



VB027 VB027(011Y) / VB027(012Y)

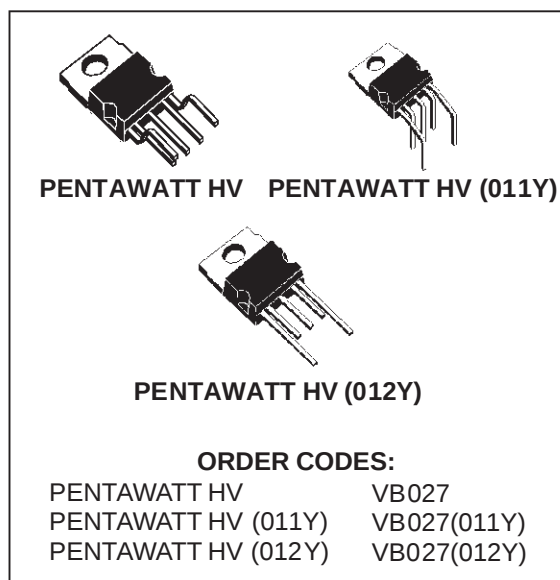
HIGH VOLTAGE IGNITION COIL DRIVER POWER I.C.

TYPE	$V_{cl(min)}$	$I_{cl(max)}$	$I_{d(on)max}$
VB027			
VB027(011Y)	300V	9A	130mA
VB027(012Y)			

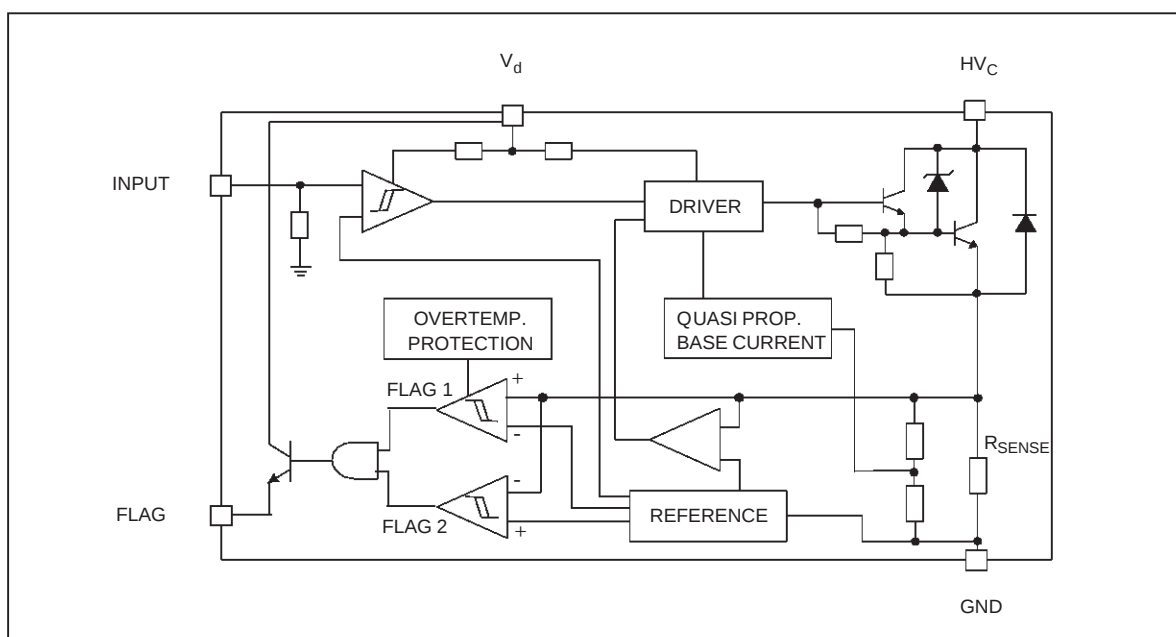
- PRIMARY COIL VOLTAGE INTERNALLY SET
- COIL CURRENT LIMIT INTERNALLY SET
- LOGIC LEVEL COMPATIBLE INPUT
- DRIVING CURRENT QUASI PROPORTIONAL TO COLLECTOR CURRENT
- DOUBLE FLAG-ON COIL CURRENT

DESCRIPTION

The VB027, VB027(011Y), VB027(012Y) is a high voltage power integrated circuit made using the STMicroelectronics VIPower™ technology, with vertical current flow power darlington and logic level compatible driving circuit. Built-in protection circuit for coil current limiting and collector voltage clamping allows the device to be used as smart, high voltage, high current interface in advanced electronic ignition system.



