



DESCRIPTION

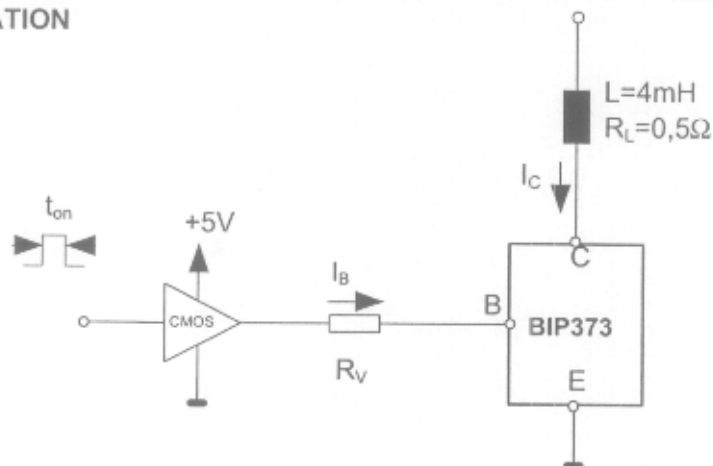
The bipolar triple-stage darlington BIP373 - especially developed to drive an ignition coil in automotive ignition circuits - can be controlled by standard CMOS logic. The rugged bipolar process assures safe operation in automotive-specific environment even under harsh conditions. The excellent quality 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 manufacturing or operation are not necessary.

The BIP373 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 at typ. 12 A for long dwell times. Using a virtual sense concept, a low saturation voltage of less than 2 V at 7 A in the entire temperature range has been obtained.

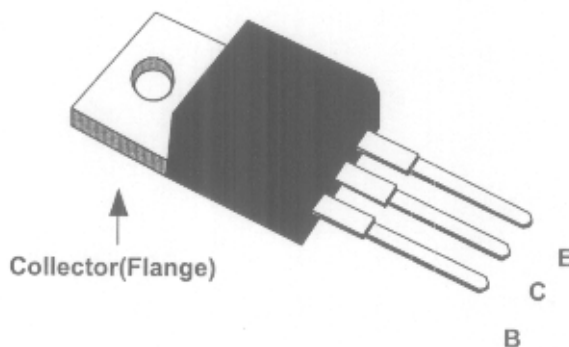
In order to prevent overheating and thermal damage of the device in case of excessive long dwell times the power stage is levelled down internally to a low current by the integrated „Overtemperature Protection“ circuit (OTP) if the critical junction temperature is reached. This smooth process avoids spark ignition and prevents the device from being heated up further.

The BIP373 with all the built-in protection circuits is suitable for high performance and high operation temperature automotive ignition applications.

APPLICATION



Pin Configuration



**ELECTRICAL CHARACTERISTICS**

Unless otherwise specified:

 $V_{\text{Bat}}=6\text{V}...16\text{V}$, $I_{\text{B}}=5\text{mA}...12\text{mA}$, $T_{\text{Junction}}=-40^{\circ}\text{C}...+150^{\circ}\text{C}$

Symbol	Parameter	Test Conditions, Comment	Min.	Typ.	Max.	Unit
V_{Cl}	Collector Emitter Clamping Voltage	at $I_{\text{C}}=6\text{A}...7.3\text{A}$ measured 25 μs after $V_{\text{CE}}=200\text{V}$	350	375	400	V
$V_{\text{Cl_Peak}}$	Collector Emitter Clamping Voltage Peak	at $I_{\text{C}}=6\text{A}...7.3\text{A}$			450	V
$I_{\text{C_L}}$	Collector Current Limitation	$V_{\text{CE}}=6\text{V}...10\text{V}$; $-40^{\circ}\text{C} = T_{\text{J}} = 125^{\circ}\text{C}$	9.0		16.0	A
		$V_{\text{CE}}=6\text{V}...10\text{V}$	8.5	11,5	16.0	A
		$V_{\text{CE}}=4\text{V}$	8.0		16.0	A
I_{off}	Off-state Current	$V_{\text{BE}}=0$; $V_{\text{CE}}=250\text{V}$			15	mA
I_{offa}	Off-state Current by active Input	$V_{\text{BE}} = 0.8\text{V}$; $V_{\text{CE}} = 20\text{V}$			25	mA
		$I_{\text{B}} = 10\mu\text{A}$; $V_{\text{CE}} = 20\text{V}$			25	mA
$V_{\text{CE_REV}}$	Reverse Polarity Collector Emitter Voltage	$I_{\text{C}}=-5\text{A}$	-1.3	-1.1		V
$V_{\text{BE_REV}}$	Reverse Polarity Base Emitter Voltage	$I_{\text{C}}=-5\text{A}$	-1.2			V
$V_{\text{CE_SAT}}$	Collector Emitter Saturation Voltage	$I_{\text{C}} = 7\text{A}$	1.4		2.0	V
		$I_{\text{C}} = 8\text{A}$			2.3	V
$V_{\text{BE_SAT}}$	Base Emitter Saturation Voltage	$I_{\text{C}} = 7\text{A}$, $I_{\text{B}} = 5\text{mA}$	2.55		3.85	V
		$I_{\text{C}} = 7\text{A}$, $I_{\text{B}} = 12\text{mA}$	3.20		4.85	V
t_{OFF}	Switching Time	$I_{\text{C}} = 7\text{A}$			40	μs
T_{OTP}	Thermally Controlled Shut-Down Temperature	at $T_{\text{Th_Sd}} = T_{\text{J}}$	185	195	210	$^{\circ}\text{C}$
$V_{\text{CE_R0}}$	Threshold Voltage after Restart-Blockade	$V_{\text{BE}} < 5.5\text{V}$, if $V_{\text{CE}} < V_{\text{CE_Re}}$, the Restart-Blockade is cancelled	30		60	V
$V_{\text{BE_bl}}$	Blockade of Device, Threshold Voltage		6,5	9,0	10,5	V
$R_{\text{thj_case}}$	Thermal Resistance				1.3	K/W

**MAXIMUM RATINGS**

Parameter	Symbol	Value	Unit
Collector Emitter Breakdown Voltage at 20mA (limited internally)	V_{CE}	250	V
Collector Base Breakdown Voltage	V_{CB}	250	V
Collector Current (limited internally)	I_{C_L}	16	A
Reverse Diode Forward Current	I_{EC}	10	A
Input Voltage $T_{case} < 40^{\circ}C$, $t < 60s$	V_{BE}	14	V
Input Current	I_B	200	mA
Inductive Load Switching Avalanche Energy (L=4 mH)	E_L	450	mJ
Operating and Storage Junction Temperature Range	T_j	-40...150	$^{\circ}C$

