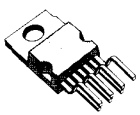
HIGH SIDE DRIVER CIRCUIT

- OPERATING SUPPLY VOLTAGE RANGE 6 TO 45V
- TYPICAL OUTPUT CURRENT 2.7A
- R_{ON} LESS THAN 400mΩ
- µP COMPATIBLE INPUT WITH THRESHOLD HYSTERESIS
- DC AND PWM OPERATION
- HIGH PERFORMANCE DIAGNOSTIC FUNCTION
- SHORT CIRCUIT AND THERMAL OVERLOAD PROTECTIONS
- GROUNDED CASE
- ENABLE INPUT FOR STANDBY MODE



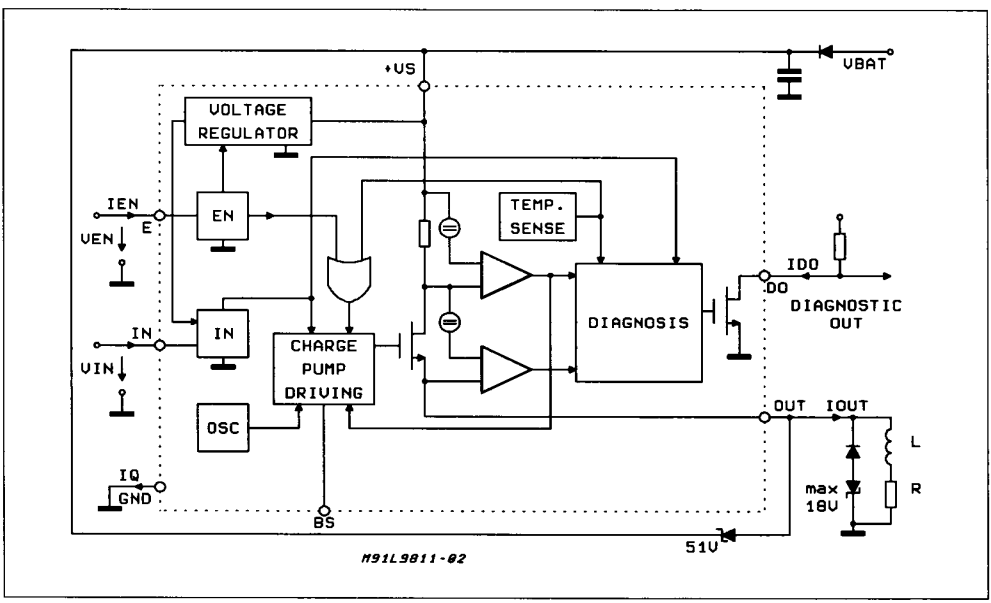
HEPTAWATT

ORDERING NUMBER: L9812R

DESCRIPTION

The L9812R is a monolithic integrated circuit realized in Multipower BCD technology. It is an intelligent high side driver designed expecially for inductive or resistive loads. It features all functions necessary for automotive environment including high performance diagnostic.

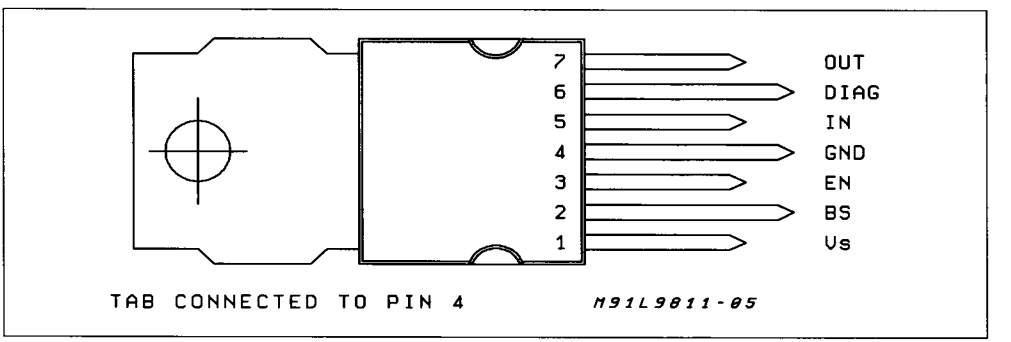
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{SDC}	DC Supply Voltage	-0.3 to 45	V
V_S - V_O	Supply to Output Voltage	60	V
V_I - V_E	Input and Enable Input Voltage	-0.2 to 7	V
V_{BS}	Bootstrap Voltage	60	V
V_O	Output Voltage	-18 to 45	V
I_O	Output Current	internally limited	V
V_{DF}	Diagnostic Output Voltage	-0.2 to 32	V
I_{DF}	Diagnostic Output Current	10	mA
T_{JSD}	Thermal Shutdown Threshold	min 150	°C
T_{JSDH}	Thermal shutdown Hysteresis	max 35	°C

PIN CONNECTION



THERMAL DATA

$R_{th\ j\ case}$	Thermal Resistance Junction-case	max 1.5	°C/W
$R_{th\ j\ camb}$	Thermal Resistance Junction-ambient	max 60	°C/W

DIAGNOSTIC DECISION TABLE

STATE	ENABLE	INPUT	OUTPUT		T_D	FUNCTION	DIAGNOSTIC
			V_O	I_O			
OFF	H	H	L	X	$<T_{JSD}$	NORMAL "OFF"	H
	H	H	L	X	$>T_{JSD}$ *	THERMAL OVERLOAD "OFF"	L
	H	H	$>V_{ODTH}$ *	X	$<T_{JSD}$	OUTPUT FAIL/"OFF"	L
ON	H	L	H	X	$<T_{JSD}$	NORMAL "ON"	H
	H	L	X	X	$>T_{JSD}$ *	THERMAL OVERLOAD "ON"	H
	H	L	$<V_S - V_{OEXD}$ *	$>I_{SC}$	X	EXTERNAL DROP DUE TO OVERCURRENT	H
	H	L	$<V_S - V_{OEXD}$ *	X	$<T_{JSD}$	XCESSIVE DROP "ON"	H
ST-BY	L	X	X	X	X	STANDBY MODE	H