BLOCK DIAGRAM



VB027 / VB027(011Y) / VB027(012Y)

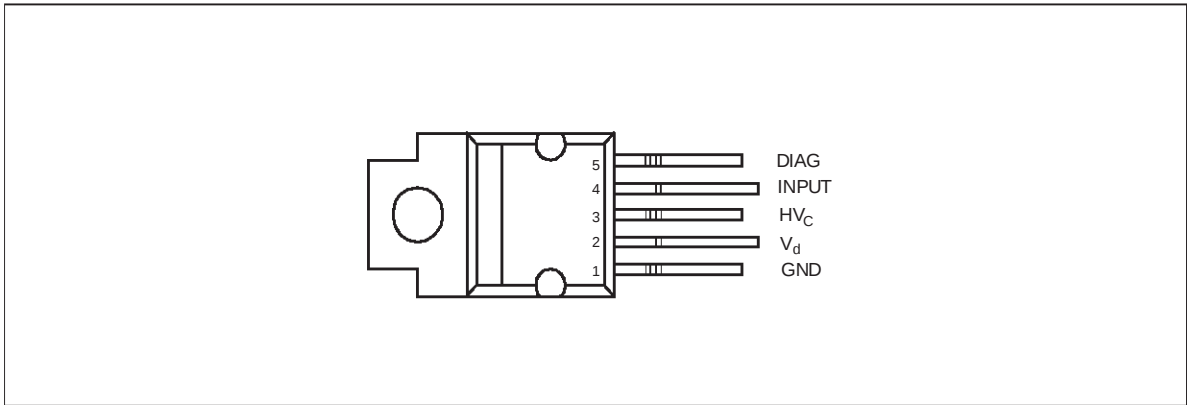
ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Value	Unit
HV_C	Collector voltage	Internally limited	V
I_C	Collector current	Internally limited	A
V_d	Driving stage supply voltage	7	V
I_d	Driving circuitry supply current	200	mA
V_{IN}	Input voltage	10	V
T_j	Junction operating temperature	-40 to 150	°C
T_{stg}	Storage temperature	-55 to 150	°C

THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case (MAX)	1.12	°C/W
$R_{thj-amb}$	Thermal resistance junction-ambient (MAX)	62.5	°C/W

CONNECTION DIAGRAM (TOP VIEW)



PIN FUNCTION (PENTAWATT HV)

No	Name	Function
1	GND	Emitter power ground
2	V_d	Driving stage supply voltage
3	HV_C	Primary coil output signal
4	INPUT	Logic input channel
5	DIAG	Diagnostic output signal

