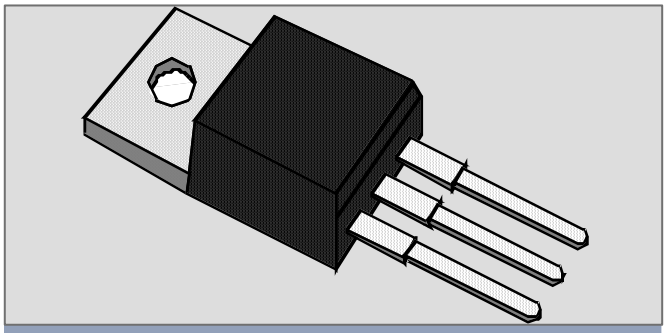
Automotive Electronics

Product Information
Ignition Power Switch – BIP355

BOSCH
Invented for life



Current-limiting bipolar ignition driver with low saturation voltage

Customer benefits:

- Excellent system know-how
- Smart concepts for system safety
- Secured supply
- Long- term availability of manufacturing processes and products
- QS9000 and ISO/TS16949 certified

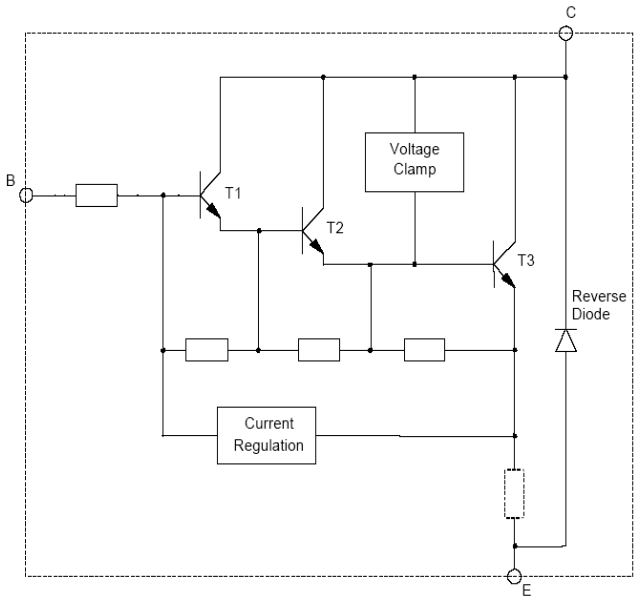
Features

- Triple stage darlington designed for automotive ignition application
- Driven by standard CMOS logic with low power consumption in the driving circuit
- Input protected against V_{BAT}
- Internal CE voltage clamp, temperature compensated
- Collector current limiting circuit
- Low saturation voltage (<2 V at 9 A in the entire temperature range)
- Integrated capacitors for oscillation free operation
- Package: TO220

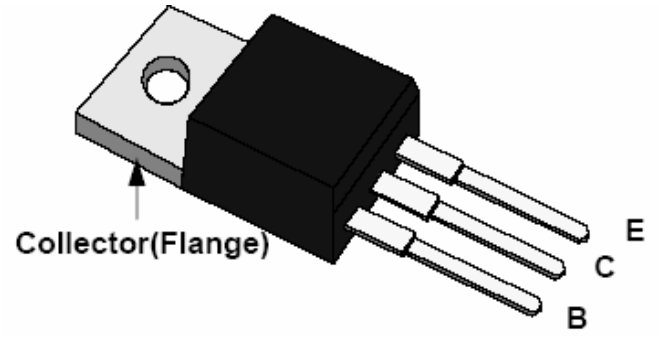
The bipolar triple stage darlington BIP355 especially developed to drive an ignition coil in automotive ignition circuits can be controlled by standard CMOS logic. The rugged bipolar process assures safe operation in automotive-specific environment even under harsh conditions. The excellent quality of the concept - chip design and plastic packaging - has been proven in the field a million times. Due to the ESD performance - typical for HV-bipolar devices - special precautions during manufacture or operation are not necessary.

The BIP355 has an active voltage clamp between collector and emitter. It is temperature compensated with an accuracy of about ±25 V in the entire temperature range. In order to protect the ECU, the wire harness, the coil and the ignition driver the collector current is limited to typ. 14 A for long dwell times. Using a virtual sense concept a low saturation voltage of less than 2 V at 9 A in the entire temperature range will be obtained.

