

CoolSET™ 5th Generation Fixed Frequency Plus

in DIP-7 Package

The ICE5xRxxxxBZx-1 is the CoolSET™ 5th Generation Fixed Frequency Plus of integrated power IC optimized for off-line switch mode power supply in cascode configuration. The CoolSET™ package has 2 separate chips inside; one is controller chip and the other is a 700 V/ 800 V/ 950 V CoolMOS™ chip. The cascode configuration helps achieve fast startup. The frequency reduction with soft gate driving and frequency jitter operation offer lower EMI and better efficiency. The selectable entry and exit standby power ABM enables flexibility and ultra-low power consumption at standby mode with small and controllable output voltage ripple.

The product has a wide operating range (10.0 ~ 32.0 V) of IC power supply and lower power consumption. The numerous protection functions support the power supply system in failure situations. All these make the CoolSET™ 5th Generation Fixed Frequency Plus series an outstanding integrated power stage fixed frequency flyback and buck converter in the market.

Overview of features and improvements

- Enhanced reliability performances
 - Higher robustness through design parameters improvements
 - Add-on protections features vs previous families
- High performance
 - Frequency reduction for high efficiency at mid and light load conditions
 - Integrated CoolMOS™ high voltage super junction MOSFET for optimal thermal performances
- High power delivery
 - Highest power delivery without heatsink in the market with standard DIP-7 package up to 41 W
 - Support non-isolated buck output current up to 700 mA
- Ease of design
 - Longer auto-restart timing reduces thermal stress with reduced V_{cc} capacitor
 - Tightened Gate rise time spread for consistent EMI
 - Integrated error amplifier supports direct feedback for non-isolated flyback
- Wide portfolio
 - Choice of 700 V, 800 V and 950 V integrated CoolMOS™



Key features

- Integrated 700 V / 800 V / 950 V avalanche rugged CoolMOS™
- Active Burst Mode with selectable entry and exit standby power to reach the lowest standby power <100 mW
- Frequency reduction for better overall system efficiency
- Frequency jitter and soft gate driving for low EMI
- Integrated error amplifier to support direct feedback in non-isolated flyback and buck topologies
- Increased pin voltage rating for ease of system design
- Selectable over temperature protection threshold
- Pin to Pin with its previous Gen-5 family

Key benefits

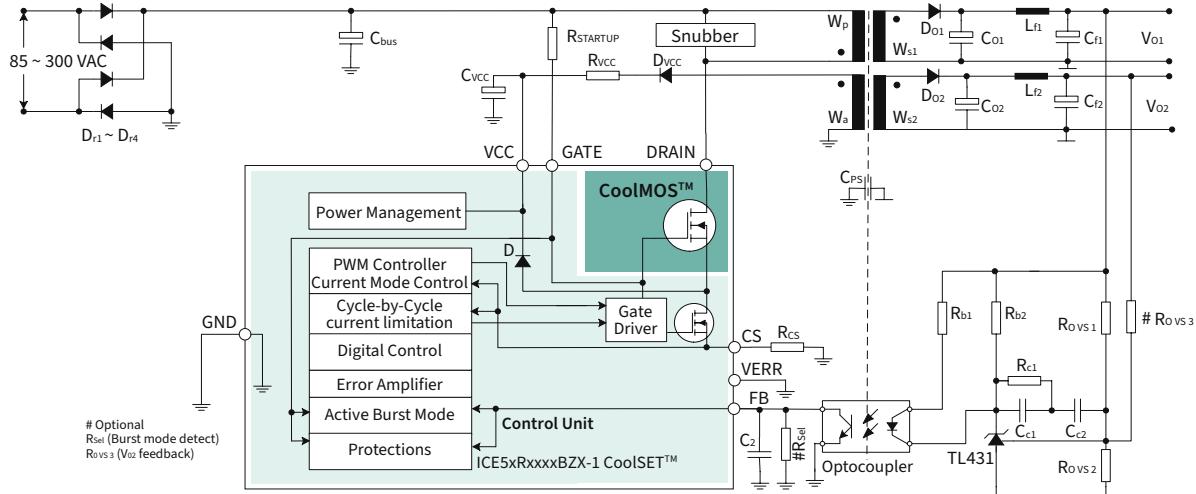
- Support both isolated and non-isolated flyback and buck topologies
- Integrate the latest generation of 700 V, 800 V and 950 V CoolMOS™ superjunction in DIP-7
- Power delivery up to 41 W (at 85 - 300 V_{AC})
- 65 kHz and 100 kHz maximum switching frequency
- Improvement in device robustness



