TPRT9266
Step-up DC/DC converter

www.sot23.com.tw

■ General Description

The TPRT9266 sasmall,highefficiency,andlowvoltage step-up DC/DC converter with an Adaptive Current Mode PWM control loop, includes an error amplifier, ramp generator, comparator, switch pass element and driver in which providing a stable and high efficient operation over a wide range of load currents. It operates in stable waveforms without external compensation.
Thelowstart-upinputvoltagebelow1VmakesTPRT9266 suitable for 1 to 4 battery cells applications of providing up to 300mA output current. The 450KHz high switching rate minimized the size of external components. Besides, the 17μA low quiescent current together with high efficiency maintains long battery lifetime.
TheTPRT9266 isavailableinsmallpackageSOT-26and SOT89-5

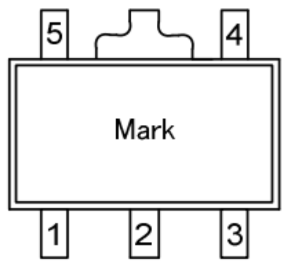
■ Features

- 90% Efficiency
- High Supply Capability to Deliver 3.3V 100mA with 1 Alkaline cell
- 17μA Quiescent (switch-off) Supply Current
- 450KHz Fixed Switching Frequency
- Zero Shutdown Mode Supply Current
- Providing Flexibility for Using Internal and External Power Switches
- 1.0V Low Start-up Input Voltage
- Small SOT-26 & SOT89-5 Package

