

Switched Mode Power Supply IC

Descriptions

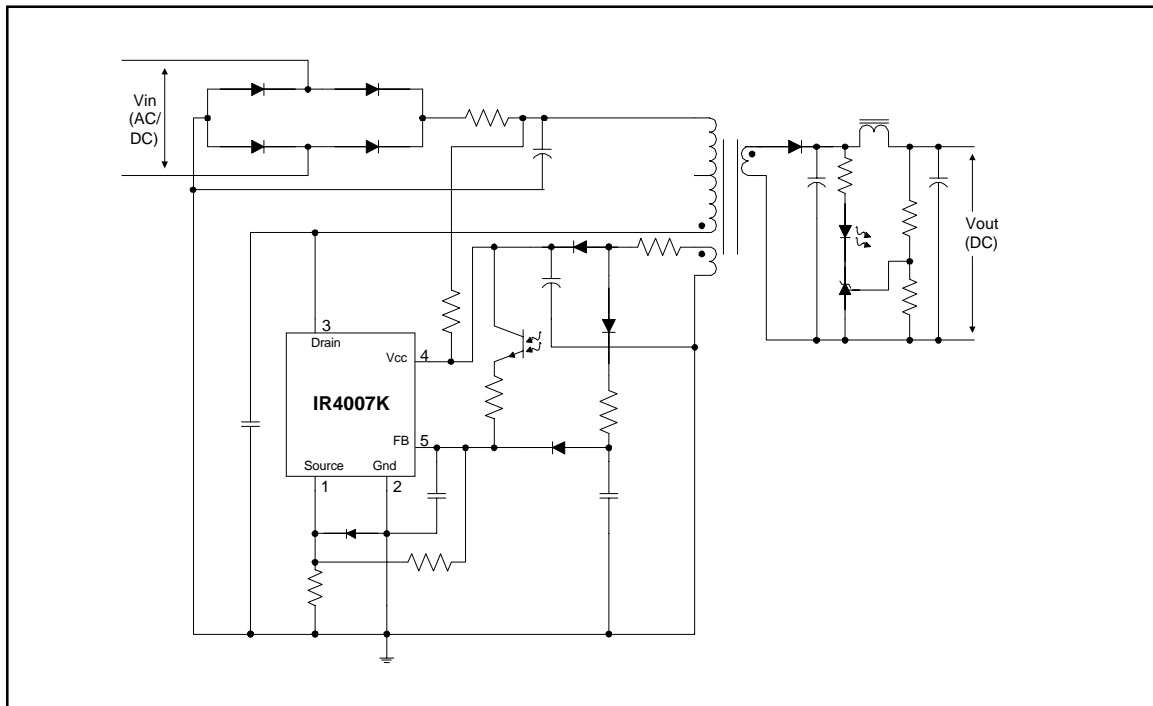
The IR4007 is a dual mode voltage and current controller combined with a MOSFET in a single Package.

The IR4007 is designed for use in AC/DC and DC/DC switching power supplies upto 100VDC nominal input. The device can operate in either a quasi-resonant or Pulse Ratio Control (PRC) mode, and thereby variable frequency operation.

Features

- Primary current mode control, and secondary voltage mode control
- Vcc Over-voltage protection (latched)
- Over-current & over-temperature protection
- Quasi resonant, variable frequency operation
- 5 pin TO262 package
- 0.4Ω Rds(on) max/ 200V MOSFET
- **Fully Characterized Avalanche Energy**

Typical Connection Diagram



**Please note that this datasheet contains advance information which could change before the product is released to production.*

Absolute Maximum Ratings

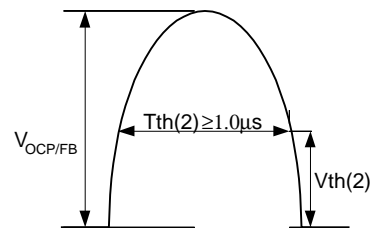
Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to terminals stated, all currents are defined positive into any lead. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

Symbol	Definition	Terminals	Max. Ratings	Units	Note
I_{Dpeak}	Peak drain current	3-1	20	A	Single pulse
I_{Dmax}	Maximum switching current	3-1	5.0		$V_{2-3} = 0.78V$ $T_c = 25^\circ C$
E_{AS}	Single pulse avalanche energy	3-1	100	mJ	$V_{dd} = 50V, L = 10mH,$ $T_c = 25^\circ C$
V_{CC}	Power supply voltage	4-3	35	V	
V_{TH}	OCP/FB terminal voltage	5-2	6		
P_{D1}	Power dissipation for MOSFET	3-1	TBA	W	With infinite heatsink
			TBA		Without heatsink
P_{D2}	Power dissipation for control part (MIC)	4-2	0.8		Specified by $V_{IN} \times I_{IN}$
R_{thJC}	Thermal resistance, junction to case	—	1.7	$^\circ C/W$	
T_J	Junction temperature	—	-55-150	$^\circ C$	
T_S	Storage temperature	—	-40-125		
T_f	Internal frame temperature in operation	—	-20-125		Refer to recommended operating temperature
T_{OP}	Ambient operating temperature	—	-20-125		
T_L	Lead temp. (soldering, 10 seconds)	—	300		

Recommended Operating Conditions

Time for input of quasi resonant signals.

For the Quasi resonant signal inputted to the $V_{DCP/FB}$ terminal at the time of quasi resonant operation, the signal should be wider than $T_{th}(2)$



Electrical Characteristics (for Control IC)

$V_{CC} = 18V$, ($T_A = 25^\circ C$) unless otherwise specified.