ELECTRICAL CHARACTERISTICS ($V_{CC}=13.5V$; $V_d=5V$; $T_j=25^\circ C$; $R_{coil}=510m\Omega$; $L_{coil}=7mH$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{cl}	High voltage clamp	$-40^\circ C \leq T_j \leq 125^\circ C$; $I_C=6A$	300	360	400	V
$V_{cg(sat)}$	Power stage saturation voltage	$I_C=6A$; $V_{IN}=4V$		1.5		V
$V_{cg(sat)td}$	Power stage saturation voltage derating in temperature	$I_C=6A$; $V_{IN}=4V$; $-40^\circ C \leq T_j \leq 125^\circ C$			2	V
$I_{d(off)}$	Power-off supply current	$V_{IN}=0.4V$			10	mA
$I_{d(on)}$	Power-on supply current	$V_{IN}=4V$; $I_C=6A$; $-40^\circ C \leq T_j \leq 125^\circ C$			130	mA
V_d	Driving stage supply voltage		4.5		5.5	V
I_{cl}	Collector current limit	$V_{IN}=4V$ (See note 1)	8	8.5	9	A
$I_{cl(td)}$	Collector current limit drift with temperature	See figure 3				
V_{INH}	High level input voltage		4		5.5	V
V_{INL}	Low level input voltage		0		0.8	V
I_{INH}	High level input current	$V_{IN}=4V$			200	μA
V_{diagH}	High level diagnostic output voltage	$R_{EXT}=22K\Omega$ (See figure 1)	3.5	(*)	V_d	V
V_{diagL}	Low level diagnostic output voltage	$R_{EXT}=22K\Omega$ (See figure 1)			0.5	V
$I_{C(diag1)}$	First threshold level collector current		4.25	4.5	4.75	A
$I_{C(diag1)td}$	First threshold level collector current drift with temperature	See figure 4				
$I_{C(diag2)}$	Second threshold level collector current		5.45	5.8	6.15	A
$I_{C(diag2)td}$	Second threshold level collector current drift with temperature	See figure 5				
$t_{d(off)}$	Turn-off delay time of output current	$I_C=6A$; (See note 2)		25		μs
$t_{f(off)}$	Turn-off fall time of output current	$I_C=6A$		8		μs
$t_{d(diag)}$	Delay time of diagnostic current	$R_{EXT}=22K\Omega$ (See figure 1)		1		μs
$t_{r(diag)}$	Turn-on rise time of diagnostic current	$R_{EXT}=22K\Omega$ (See figure 1)		1		μs
$t_{f(diag)}$	Turn-off fall time of diagnostic current	$R_{EXT}=22K\Omega$ (See figure 1)		1		μs

Note 1: the primary coil current value I_{cl} must be measured 1ms after desaturation of the power stage.

Note 2: time from input switching V_{NEG} until collector voltage equal 200V.

