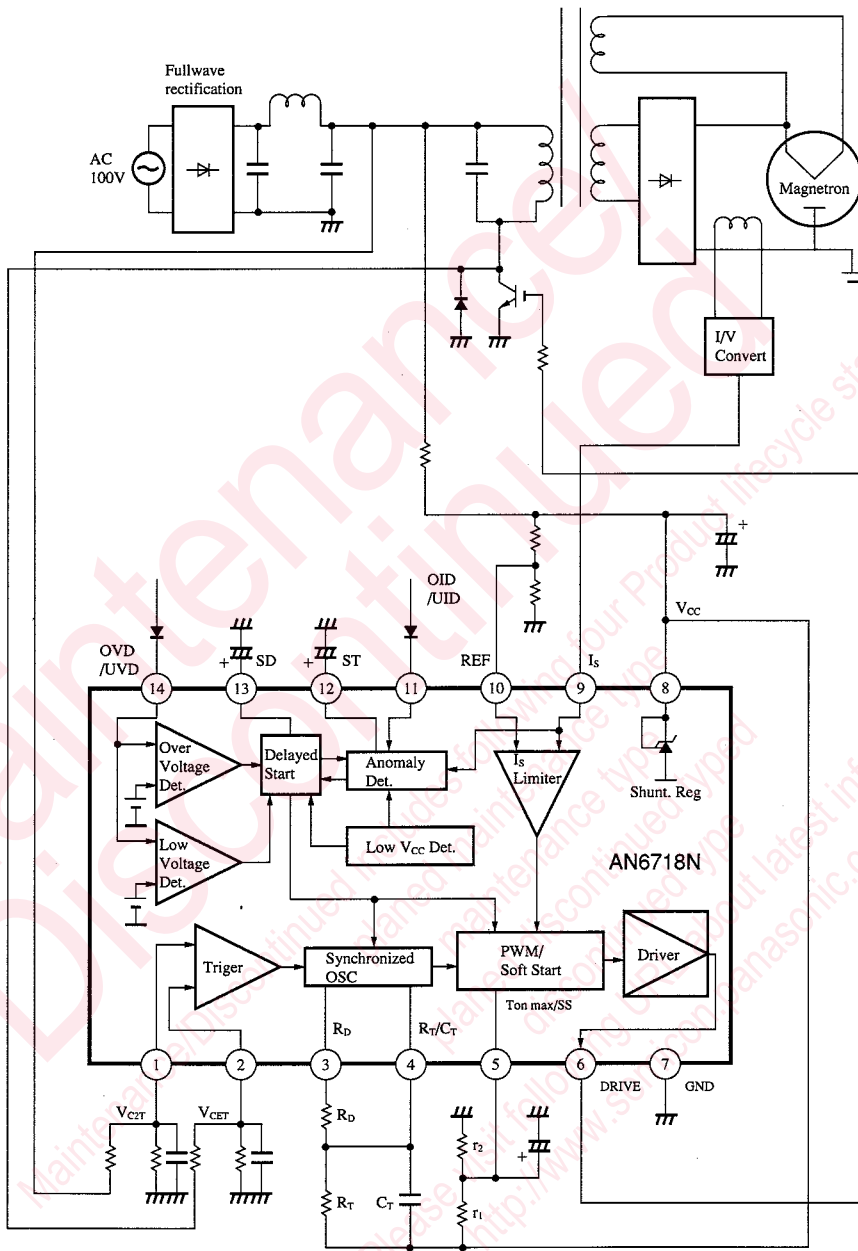
■ Pin Name

Pin No.	Pin name	Pin No.	Pin name
1	Trigger input (A)	8	V <sub>CC</sub>
2	Trigger input (B)	9	IS limiter input
3	Oscillation circuit time constant (A) setting	10	Power control reference voltage
4	Oscillation circuit time constant (B) setting	11	Abnormality detection level setting
5	Pulse width maximum value and soft start time constant setting	12	Abnormality detection timer C
6	Pulse output	13	Start delay C
7	GND	14	Low voltage detection input and overvoltage detection input

■ Package Power Dissipation



■ Application Circuit



**Pin Descriptions**

Pin No.	Symbol	I/O	Pin description	Equivalent circuit
1	V <sub>CT2</sub>	I	<p>&lt;Trigger input&gt; It sets the pulse output drive to "Low" after delay time T<sub>D</sub> elapses from the voltage cross point where V<sub>CET</sub> &gt; V<sub>CT2</sub> is replaced with V<sub>CET</sub> &lt; V<sub>CT2</sub>.</p>	<p>140V full-wave rectification</p>
2	V <sub>CET</sub>	I		
3	R <sub>D</sub>	O	<p>&lt;Oscillation circuit time constant&gt; It determines the self-excitation oscillation cycle (maximum cycle) T<sub>O</sub> and delay time T<sub>D</sub>. T<sub>D</sub> ∝ R<sub>T</sub>C<sub>T</sub> T<sub>D</sub> ∝ (R<sub>T</sub>/R<sub>D</sub>)C<sub>T</sub></p>	
4	R <sub>T</sub> /C <sub>T</sub>	I	<p>&lt;Pulse width maximum value and soft start time constant&gt; It determines the pulse width maximum value and the soft start time. The pulse width maximum value is determined by R<sub>T</sub>C<sub>T</sub>, the voltage dividing ratio between R<sub>1</sub> and R<sub>2</sub>. Soft start time is proportional to (R<sub>1</sub>/R<sub>2</sub>)C<sub>SS</sub></p>	
5	T <sub>ONmax/ss</sub>	I		
6	DRIVE	O	<p>&lt;Pulse output&gt; It controls the gate signal of the inverter controlled IGBT.</p>	
7	GND	I	<p>&lt;Ground terminal&gt;</p>	
8	V <sub>CC</sub>	I	<p>&lt;Power supply terminal&gt; The shunt regulator of 14V output is built in.</p>	

Others

Pin Descriptions (cont.)

Pin No.	Symbol	I/O	Pin description	Equivalent circuit
9	I <sub>s</sub>	I	<p>&lt;I<sub>s</sub> limiter&gt; &lt;Abnormality detection&gt;                      It controls the pulse width of pulse output drive so that the I<sub>s</sub> voltage could be equal to REF voltage. It stops the inverter when the I<sub>s</sub> voltage deviates from the range of OID/UID voltage +2V<sub>D</sub>/-3V<sub>D</sub>.                      (It is not automatically reset. It is reset by restart of power supply or low V<sub>CC</sub> detection circuit.)</p>	
10	REF	I		
11	OID/UID	O		
12	ST	I	<p>&lt;Abnormality detection timer C&gt;                      It determines the delay time from the time when the I<sub>s</sub> voltage decreases under the OID/UID voltage - 3V<sub>D</sub> to the time when the inverter stops,  <math>T_{OID} \propto C_{ST}/I_1</math>                      It determines the delay time from the time when the I<sub>s</sub> voltage increases over the OID/UID voltage +2V<sub>D</sub> to the time when the inverter stops,  <math>T_{UID} \propto C_{ST}/I_1 + I_2</math></p>	
13	SD	I	<p>&lt;C for start delay&gt;                      It determines the start delay time,  <math>T_{SD} \propto C_{SP}</math></p>	
14	OVD/UVD	I	<p>&lt;Low voltage detection input and overvoltage detection input&gt;                      It stops the inverter when the OVD/UVD voltage becomes smaller than the V<sub>OVD</sub> or when it becomes larger than the V<sub>UVD</sub>.</p>	

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