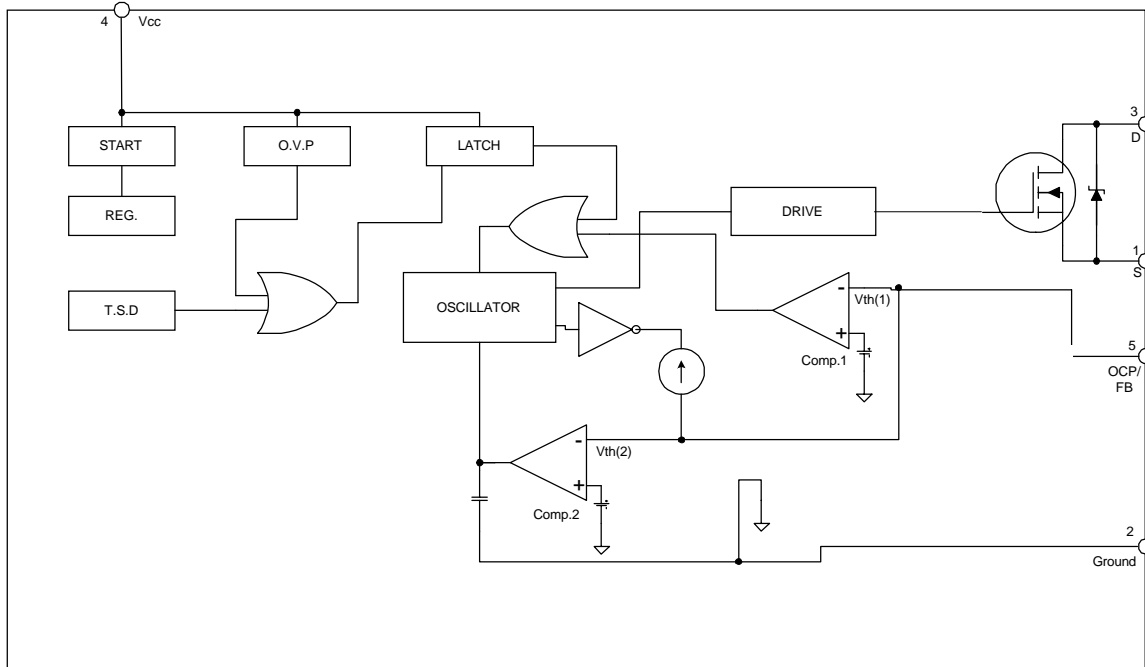
Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V_{CCUV+}	V_{CC} supply undervoltage positive going threshold	14.4	16	17.6	V	
V_{CCUV-}	V_{CC} supply undervoltage negative going threshold	9	10	11		
I_{QCCUV}	UVLO mode quiescent current	—	—	100	μA	$V_{CC} < V_{CCUV+}$
I_{QCC}	Quiescent operating V_{CC} supply current	—	—	30	mA	
$T_{OFF(MAX)}$	Maximum OFF time	45	—	55	μsec	
$T_{TH(2)}$	Minimum input pulse width for quasi resonant signals	—	—	1.0		
$T_{OFF(MIN)}$	Minimum OFF time	—	—	1.5		
$V_{TH(1)}$	OCP/FB terminal threshold voltage 1	0.68	0.73	0.78	V	
$V_{TH(2)}$	OCP/FB terminal threshold voltage 2	1.3	1.45	1.6		
$I_{OCP/FB}$	OCP/FB terminal sink current	1.2	1.35	1.5	mA	
$V_{CC(OVP)}$	V_{CC} overvoltage protection limit	20.5	22.5	24.5	V	
$I_{CC(LA)}$	Latch circuit holding current	—	—	400	μA	
$V_{CC(LaOFF)}$	Latch circuit reset voltage	6.6	—	8.4	V	
$T_{J(TSD)}$	Thermal shutdown activation temperature	140	—	—	$^\circ C$	

Electrical Characteristics (for MOSFET)

($T_A = 25^\circ C$) unless otherwise specified.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V_{DSS}	Drain-to-source breakdown voltage	200	—	—	V	
I_{DSS}	Drain leakage current	—	—	250	μA	$V_{ds}=160V, V_{CC}=0V$ $T_j=125^\circ C$
$R_{DS(ON)}$	On-resistance	—	—	0.4	Ω	$V_{3-1}=10V, I_D=5A$
t_r	Rise time (10% to 90%)	—	—	200	ns	
θ_{J-C}	Thermal resistance	—	—	1.7	$^\circ C/W$	Between junction and case

Block Diagram



Lead Assignments	Pin #	Symbol	Description
	1	S	MOSFET Source terminal
	2	Ground	Ground terminal
	3	D	MOSFET Drain terminal
	4	Vcc	Control circuit supply voltage
	5	OCP/FB	Overcurrent detection, and Voltage mode control feedback signal

Other Functions

O.V.P. – Overvoltage Protection Circuit

T.S.D. – Thermal Shutdown Circuit

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245 Tel: (310) 252-7105

IR EUROPEAN REGIONAL CENTRE: 439/445 Godstone Rd., Whyteleafe, Surrey CR3 0BL, United Kingdom
Tel: ++ 44 (0) 20 8645 8000

IR JAPAN: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171-0021 Tel: 8133 983 0086

IR HONG KONG: Unit 308, #F, New East Ocean Centre, No. 9 Science Museum Road, Tsimshatsui East, Kowloon
Hong Kong Tel: (852) 2803-7380

Data and specifications subject to change without notice. 10/19/2000