(*) $V_d - V_{be(on)}$

FIGURE 2: Switching waveform

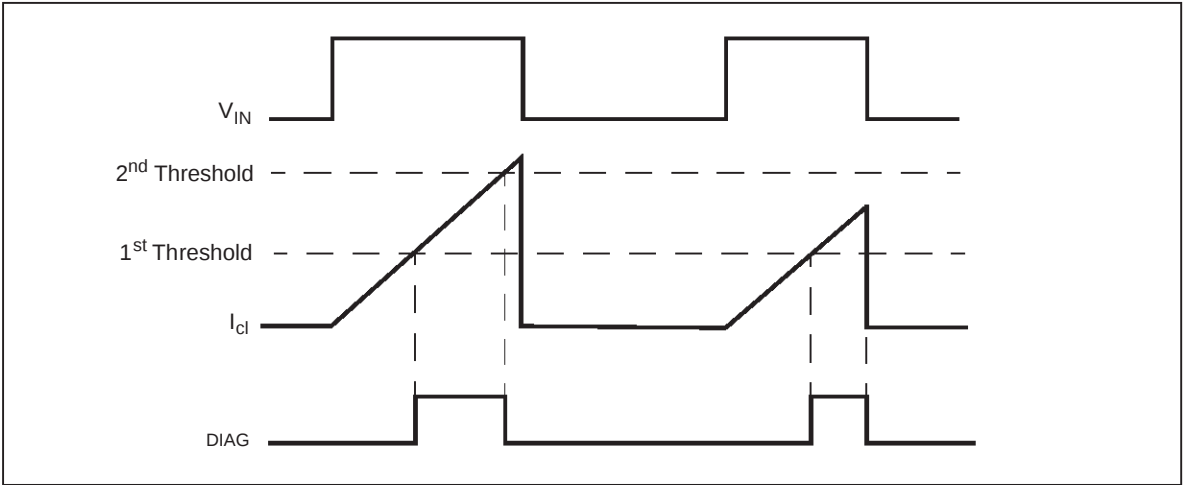


FIGURE 3: Maximum I_{cl} VS temperature

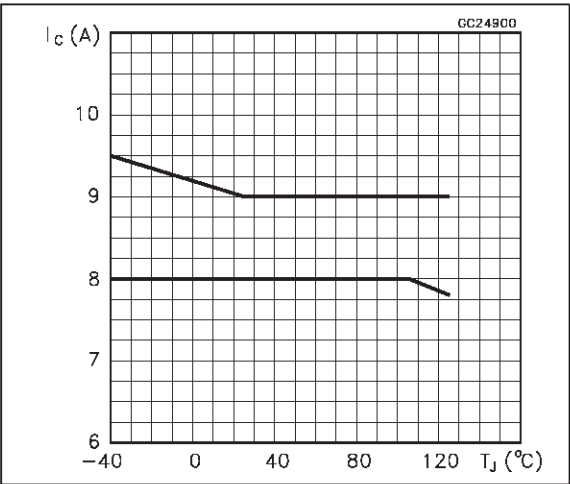


FIGURE 4: $I_{C(diag1)}$ VS temperature

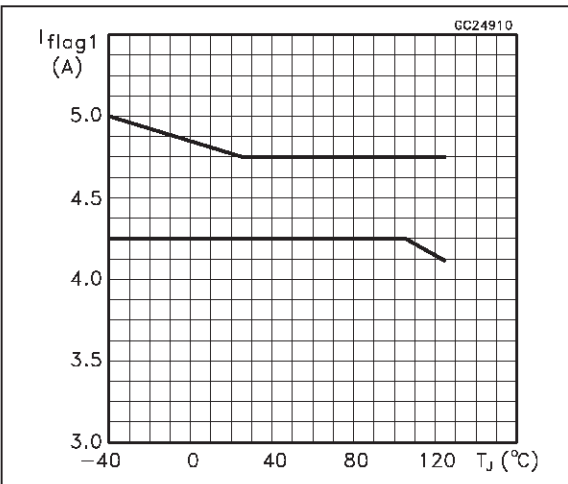
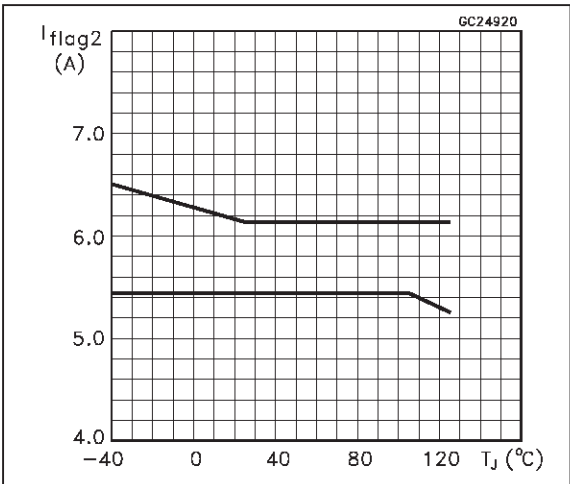
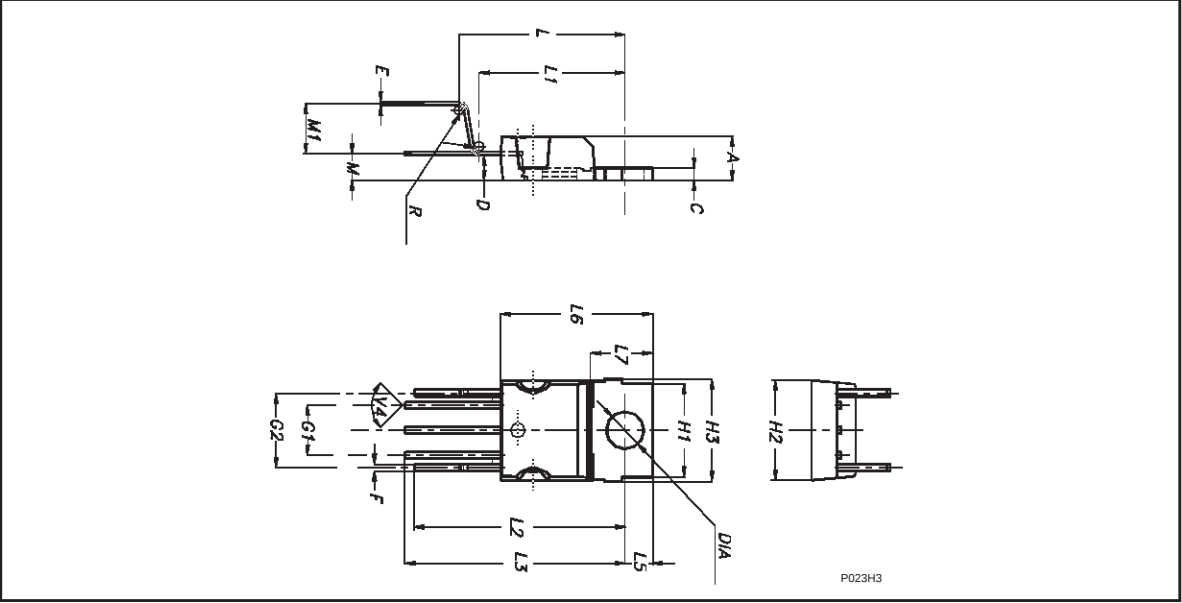


