AUTOMOTIVE GRADE

CS290/291

Ignition Controller

Description

The CS290/291 are integrated circuits to be used in the automotive ignition system. The application diagram shown below highlights the CS290. The CS291 is identical with the differential input replaced by a single-ended input. The part is capable of withstanding 90V load dump transients in the circuit shown below. The part is also reverse battery protected.

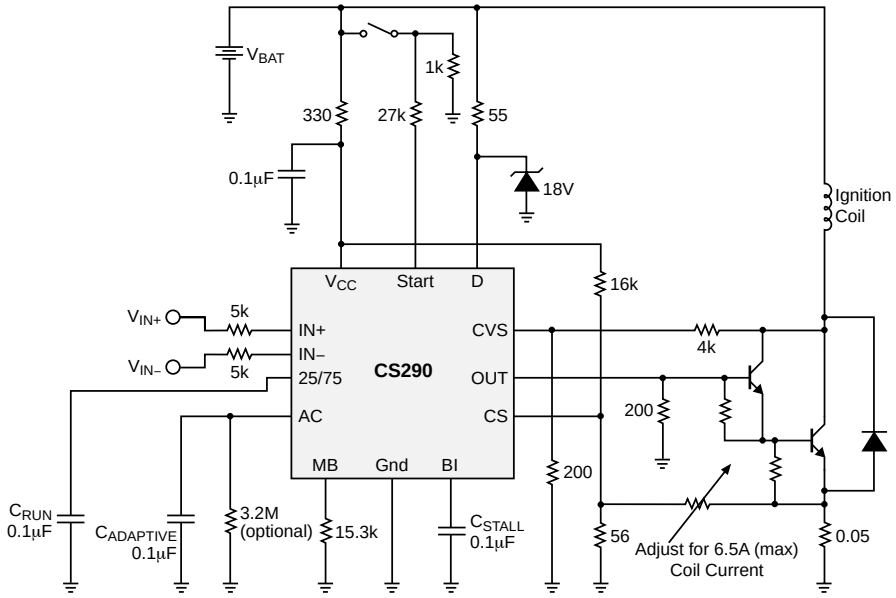
Features

- **40mA Driver**
- **Stall Timing**
- **Output Current Control**
- **Output Clamp**
- **Overvoltage Shutdown**

Absolute Maximum Ratings

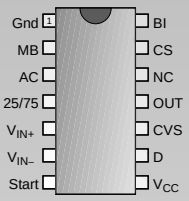
Power supply voltage, V_{BAT} . . . . . –0.3V to 22V
Peak Transient Voltage (Load Dump 76V @ 14V V_{BAT}) 90V
Storage Temperature . . . . . –55°C to 165°C
Operating Junction Temperature, T_J . . . . . .150°C
Lead Temperature Soldering
Wave Solder (through hole styles only) . . . . . .10 sec. max, 260°C peak
Reflow (SMD styles only) . . . . . .60 sec. max above 183°C, 230°C peak

Application Diagram



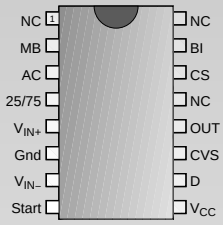
Package Options

14 Lead PDIP

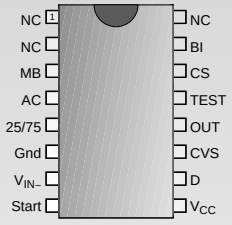


16 Lead SO Wide

CS290



CS291



Consult Factory for Flip Chip

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Electrical Characteristics: 6V < V_B < 16V, –30°C < T_A < 125°C