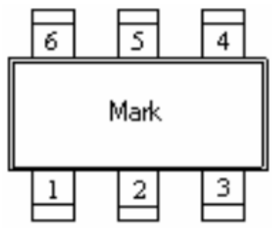
■ Applications

- LCD Panel
- DSC
- MP3
- Wireless Equipment
- Portable Instrument
- PDA

■ Package Information



SOT89-5



SOT-23-6

Ordering Information

TPRT9266 □□

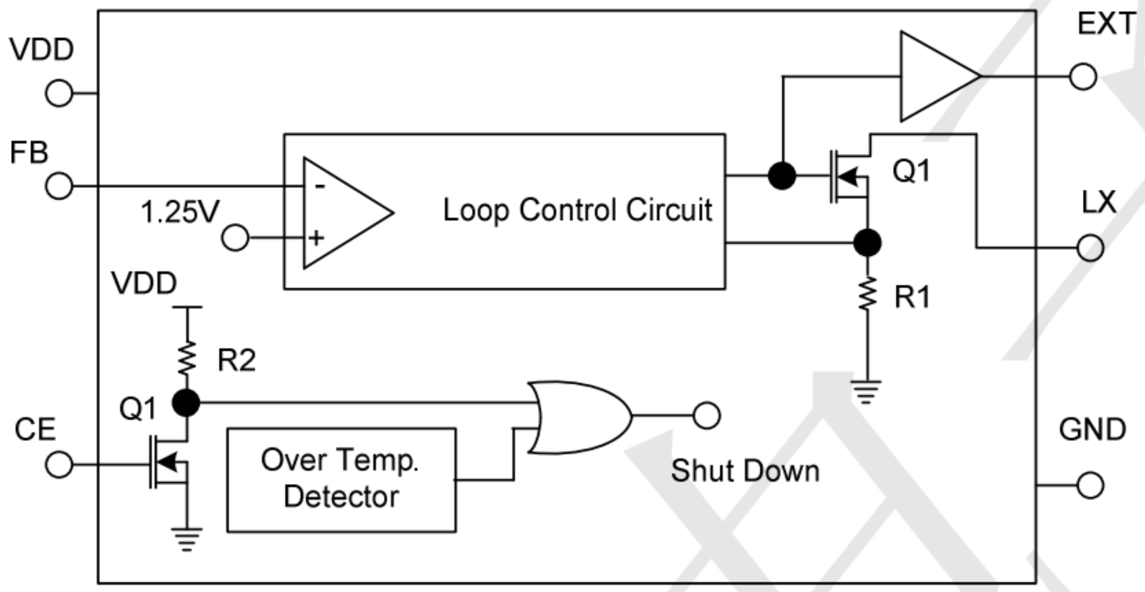
Package Type
E : SOT-26
X5 : SOT-89-5

Operating Temperature Range
G : Green (Halogen Free and Pb Free)
P : P : Pb Free

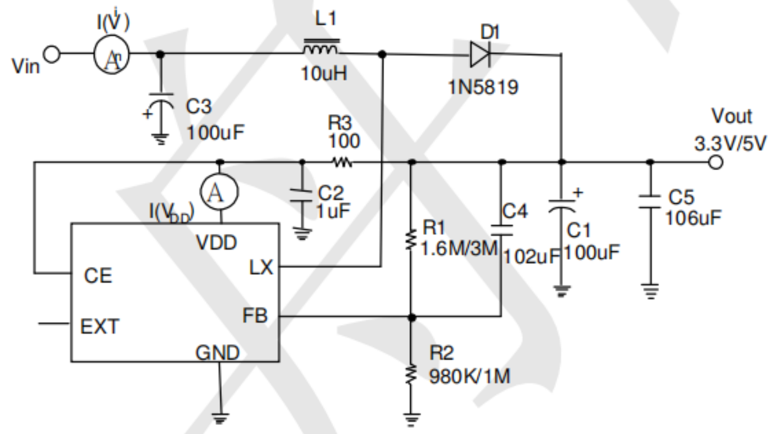
■ Pin Configurations

SOT-26	SOT-89-5	Pin Name	Pin Function
1	1	CE	Chip enable
2		EXT	Output
3	5	GND	Ground
4	4	LX	Switching
5	2	VDD	Input
6	3	FB	Feedback input 1.25V

■ Function Block Diagram



■ Test Circuit



■ Absolute Maximum Ratings (Ta=25℃)

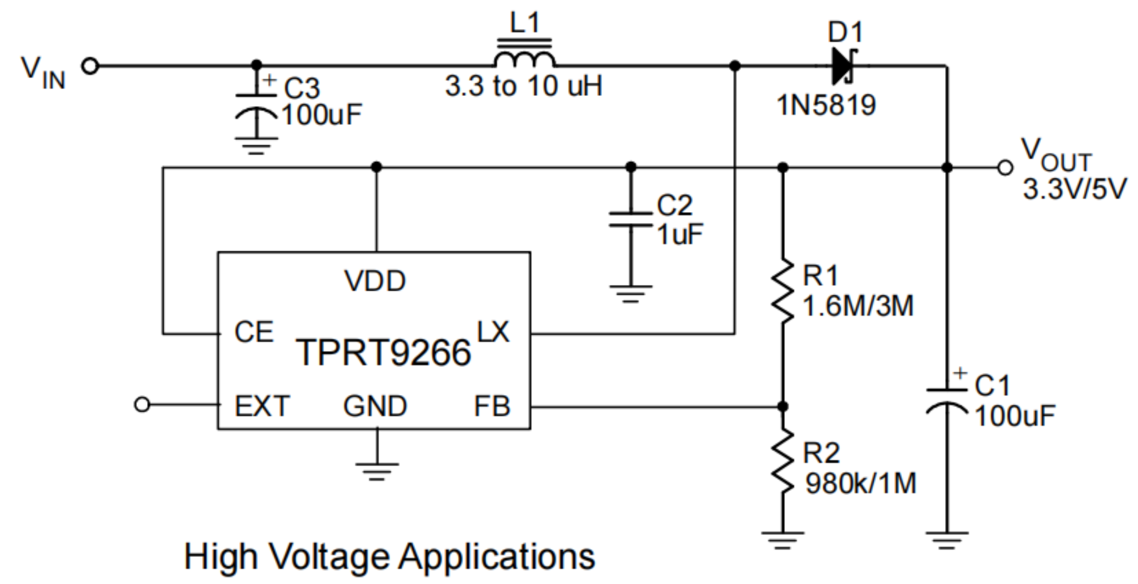
Paramenter		Symbol	Ratings	Unit
Supply Voltage		Vin	- 0.3V ~ 7V	V
LX Pin Switch Voltage		V_{LX}	- 0.3 ~ (VDD + 0.8V)	V
Other I/O Pin Voltages		Vss	- 0.3V ~ (VDD + 0.3V)	V
Lx Pin Switch Current		I_{LX}	2.5	A
EXT Pin Driver Current		I_{EXT}	200	mA
Package Thermal Resistance	SOT-26	Pd	145	℃/W
	SOT-89-5		45	℃/W
Operating Junction Temperature		Tj	125	℃
Storage Temperature Range		Tstg	- 65 ~ +150	℃

