

Step Down DC - DC Converter Power IC

MD1423R

Frequency adjustable

Small footprint

Output adjustable

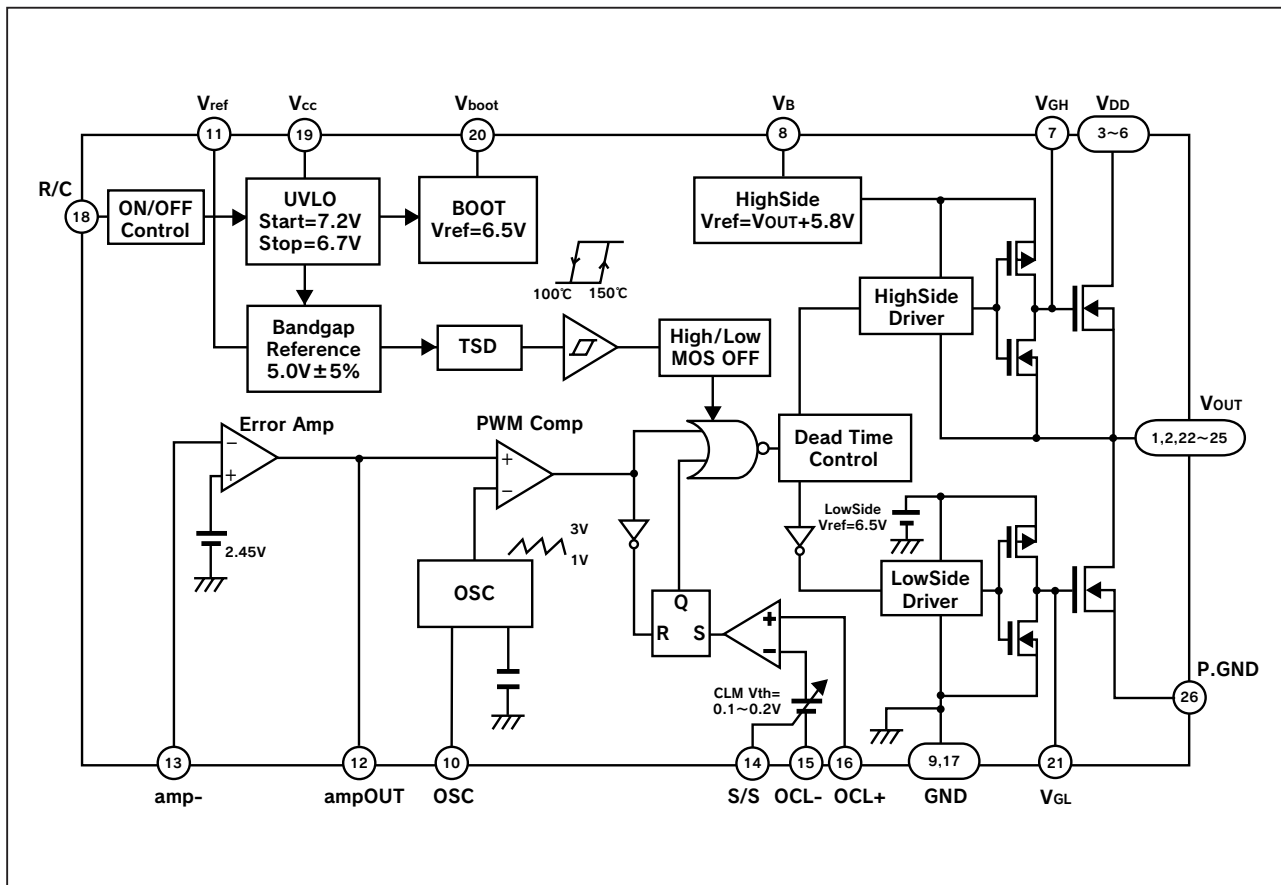
Remote On/Off

Synchronous Rectification

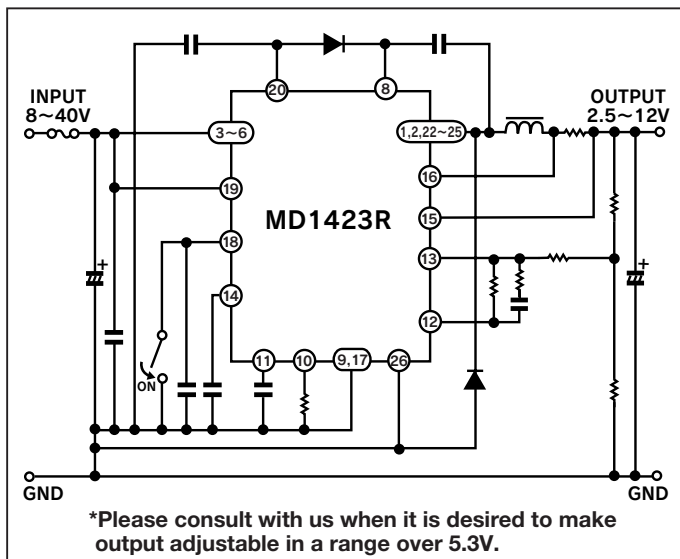
Feature

- Input Voltage range 8V to 40V
- Maximum Output Current 3A
- Built_in MOSFETs for main switch and synchronous rectification
- Adjustable output from 2.5V to 12V with external resistors
- Adjustable oscillation frequency from 100kHz to 500kHz with external resistors
- High Efficiency typ. 96%
(at:Vin=8V, Vout=5V, Iout=1A, f=100kHz)
- Over Current Protection
- Thermal Shut Down
- Remote On / Off

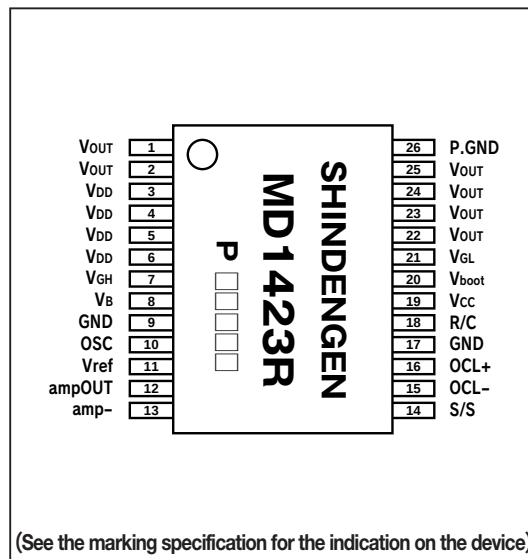
Block Diagram



Standard Connection Diagram



Pin Assignment (LSSOP26)



(See the marking specification for the indication on the device)

Absolute Maximum Ratings

Unless otherwise specified : Ta=25°C

Item	Symbol	Ratings	Units
Input/Output Ratings			
Input voltage	V _{CC}	42	V
Main MOSFET input voltage	V _{DD}	42	V
Output current (ave)	I _{OUTave}	3	A
Output current (peak)	I _{OUTpeak}	4	A
OCL-, OCL+ input voltage	V _{OCL}	5.5	V
Remote control voltage	V _{RC}	5.5	V
Thermal Ratings			
Power dissipation max ※1	PD1 ※3	1.1	W
	PD2 ※3	1.5	W
Operating temperature	Ta-ope	-30 to 85	°C
Storage temperature	Tstg	-40 to 150	°C
Junction temperature	Tj	150	°C
Thermal resistance ※1	θ_{ja1} ※3	110	°C/W
	θ_{ja2} ※3	87	°C/W
	θ_{jc1} ※2, ※3	55	°C/W
	θ_{jc2} ※2, ※3	30	°C/W

※1 CEM-3 Board : 50.8×50.8mm², Thickness : 1mm, Copper Pattern : 300mm² (Top Side), There is no through-hole.

※2 The measurement result in the center of case.

