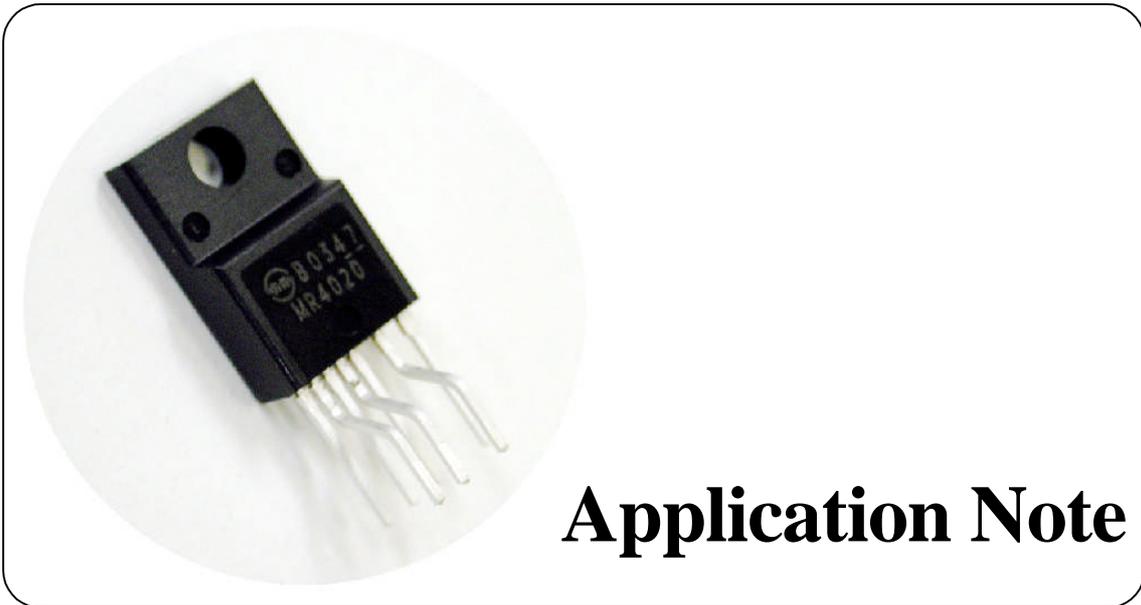




Provision for standby mode operation

Partial Resonance Power Supply IC Module

MR4000 Series



Application Note

Version 1.4

Shindengen Electric Manufacturing Co., Ltd.

1.1 Introduction

The MR4000 Series IC modules incorporate a burst-mode switching function at micro-loads. These are partial resonance modules consisting of a switching device optimized for 100 V, 200 V, and auto-sensing power supply input and a control IC. The IC modules are designed to provide the following power supply characteristics:

1.2 Characteristics

1. High efficiency and low noise through partial resonance
2. Second-generation high-speed IGBT with 900-V resistance simplifies design for auto-sensing power supply input. (MR40XX series)
3. Burst mode helps reduce power consumption at micro-loads.
4. Onboard startup circuit eliminates the need for startup resistors.
5. Soft-drive circuit achieves low noise levels.
6. Overcurrent protection function (ton limit and primary current limit), overvoltage protection, and thermal shutdown function
7. Allow configuration of a power supply circuit with fewer external components.
8. Full-mold package facilitates insulation design.

