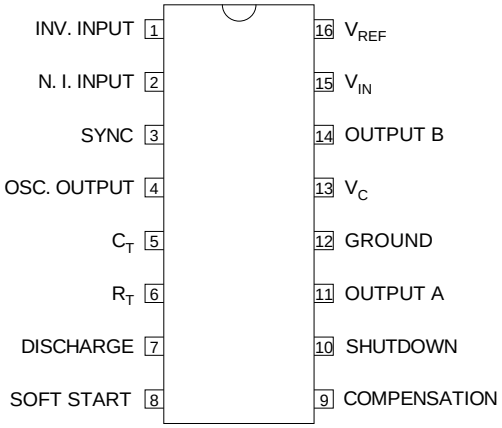
IP1P125
IP3P125

TOP VIEW



J Package – 16 Pin Ceramic DIP
N Package – 16 Pin Plastic DIP
D Package – 16 Pin Plastic (300) SOIC

REGULATING PULSE WIDTH MODULATORS

FEATURES

- **Pin Compatible with 1525A Series**
- **Low Output Crossover Current**
- **Fixed 100ns Deadtime**
- **100Hz to 500kHz Operating Frequencyrange**
- **5.1 volt ± 1% Reference**
- **Oscillator Sync. Terminal**
- **Soft Start**
- **Undervoltage Lockout**
- **Latching PWM**

Order Information

Part Number	J–Pack 16 Pin	N–Pack 16 Pin	D–16 16 Pin	Temp. Range
IP1P125J	✔			-55 to +125°C
IP3P125D			✔	0 to + 70°C
IP3P125J	✔			0 to +70°C
IP3P125N		✔		0 to +70°C

Note:
To order, add the package identifier to the part number.
eg. IP1P125J

ABSOLUTE MAXIMUM RATINGS (T_{case} = 25°C unless otherwise stated)

$+V_{IN}$	Input Voltage		+40V
	Collector Voltage		+40V
	Logic Inputs		–0.3 to +5.5V
	Analogue Inputs		–0.3 to $+V_{IN}$
	Output Current, Source or Sink		500mA
	Reference Output Load Current		Internally Limited
	Oscillator Charging Current		5mA
P_D	Power Dissipation	T_A = 25°C	1000mW
		Derate @ T_A > 50°C	10mW/°C
P_D	Power Dissipation	T_C = 25°C	2000W
		Derate @ T_C > 25°C	16mW/°C
T_J	Operating Junction Temperature		–55 to +150°C
T_{STG}	Storage Temperature Range		–65 to +150°C
T_L	Lead Temperature	(soldering, 10 seconds)	+300°C

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IP1P125
IP3P125

DESCRIPTION

The IP1P125 series of pulse width modulator intergrated circuits offers high speed performance optimized for MOSFET drive. Pin compatible with SG1525A, the IP1P125 features low crossover current through the output transistors as well as 95% total usable output pulse width up to 500KHz. High speed latched shutdown is included as well as a precision 5.1 volt rference, error amp, oscillator, latched PWM coparator, totem-pole output drivers, soft-start and undervoltage lockout.

RECOMMENDED OPERATING CONDITIONS

V_{IN}	Input Voltage		+8 to +
	Collector Voltage		+4.5 to +35V
	Sink/Source Load Current (Steady State)		0 to 100mA
	Sink/Source Load Current (Peak)		0 to 400mA
	Reference Load Current		0 to 20mA
	Oscillator Frequency Range		100Hz to 500kHz
R_T	Oscillator Timing Resistor		1.5kΩ to 200kΩ
C_T	Oscillator Timing Capacitor		470pF to 0.1μF
	Deadtime Resistor Range		0 to 500Ω
	Operating Ambient Temperature Range	IP1525A / IP1527A	–55 to +125°C
		IP2525A / IP3527A	–25 to + 85°C
		IP3525A / IP3527A	0 to +70°C

ELECTRICAL CHARACTERISTICS (T_J = Over Operating Temperature Range unless otherwise stated)