FIGURE 5: $I_{C(diag2)}$ VS temperature



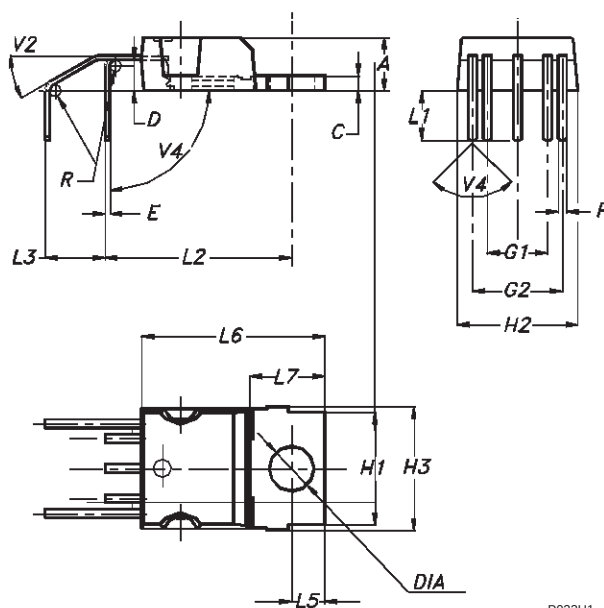
PENTAWATT HV MECHANICAL DATA	
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DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.30		4.80	0.169		0.189
C	1.17		1.37	0.046		0.054
D	2.40		2.80	0.094		0.11
E	0.35		0.55	0.014		0.022
F	0.60		0.80	0.024		0.031
G1	4.91		5.21	0.193		0.205
G2	7.49		7.80	0.295		0.307
H1	9.30		9.70	0.366		0.382
H2			10.40			0.409
H3		10.05	10.40		0.396	0.409
L	15.60		17.30	6.14		0.681
L1	14.60		15.22	0.575		0.599
L2	21.20		21.85	0.835		0.860
L3	22.20		22.82	0.874		0.898
L5	2.60		3	0.102		0.118
L6	15.10		15.80	0.594		0.622
L7	6		6.60	0.236		0.260
M	2.50		3.10	0.098		0.122
M1	4.50		5.60	0.177		0.220
R	0.50			0.02		
V4	90° (typ)					
Diam	3.65		3.85	0.144		0.152