1.3 Applications

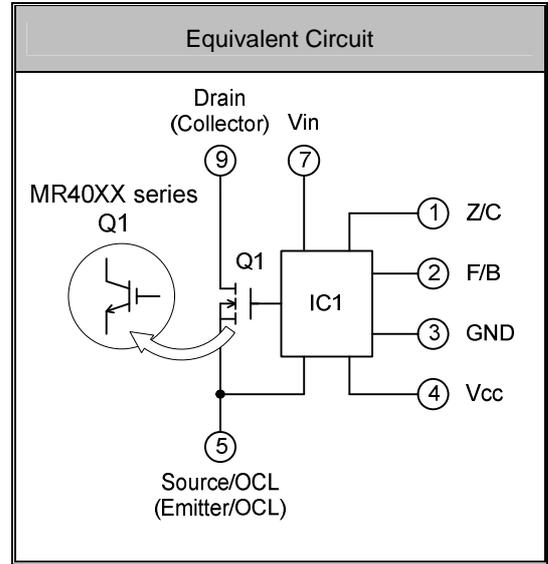
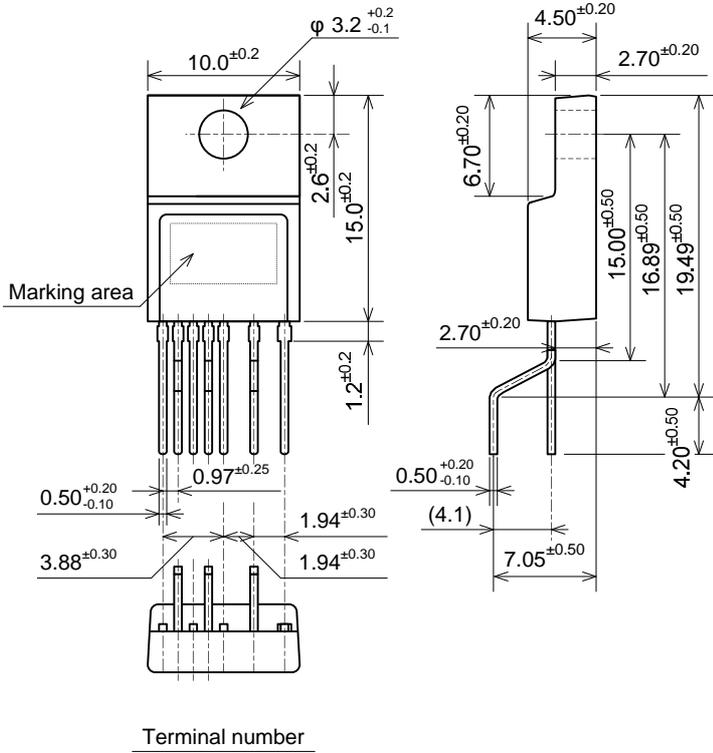
Televisions, displays, printers, video recorders, DVD, STB, refrigerators, and other appliances; various automated business machines

1.4 Absolute maximum ratings and reference output capacities

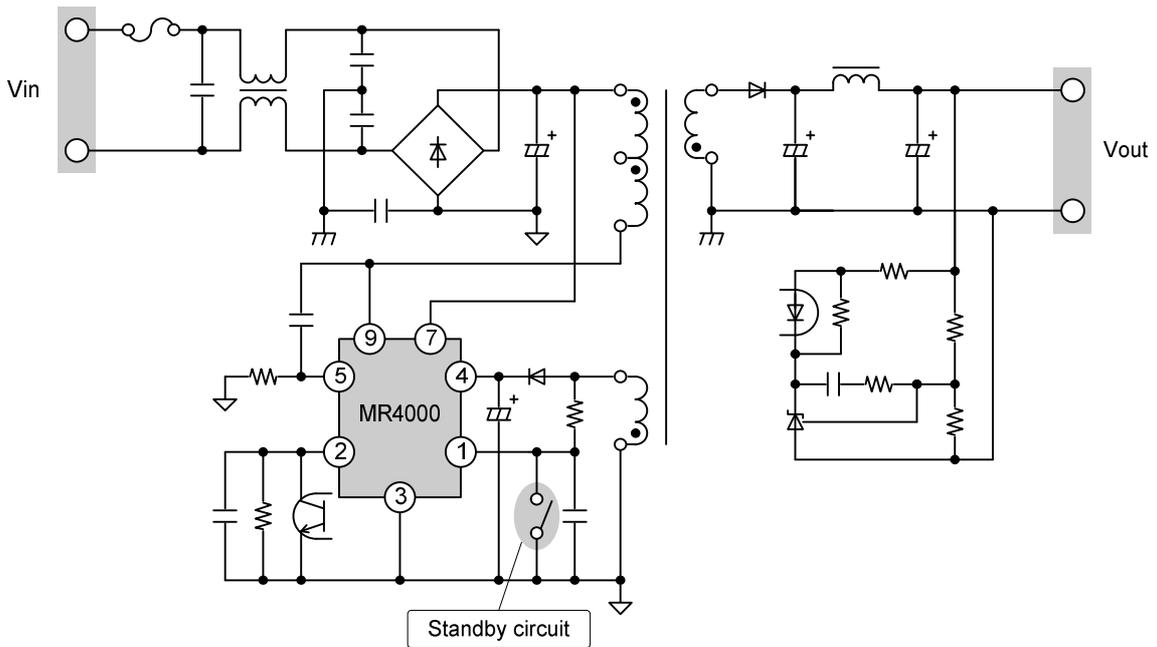
型名	Main switching device	VDS/VCE [V]	Maximum output capacity Po[W]		
			Input voltage range		
			AC90 - 132V	AC180 - 276V	AC90 - 276V
MR4500	MOSFET	500	12 (20)	—	—
MR4510			25 (40)	—	—
MR4520			50 (80)	—	—
MR4530			80 (100)	—	—
MR4710		700	—	25 (40)	12 (20)
MR4720			—	50 (80)	25 (40)
MR4010	Second-generation high-speed IGBT	900	—	65	45
MR4020			—	105	70
MR4030			—	135	90
MR4040			—	180	120

Maximum output capacity and input voltage range vary with design parameters.
Output capacities in parentheses are peak values.