■ Electrical Characteristics (Vin =1.5V, VDD=3.3V, I=0, Ta = 25℃, unless otherwise spe

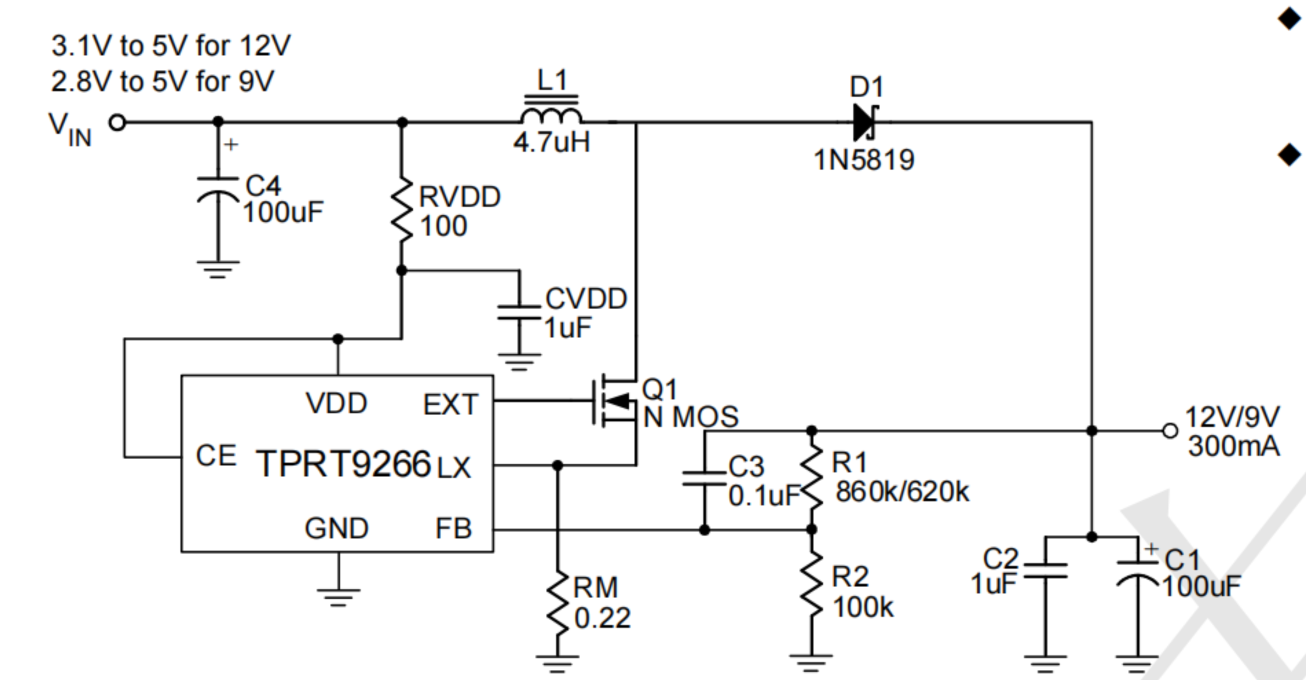
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Start-UP Voltage	V_{ST}	I_L = 1mA	--	0.98	1.05	V
Operating VDD Range	V_{DD}	VDD pin voltage	2	--	6.5	V
No Load Current I (V_{IN})	$I_{NO\ LOAD}$	V_{IN} = 1.5V, V_{OUT} = 3.3V	--	75	--	µA
Switch-off Current I (VDD)	$I_{SWITCH\ OFF}$	V_{IN} = 6V	--	17	--	µA
Shutdown Current I (V_{IN})	I_{OFF}	CE Pin = 0V, V_{IN} = 4.5V	--	0.01	1	µA
Feedback Reference Voltage	V_{REF}	Close Loop, VDD = 3.3V	1.225	1.25	1.275	V
Switching Frequency	F_S	VDD = 3.3V	--	450	--	KHz
Maximum Duty	D_{MAX}	VDD = 3.3V	--	95	--	%
LX ON Resistance		VDD = 3.3V	--	0.3	--	Ω
Current Limit Setting	I_{LIMIT}	VDD = 3.3V	--	2	--	A
EXT ON Resistance to VDD		VDD = 3.3V	--	5	--	Ω
EXT ON Resistance to GND		VDD = 3.3V	--	5	--	Ω
Line Regulation	$\triangle V_{LINE}$	V_{IN} = 1.5 ~ 2.5V, I_L = 1mA	--	10	--	mV/V
Load Regulation	$\triangle V_{LOAD}$	V_{IN} = 2.5V, I_L = 1 ~ 100mA	--	0.25	--	mV/mA
CE Pin Trip Level		VDD = 3.3V	0.4	0.8	1.2	V
Temperature Stability for Vout	T_S		--	50	--	ppm/℃
Thermal Shutdown	T_{SD}		--	165	--	℃
Thermal Shutdown Hysterises	$\triangle T_{SD}$		--	10	--	℃