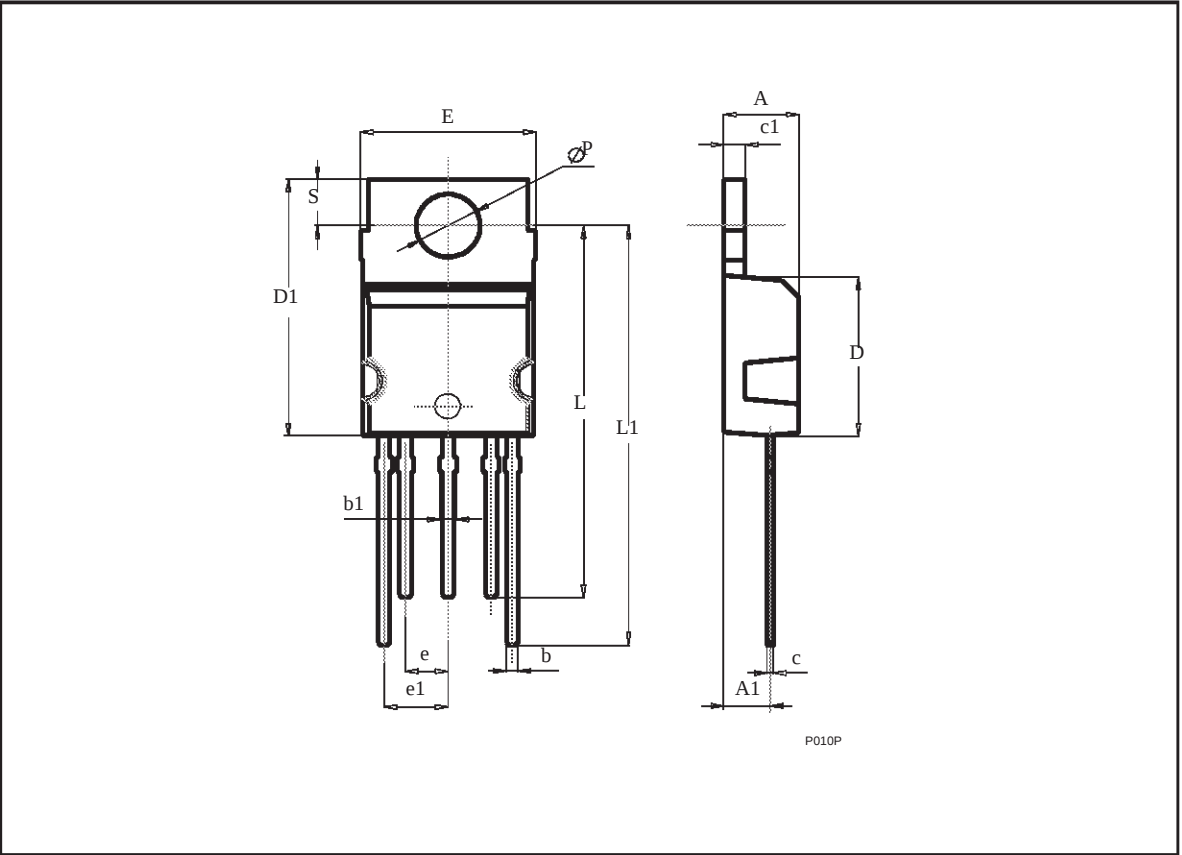
PENTAWATT HV 011Y (horizontal) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.30		4.80	0.169		0.189
C	1.17		1.37	0.046		0.054
D	2.40		2.80	0.094		0.11
E	0.35		0.55	0.014		0.022
F	0.60		0.80	0.024		0.031
G1	4.91		5.21	0.193		0.205
G2	7.49		7.80	0.295		0.307
H1	9.30		9.70	0.366		0.382
H2			10.40			0.409
H3		10.05	10.40		0.396	0.409
L1	3.90		4.50	0.154		0.177
L2	15.10		16.10	0.594		0.634
L3	4.80		5.40	0.189		0.213
L5	2.60		3.00	0.102		0.118
L6	15.10		15.80	0.594		0.622
L7	6.00		6.60	0.236		0.26
R		0.5				
V2	30° (typ)					
V4	90° (typ)					
DIA	3.65		3.85	0.144		0.152



PENTAWATT HV 012Y (in line) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.3		4.8	0.169		0.189
A1	2.5		3.1	0.098		0.122
b	0.6		0.8	0.024		0.031
b1	0.75		0.9	0.03		0.035
c	0.35		0.55	0.014		0.022
c1	1.22		1.42	0.048		0.056
D	9		9.35	0.354		0.368
D1	15.2		15.8	0.598		0.622
e	2.44		2.64	0.096		0.104
e1	3.71		3.91	0.146		0.154
E	10		10.4	0.394		0.409
L	22.32		22.92	0.879		0.902
L1	25.1		25.7	0.988		1.012
P	3.65		3.95	0.144		0.156
S	2.55		3.05	0.1		0.12



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