※3 PD1, θ_{ja1} , θ_{jc1} are the values of the power dissipation and thermal resistance when electifying to a single internal element.

PD2, θ_{ja2} , θ_{jc2} are the values of the power dissipation and thermal resistance when electifying to two internal element.

Recommended Operating Conditions

Item	Symbol	Recommendation	Units
Junction temperature	Tj	-30 to 125	°C
Input voltage (Ta = -10°C to 85°C)	V _i ※4	8 to 40	V
Input voltage (Ta = -30°C to -10°C)	V _i ※4	8.5 to 40	V
Output voltage setting range	V _O ※5	2.5 to 12	V
Oscillation frequency	frq	100 to 500	kHz

※4 Input voltage at the time of power supply operation.

※5 Output voltage at the time of power supply operation.

Electrical Characteristics

Unless otherwise specified : Ta=25°C

Item	Symbol	Condition	MIN	TYP	MAX	Units
High Side MOSFET						
Drain-source breakdown voltage	V _{DSS_H}	I _D = 1mA, V _{GS} = 0V	42	—	—	V
Zero gate voltage drain current	I _{DSS_H}	V _{DS} = 42V, V _{GS} = 0V	—	—	10	μA
Static drain-source on-state resistance	R _{ON_H}	I _D = 1.2A, V _{GS} = 4.5V	—	33	70	mΩ
Source-drain diode forward voltage	V _{SD_H}	I _S = 1.2A, V _{GS} = 0V	—	—	1.5	V
Low Side MOSFET						
Drain-source breakdown voltage	V _{DSS_L}	I _D = 1mA, V _{GS} = 0V	42	—	—	V
Zero gate voltage drain current	I _{DSS_L}	V _{DS} = 42V, V _{GS} = 0V	—	—	10	μA
Static drain-source on-state resistance	R _{ON_L}	I _D = 1.2A, V _{GS} = 4.5V	—	33	70	mΩ
Source-drain diode forward voltage	V _{SD_L}	I _S = 1.2A, V _{GS} = 0V	—	—	1.5	V
Control IC						
Undervoltage lockout threshold (start)	V _{cc_start}	—	6.5	7.2	7.9	V
Undervoltage lockout threshold (stop)	V _{cc_stop}	—	6.0	6.7	7.4	V
Undervoltage lockout hysteresis	V _{cc_hys}	—	—	0.5	—	V
Supply current	I _{cc}	V _{cc} = 8 to 40V, f = 300kHz	—	10	1.3	mA
Supply current-remote OFF state	I _{cc_off}	V _{cc} = 8 to 40V	—	1.2	1.5	mA
Remote control ON input voltage	V _{RC_on}	V _{cc} = 8 to 40V	-0.2	—	0.45	V
Remote control OFF input voltage	V _{RC_off}	V _{cc} = 8 to 40V	2.5	—	5.3	V
Remote control source current	I _{RC}	V _{cc} = 8 to 40V	—	—	250	μA
Bootstrap voltage	V _{boot}	V _{cc} = 24V	5.4	6.5	7.6	V
Reference voltage	V _{ref}	V _{cc} = 8 to 40V	4.75	5	5.25	V
Frequency1 accuracy	frq_100	V _{cc} = 24V, R = 406.0kΩ	93	100	107	kHz
Frequency2 accuracy	frq_300	V _{cc} = 24V, R = 105.1kΩ	279	300	321	kHz
Frequency3 accuracy	frq_500	V _{cc} = 24V, R = 49.8kΩ	465	500	535	kHz
Threshold of over current limit	V _{th_OCL}	V _{cc} = 24V	0.162	0.19	0.218	V
Softstart source current	I _{s/s}	V _{cc} = 24V	-20	-12.5	-5	μA
Error amp reference voltage	V _{vamp}	V _{cc} = 8 to 40V	2.4	2.45	2.5	V
Thermal shutdown temperature	T _{TSD}	—	—	150	—	°C