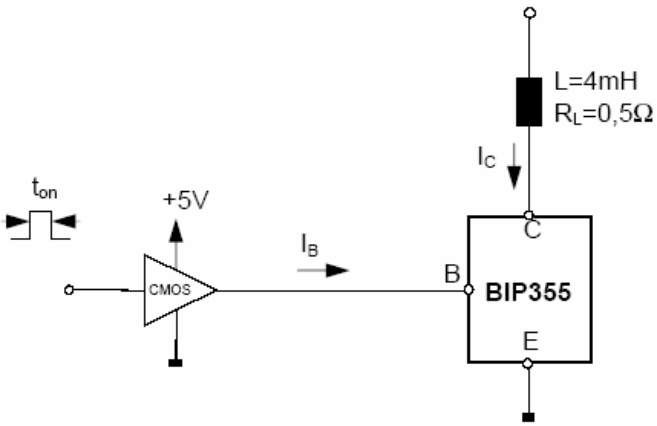
Block diagram



PIN configuration



Application example



Maximum ratings

Parameter	Symb.	Value	Unit
Collector emitter breakdown voltage	V_{CE}	200	V
Collector base breakdown voltage	V_{CB}	200	V
Collector current (sine half wave tp= 40us, f= 100Hz)	I_C	20	A
Reverse diode forward current t=300s, Tcase= 25°C	I_{EC}	10	A
Input voltage Tcase < 40°C, t< 60s, no function	V_{BE}	14	V
Input current, no function	I_B	-100 ...500	mA
Inductive load switching avalanche energy (L= 4mH, I_C= 15A)	E_{off}	430	mJ
Operating and storage junction temperature range	T_j	-40... 150	°C
AC-operating temperature (<1% of total operating time)	V_{batt}	6...16	V

Electrical characteristics

Unless otherwise specified: V_{Bat} = 6V...16V, I_B= 25mA...25mA, $T_{junction}$= -40°C....+150°C

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{Cl}	Collector emitter clamping voltage	On: I_B= 20mA, I_C= 9A, L= 4mH, Off: V_{BE} < 0.7V, measured 25ms after V_{CE}= 200V	310	335	360	V
V_{Cl_Peak}	Collector emitter clamping voltage peak	On: I_B= 20mA, I_C= 9A, L= 4mH, Off: V_{BE} < 0.7V			410	V
I_{Con}	Collector current limitation	V_{CE}= 4V...10V; I_B= 10mA...25mA	10	14	18	A
		V_{CE}= 4V...10V; T_j ≥ 25°C			17	
		V_{CE}= 4V...10V; I_B= 5mA...35mA	5		20	
I_{Coff}	Leak current	V_{BE}= 0V; V_{CE}= 250V			15	mA
I_{Coffa}	Leak current by active Input	V_{BE} ≤ 0.7V; V_{CE} ≤ 20V			25	mA
		I_B = 10uA; V_{CE} ≤ 20V			25	
V_{CE_Rev}	Reverse polarity collector emitter voltage	I_C = -5A	-1.3	-1.1		V
V_{BE_Rev}	Reverse polarity base emitter voltage	I_C = -5A	-1.2			V
V_{CE_SAT}	Collector emitter saturation voltage	I_C = 9A; T_j ≥ 25°C		1.7	1.9	V
		I_C = 9A; T_j < 25°C I_B= 10mA...25mA			2.0	
V_{BE_SAT}	Base emitter saturation voltage	I_C = 9A; I_B= 15...25mA	2.7		4.2	V
		I_C = 9A; I_B= 10mA, T_j < 25°C			3.75	
		I_C = 9A; I_B= 15mA, T_j ≥ 25°C			3.70	
V_{CE_Re}	Threshold voltage of the restart blockade	V_{BE} ≤ 5.5V; if V_{CE} > V_{CE_Th}, the restart is blockaded	30		60	V
t_{OFF}	Switching time delay	I_C = 9A, Trigger: V_{CE}=200V, t_0 at ½ I_B	5		43	µs
R_{thj_Case}	Thermal resistance	Case: TO220			1.3	K/W

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