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
■ Input					
Positive Threshold				66	%V_{BAT}
Negative Threshold	V_{BAT} =16V V_{BAT} = 6V	29 29			%V_{BAT}
Hysteresis		9			%V_{BAT}
Input Impedance	Input = 100μA	70		325	kΩ
V_{CC} Negative Edge Filter	V_{BAT} = 16V V_{BAT} = 6V	18 4		1100 1100	μs
■ Output Stage					
Negative Edge Delay (Start Mode)	V_{BAT} = 6V	1.1		3.1	ms
Positive Edge Delay (Start Mode)	V_{BAT} = 5V	1.06		1.80	ms
Delay Time (Start High to Output Low)	V_{BAT} = 14V	0		16	μs
Output Current	V_{BAT} = 6V	40		65	mA
Output SOA	V_{BAT} = 22V	40		65	mA
Output Leakage	V_{BAT} = 18V	0		100	uA
Output Clamp Voltage	Output = 10mA	13.7		17	V
Output Clamp Impedance (Refers to Collector Sense Voltage pin)	Output = 10mA	10		80	Ω
High Frequency On Time	V_{BAT} = 14V	70		80	%
■ General					
I_{CC}	V_{BAT} = 6V V_{BAT} = 16V	1.4 5		4.6 19	mA
AC Gain Adaptive Cap Gain	V_{BAT} = 14V	0.8		1.2	V/V
V_{CS} Regulation	V_{BAT} = 6V	140		210	mV
High Voltage Shutdown		24.3		31	V
■ Stall					
V_{STALL} Soft Shutdown Voltage	V_{CS} = 6V	0		11	mV
Soft Shutdown Frequency	V_{BAT} = 14V	1.0		2.6	Hz
Soft Shutdown Time	V_{BAT} = 6V	13.1		27	ms
Stall to Spark Output Delay	V_{BAT} = 14V	4.5		8.9	ms
Battery Interrupt Time	V_{BAT} = 14V	25		750	ms
Battery Interrupt Recovery Time	(200 Hz)	0		800	ms
■ Dwell					
Dwell @ 10Hz (Start Mode)	V_{BAT} = 5V	46		54	%
Start to Output Disable Time	V_{BAT} = 14V	65		135	ms
Excess Dwell @ 20Hz (Run Mode)	V_{BAT} = 14V	14		20.8	%

Electrical Characteristics: 6V < V_B < 16V, –30°C < T_A < 125°C

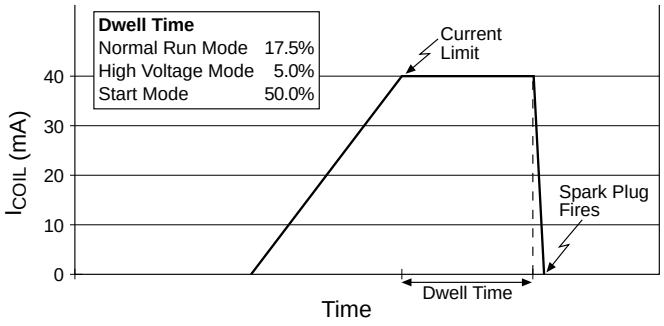
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
■ **Dwell: continued**					
Excess Dwell @ 200Hz (Run Mode)	V_{BAT} = 14V	14		20.8	%
Reduced Dwell Threshold		16.6		21.0	V
Reduced Dwell Hysteresis		200		800	mV
Reduced Dwell	V_{BAT} = 20V	4.0		6.0	%

Package Pin Description

PACKAGE PIN #			PIN SYMBOL	FUNCTION
14 lead PDIP	16 lead SO wide CS290	16 lead SO wide CS291		
1	6	6	Gnd	Signal Ground.
2	2	3	MB	Master Bias. Sets up operating currents on the IC with external resistor.
3	3	4	AC	Adaptive Capacitor. Follows the 25/75 capacitor. Voltage trip points control the Output for setting dwell.
4	4	5	25/75	Run Capacitor. Provides 25%/75% charge and discharge current to an external capacitor for setting dwell.
5	5	NC	V_{IN+}	Input pin +.
6	7	7	V_{IN-}	Input pin –.
7	8	8	Start	Input pin to put device in the “start mode”.
8	9	9	V_{CC}	Supply input voltage.
9	10	10	D	Supply current to output pin.
10	11	11	CVS	Collector Voltage Sense. Input for flyback detect.
11	12	12	OUT	Output. Driver for external darlington.
12	1,13,16	1,2,16	NC	No connection.
13	14	14	CS	Current Sense. Feedback for max coil current.
14	15	15	BI	Battery Int. Input for “stall mode” of operation
NC	NC	13	Test	Factory test pin. Pin should be grounded in customer application.