* Note: The CE pin shall be tied to VDD pin and inhibit to act the ON/OFF state whenever the VDD pin voltage may reach to 5.5V or above.

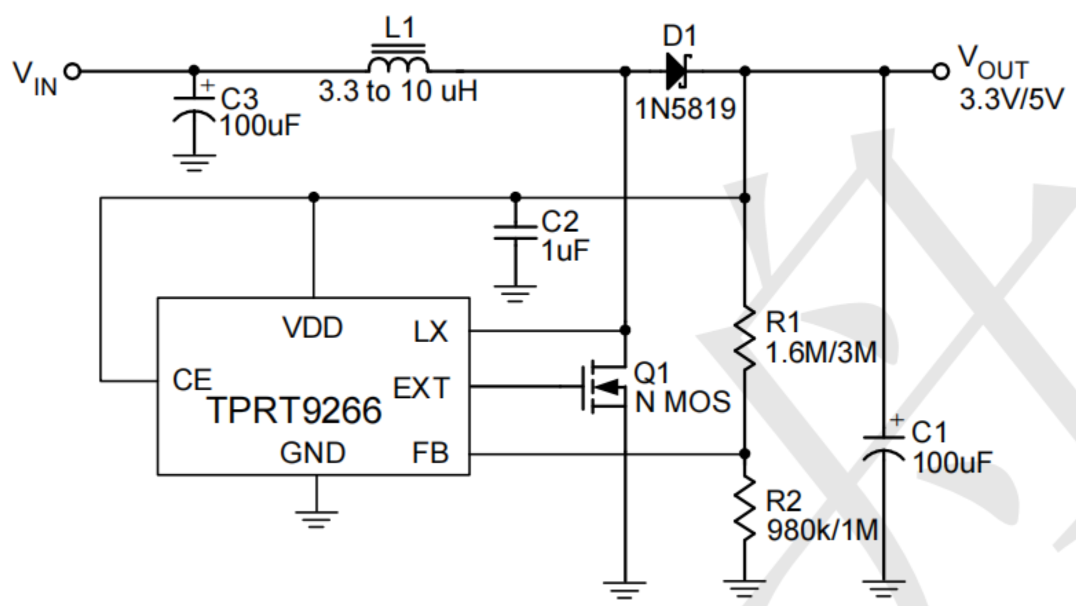
Application for Portable Instruments



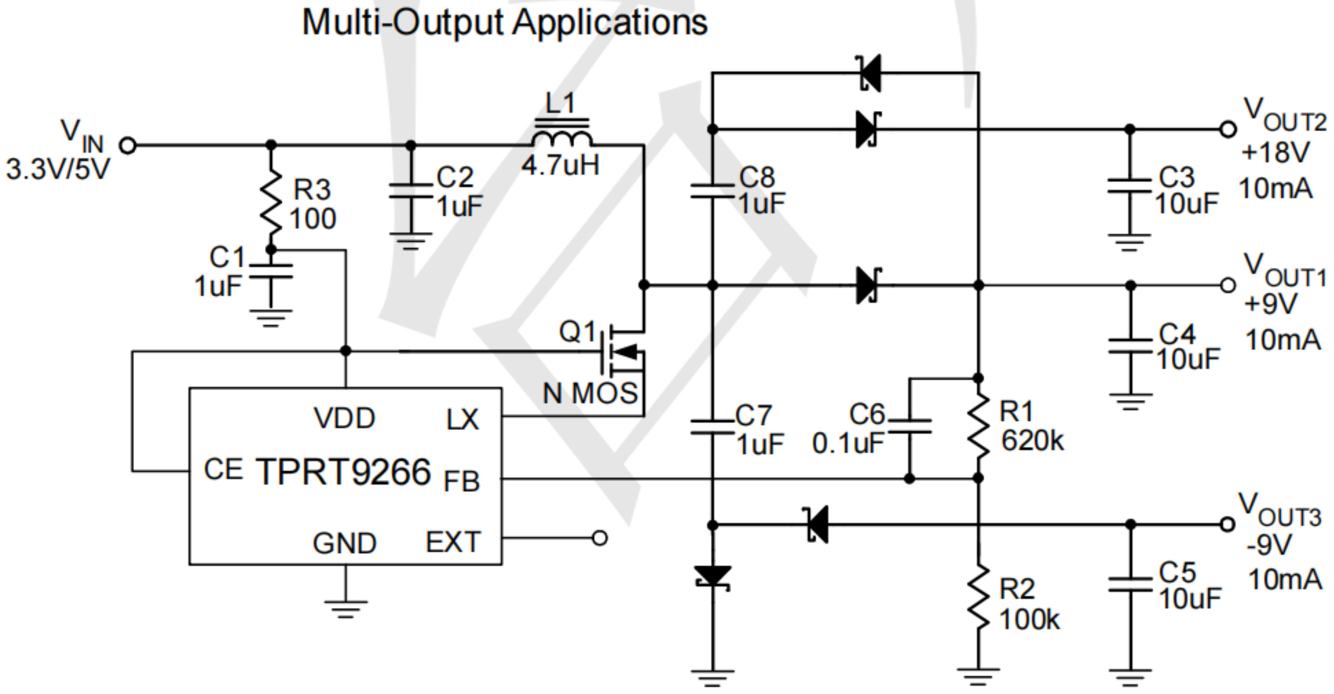
High Voltage Applications



Higher Current Applications



Multi-Output Applications



■ Application Note

● Output Voltage Setting

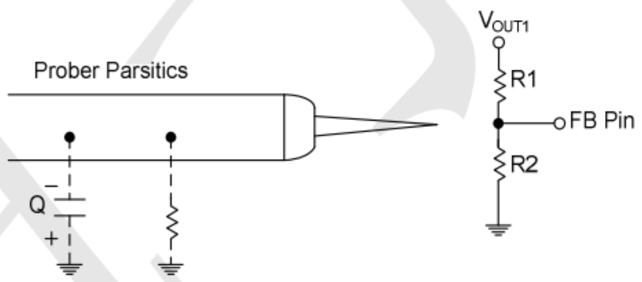
Referring to application circuits, the output voltage of the switching regulator (V_{OUT}) can be set

$$V_{OUT1} = \left(1 + \frac{R1}{R2}\right) \times 1.25V \quad \cdots A$$

● Feedback Loop Design

Referring to application circuits, The selection of R1and R2 based on the trade-off between quiescent current consumption and interference immunity is stated below:

- ◆ Follow Equation A
- ◆ Higher R reduces the quiescent current (Path current =1.25V/R2), however resistors beyond 5MΩ are not recommended.
- ◆ Lower R gives better noise immunity, and is less sensitive to interference, layout parasitics, FB node leakage, and improper probing to FB pins.



- ◆ A proper value of feed forward capacitor parallel with R1 can improve the noise immunity of the feedback loops, especially in an improper layout. An empirical suggestion is around 0~33pF for feedback resistors of MΩ, and 10nF~0.1μF for feedback resistors of tens to hundreds KΩ.

For applications without standby or suspend modes, lower values of R1 and R2 are preferred. For applications concerning the current consumption in standby or suspend modes, the higher values of R1and R2 are feedback needed. Such "high impedance loops" are sensitive to any interference, which require careful layout and avoid any interference, e.g. probing to FB pin.