(*)Parameter causing Diagnostic = LOW

ELECTRICAL CHARACTERISTICS (V_S = 6 to 45V (1); T_j = -40 to 150°C; V_{EN} = HIGH; unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_{ON}	ON Resistance	V_I < 0.8V; T_j < 125°C		200	400	mΩ
I_{SC}	Short Circuit Current	V_{SDC} ≤ 32V; V_{SPULSE} (Tp < 2ms)	1	2.7	4	A
I_{OC} (2)	Output Current	V_O = -18V			100	mA
I_Q	OFF State Quiescent Current	V_I > 2V; V_S = 32V; V_I > 2V;		4.5 7.5	10 12	mA mA
I_Q	ON State Quiescent Current	V_I < 0.8V; V_S = 32V; V_I < 0.8V;		4.5 10	10 16	mA mA
V_{IL}	Input Low Level				0.8	V
V_{IH}	Input High Level		2			V
V_{ITH}	Input Threshold Hysteresis		50	100		mV
I_{IN}	Input Current	V_I = 0 to 5.5V			10	µA
I_{DFL}	Diagnostic Output Leakage Current	T_j ≤ 125°C; V_D = 7V; Diagnostic output High			10	µA
V_{DFL}	Diagnostic Output Low	I_{DF} ≤ 2mA			0.4	V
V_{OEXD}	Excessive Dropout Voltage Detection Level		1	1.5	2	V
V_{ODTH}	Output Diagnostic Threshold	V_I ≥ 2V	4		6	V
t_{RD}	Diagnostic Delay Time				10	µs
I_{QSB}	Standby Mode Quiescent Current	V_{EN} < 0.8V; T_j ≤ 125°C; V_S= 27V V_S= 13V			400 200	µA µA
V_{ENL}	Enable Level Low	Standby Mode			0.8	V
V_{ENH}	Enable Level High		2			V
V_{ENTH}	Enable Threshold Hysteresis		50	100		mV
I_{ENH}	Enable Input Current High	V_{EN} = 2 to 5.5V; V_{EN} < V_S -2			10	µA
I_{ENL}	Enable Input Current Low	V_{EN} = 0 to 0.8V;	-1		1	µA
t_{rON}	ON Rise Time (3)	with C_B: V_S ≤ 32V V_S > 8V V_S > 10V t_{OFF} > 0.3ms			 4 2 6	 µs µs µs
t_{fOFF}	OFF Fall Time	V_S = 8 to 32V			2	µs
t_{dON}	ON Delay Time	V_S = 8 to 32V		1	3	µs
t_{dOFF}	OFF Delay Time	V_S = 8 to 32V		1	3	µs
t_d	Diff. Delay Time t_{dON} - t_{dOFF}	VS = 8 to 32V			4	µs

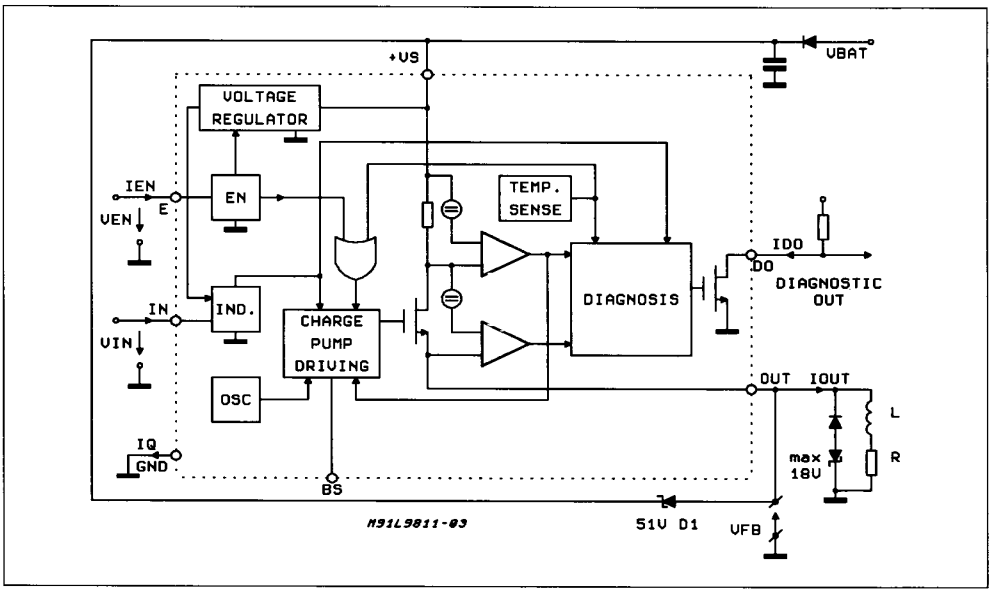
Notes:

1) For Vs < 6V the device can switch off.

2) An external recirculation path must be assured in PWM operation to avoid excessive power dissipation

3) Measured with resistive load and I_{LOAD} = 1A from 10% to 90% of the output voltage amplitude with C_B = 33nF and after t_{OFF} < 10µs

APPLICATION DIAGRAM: DC Operation



APPLICATION DIAGRAM: PWM Operation