Typical Performance Characteristics

Timing Diagram, I_{COIL} vs. Time



Package Specification

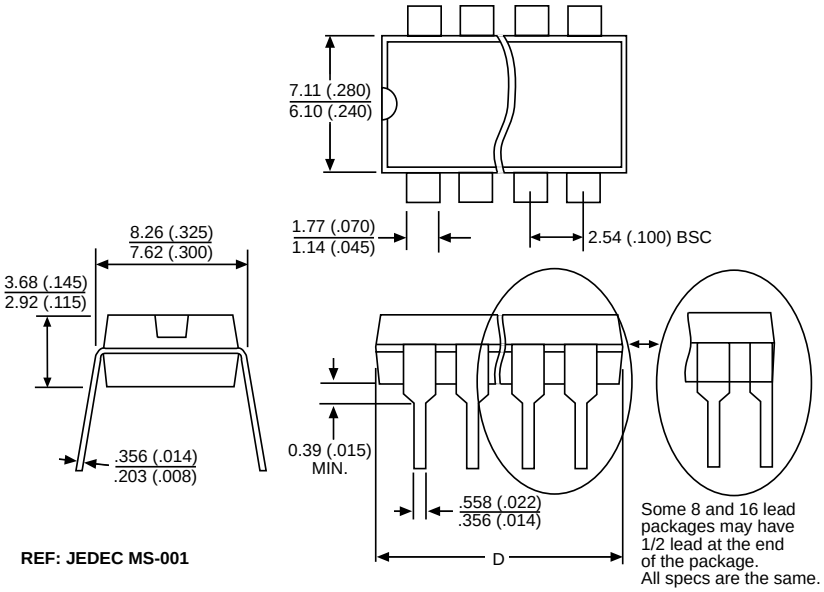
PACKAGE DIMENSIONS IN mm (INCHES)

Lead Count	D			
	Metric		English	
	Max	Min	Max	Min
14L PDIP	19.69	18.67	.775	.735
16L SO Wide	10.50	10.10	.413	.398

PACKAGE THERMAL DATA

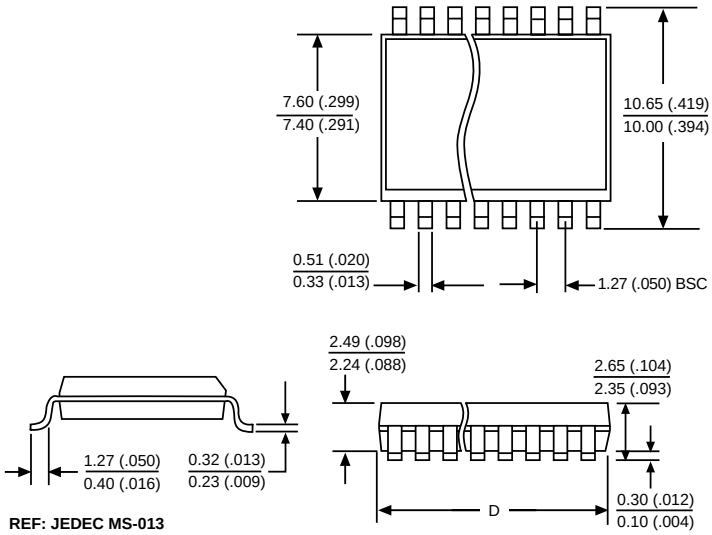
Thermal Data		14 Lead PDIP	16 Lead SO Wide	
$R\Theta_{JC}$	typ	48	23	°C/W
$R\Theta_{JA}$	typ	85	105	°C/W

Plastic DIP (N); 300 mil wide



REF: JEDEC MS-001

Surface Mount Wide Body (DW); 300 mil wide



REF: JEDEC MS-013

Ordering Information

Part Number	Description
CS290N14	14L PDIP
CS291N14	14L PDIP
CS290DW16	16 Lead SO Wide
CS290DWR16	16 Lead SO Wide *(tape & reel)*
CS291DW16	16 Lead SO Wide
CS291DWR16	16 Lead SO Wide *(tape & reel)*

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