Parameter	Test Conditions	IP1P125			IP3P125			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
	REFERENCE SECTION							
Output Voltage	T_J = 25°C	5.05	5.10	5.15	5.0	5.1	5.2	V
Line Regulation	V_{IN} = 8 to 35V		1	10		1	15	mV
Load Regulation	I_L = 0 to 20mA		5	15		5	25	
Temperature Stability **note5**	Over Operating Range		15	50		15	20	mV
Total Output	V_{IN} = 8 to 35V, I_L = 0 to 20mA	5.0		5.2	4.95		5.25	V
Short Circuit Current	V_{REF} = 0	25	70	120	25	70	120	mA
Output Noise Voltage**note5**	10 Hz ≤ f ≤ 10kHz		40	200		40	200	µVrms
Long Term Stability **note5**			1	10		1	50	mV / kHr
	OSCILLATOR SECTION [2]							
Initial Accuracy		37.6	40	42.4	37.6	40	42.4	kHz
Voltage Stability	V_{IN} = 8 to 35V		0.1	0.5		0.1	2	%
Temperature Stability **note5**	Over Operating Range		1	4		1	6	
Minimum Frequency	R_T = 200kΩ C_T = 0.1µF		80	120		80	120	Hz
Maximum Frequency	R_T = 2kΩ C_T = 470pF R_D = 0Ω		900			900		kHz
Current Mirror	I_{RT} = 2mA	1.7	2.0	2.2	1.7	2.0	2.2	mA
Clock Amplitude	Output, PIN 4, C_T = 0.1µF	3.0	4.0		3.0	4.0		V
Clock Width	Output, PIN 4, C_T = 0.1µF	0.3	0.5	1.0	0.3	0.5	1.0	µs
Sync Threshold		1.2	2.0	2.8	1.2	2.0	2.8	V
Sync Input Current	Sync Voltage = 3.5V		1.0	2.5		1.0	2.5	mA
	ERROR AMPLIFIER SECTION [3]							
Input Offset Voltage	V_{cm} = 1.5 to 5.2V		0.1	5		2	10	mV
Input Bias Current	V_{cm} = 1.5 to 2.5V		1	10		1	10	µA
Input Offset Current	V_{cm} = 1.5 to 5.2V		0.1	1		0.1	1	
DC Open Loop Gain	Δ V_0 = 1 to 3V ,R_L ≥ 10 MΩ	60	80		60	80		dB
Gain Bandwidth Product	**note5**	1	3.5		1	3.5		MHz

ELECTRICAL CHARACTERISTICS (T_J = Over Operating Temperature Range unless otherwise stated)

Parameter	Test Conditions	IP1P125			IP3P125			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
	ERROR AMPLIFIER SECTION (cont.) [3]							
Output Low Level			0.2	0.5		0.2	0.5	V
Output High Level		3.8	5.6	7.0	3.8	5.6	7.0	
Common Mode Rejection	V_{CM} = 1.5 to 5.2V	60	90		60	90		dB
Supply Voltage Rejection	V_{IN} = 8 to 35V	50	60		50	60		
	PWM COMPARATOR							
Minimum Duty Cycle	$V_{PIN1} - V_{PIN2} \geq 150mV$			0			0	%
Maximum Duty Cycle	$V_{PIN2} - V_{PIN1} \geq 150mV$	45	49		45	49		
Input Threshold	Zero Duty Cycle	0.6	0.9		0.6	0.9		V
Input Threshold	Max. Duty Cycle		3.3	3.6		3.3	3.6	
Input Bias Current			50			50		µA
	SHUTDOWN SECTION							
Soft Start Current	$V_{SHUTDOWN}$ = 0V	25	50	80	25	50	80	µA
Soft Start Low Level	$V_{SHUTDOWN}$ = 2V		0.4	0.6		0.4	0.6	V
Shutdown Threshold	To Outputs	0.6	1.3	2.0	0.6	1.3	2.0	
Shutdown Input Current	$V_{SHUTDOWN}$ = 2.5V		0.1	1.0		0.1	1.0	mA
Shutdown Delay **note5**	PIN 10 to Output T_J = 25°C		50	300		50	300	ns
	OUTPUT DRIVERS (each output) [4]							
Output Low Level	I_{SINK} = 20mA		0.2	0.4		0.2	0.4	V
	I_{SINK} = 100mA		1.0	2.5		1.0	2.5	
Output High Level	I_{SOURCE} = 20mA	18	19		18	19		V
	I_{SOURCE} = 100mA	17	18		17	18		
Collector Leakage Current	V_C = 35V			200			200	V
Rise Time	C_L = 1nF T_J = 25°C		100	300		100	300	ns
Fall Time	C_L = 1nF T_J = 25°C		50	300		50	300	
Dead Time	C_L = 1nF T_J = 25°C		100			100		

NOTES

note5

These parameters, although guaranteed over the recommended conditions are not 100% tested in production.