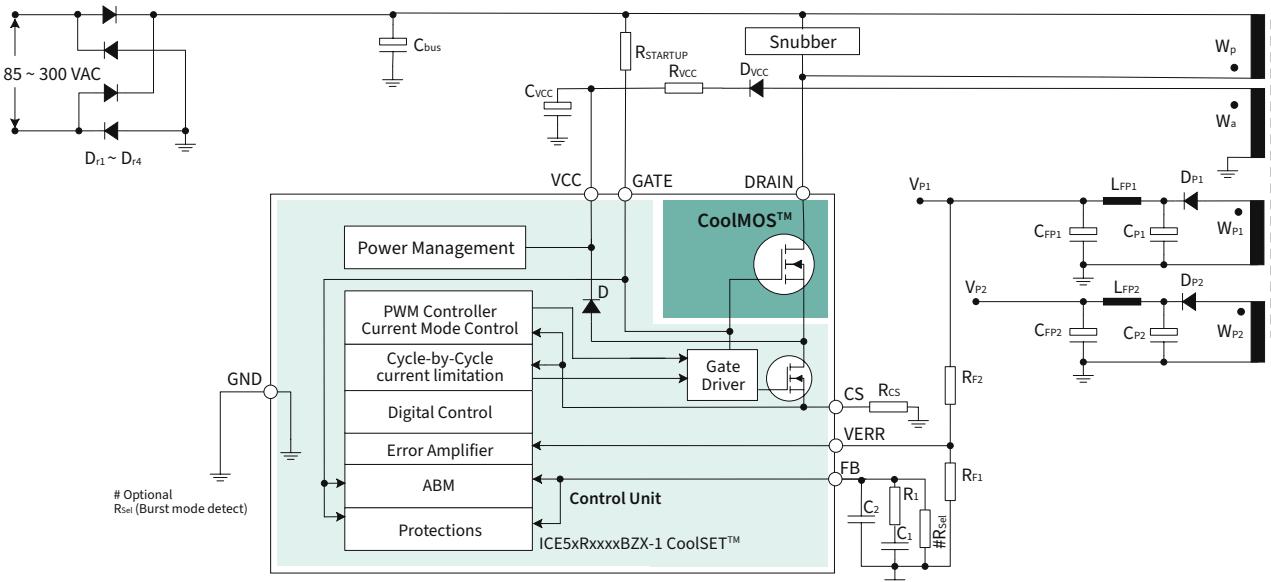
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Typical application in an isolated fixed-frequency flyback converter using TL431 and an optocoupler



Typical application in a non-isolated flyback converter using an integrated error amplifier



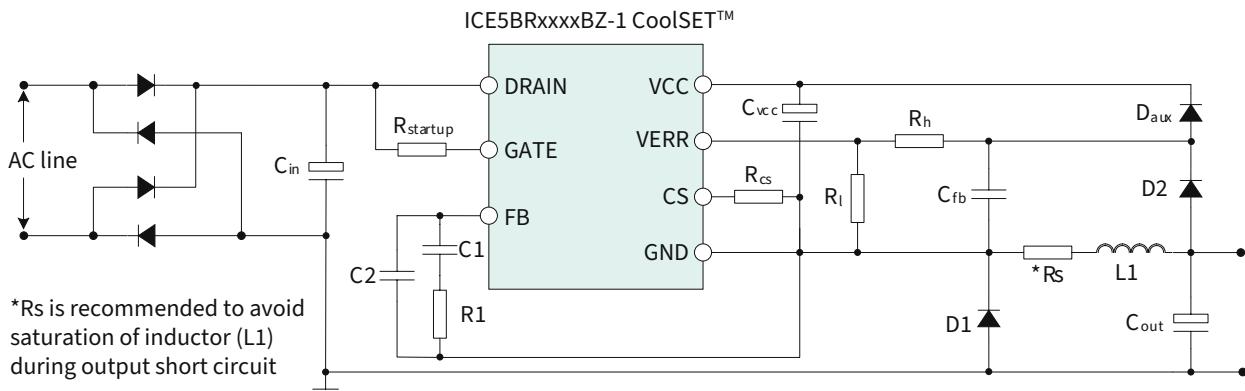
Output power of CoolSET™ 5th Generation Fixed Frequency Plus in flyback design

Type	Package	Marking	V _{DS}	F _{sw}	R _{DS(on)}	220 V _{AC} ± 20% at DCM	85-300 V _{AC} at DCM	85-300 V _{AC} at CCM
ICE5AR4770BZS-1	PG-DIP-7	5AR4770BZS-1	700 V	100 kHz	4.73 Ω	26.5 W	14.5 W	16 W
ICE5AR4780BZS-1	PG-DIP-7	5AR4780BZS-1	800 V	100 kHz	4.13 Ω	27.5 W	15 W	16.5 W
ICE5BR4780BZ-1	PG-DIP-7	5BR4780BZ-1	800 V	65 kHz	4.13 Ω	27.5 W	15 W	16.5 W
ICE5AR3995BZ-1	PG-DIP-7	5AR3995BZ-1	950 V	100 kHz	3.46 Ω	30 W	16.5 W	18 W
ICE5BR3995BZ-1	PG-DIP-7	5BR3995BZ-1	950 V	65 kHz	3.46 Ω	30 W	16.5 W	18 W
ICE5BR2280BZ-1	PG-DIP-7	5BR2280BZ-1	800 V	65 kHz	2.13 Ω	40 W	22 W	24 W
ICE5AR0680BZS-1	PG-DIP-7	5AR0680BZS-1	800 V	100 kHz	0.71 Ω	66 W	39 W	41 W

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Typical application in non-isolated buck



Output current of CoolSET™ 5th Generation Fixed Frequency Plus in non-isolated buck design

Type	Package	Marking	V _{DS}	F _{sw}	R _{DS(on)}	85-265 V _{AC} at DCM	Typical output voltage
ICE5BR4780BZ-1	PG-DIP-7	5BR4780BZ-1	800 V	65 kHz	4.13 Ω	450 mA	15 V
ICE5BR3995BZ-1	PG-DIP-7	5BR3995BZ-1	950 V	65 kHz	3.46 Ω	550 mA	15 V
ICE5BR2280BZ-1	PG-DIP-7	5BR2280BZ-1	800 V	65 kHz	2.13 Ω	700 mA	15 V

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