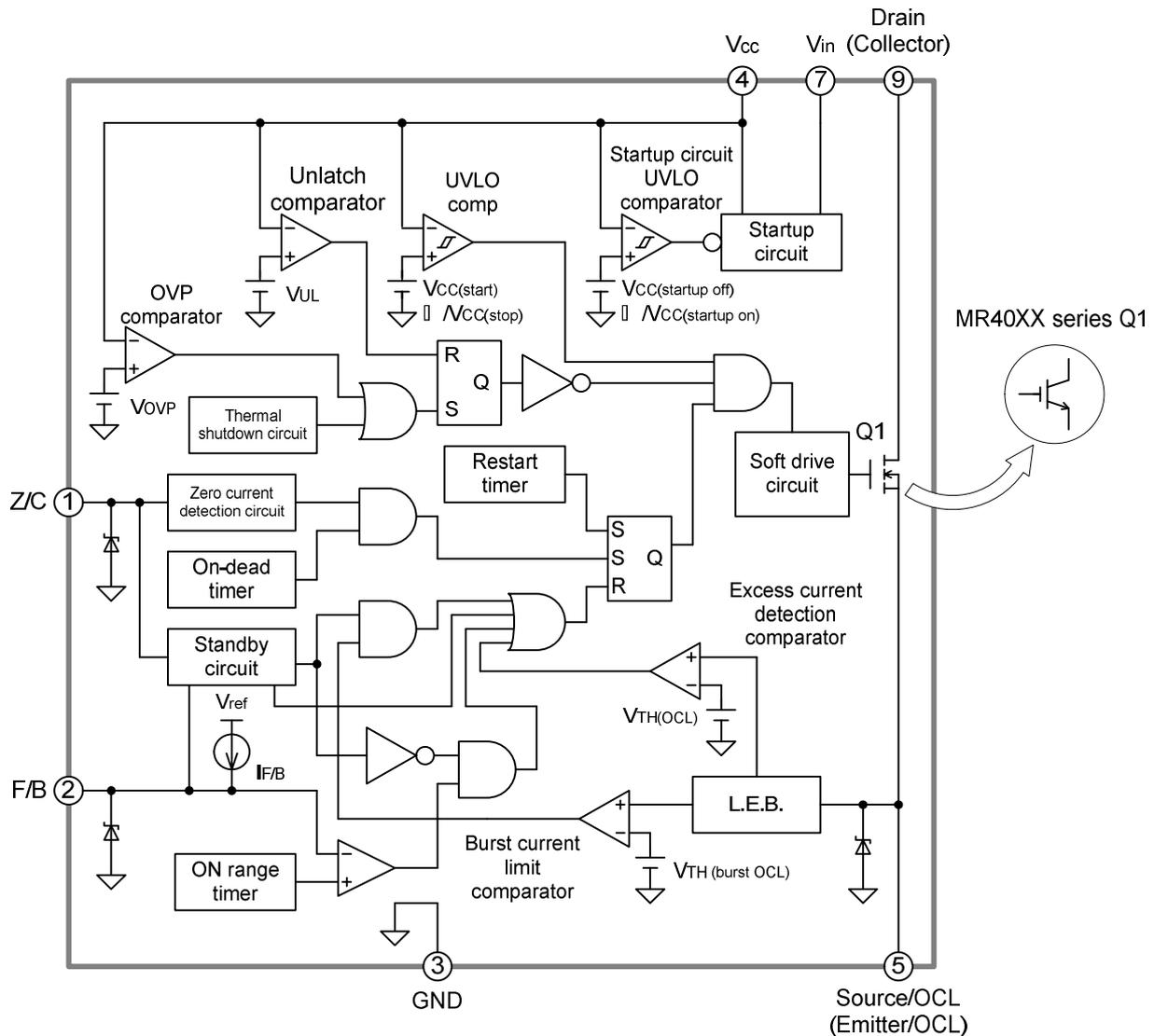
1.5 Dimensions and equivalent circuit



1.6 Basic circuit



2.1 Block diagram



2.2 Pin function description

Pin number	Abbreviation	Description	
1	Z/C	Zero current detection pin	
2	F/B	Feedback signal input pin	
3	GND	GND pin	
4	V _{cc}	V _{cc} (IC power supply) pin	
5	Source/OCL	MR45XX series	Main switching device source and OCL (current detection) pin
		MR47XX series	
5	Emitter/OCL	MR40XX series	Main switching device emitter and OCL (current detection) pin
6		—	
7	V _{in}	V _{in} (startup) pin	
8		—	
9	Drain	MR45XX series	Main switching device drain pin
		MR47XX series	
	Collector	MR40XX series	Main switching device collector pin