

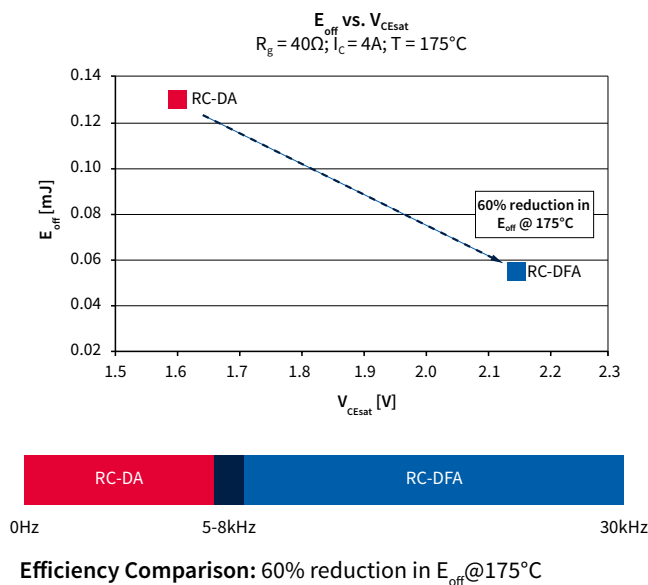


Product Brief

Reverse Conducting Drives Fast

Higher Efficiency at High Speed Switching Applications

A high speed switching capable variant of the well established RC-Drives Automotive IGBT was developed to meet the rising demand for high frequency applications. This new variant is called RC-Drives Fast Automotive (RC-DFA).



Features

- Operating range of DC up to 30kHz
- Maximum junction temperature 175°C
- Short circuit capability of 5 μ s
- Very tight parameter distribution
- Smooth switching performance leading to low EMI emission
- Best-in-Class current versus package size performance
- Complementary to RC-DA devices

Benefits

- Excellent cost/performance for hard switching applications
- Outstanding temperature stability
- Very good EMI behavior
- Up to 60% space saving on the PCB
- Higher reliability due to monolithically integrated IGBT and diode due to less thermal cycling during switching

Applications

- Piezo Injection
- HID Lighting
- Low Power Motor Drives

A typical automotive application for this family amongst others are Piezo Injection systems. Within these system space is limited and therefore DPAK solutions are most required.

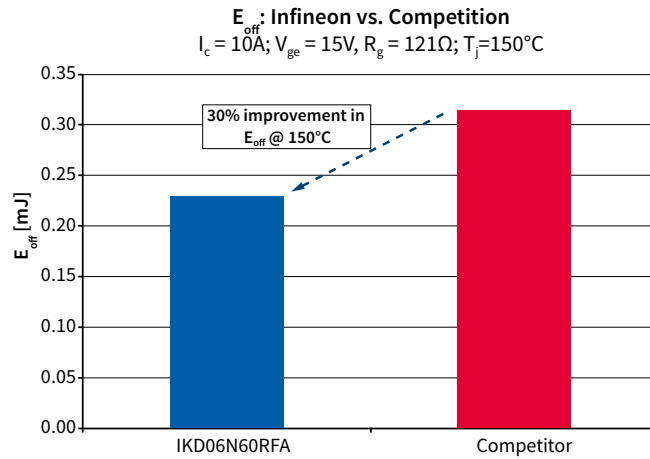
Piezo Injection is used for diesel and gasoline systems to improve efficiency and reduce the fuel consumption. The system itself is split into four sections with different requirements to its components.

A flyback converter transforms the low-volt battery voltage to a high voltage of several hundred volts. These high-voltage is used to charge/discharge the Piezo Injection elements. Especially these charging/discharging switches (IGBT/diode) are operating at high average switching frequencies above 10kHz over the injection cycle. Correspondingly fast switching IGBTs and diodes are the most suitable solution.

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Higher Efficiency at High Speed Switching Applications

Compared to competition a significant reduction of turn-off losses has been achieved resulting in a decrease of the total switching and thus total power losses. Improved performance leads to higher efficiency and lower junction temperature which as well has a positive influence on the product lifetime and reliability.



Efficiency Comparison: 30% improvement in E_{off}@150°C

For the stop switch section, the conduction losses are dominating the power losses. Hence, Infineon’s Reverse Conducting Drives Fast (RC-DFA) as well as its complementary variant, the Reverse Conducting Drives (RC-DA) technology can be used for such a stop switch.

The cylinder select switches (IGBT/diode) are operating at low average frequencies below 1kHz for charging and discharging. Here RC-DA would be Infineon’s preferred suggestion but also the RC-DFA is a suitable semiconductor product for these switches.

Product Portfolio Reverse Conducting Drives Fast

Product	Package	Blocking Voltage	I _c T _c = 100°C	V _{CEsat} @ I _c		Body Diode	
				25°C	175°C	V _f @ I _c	Q _{rr} @ 25°C / 175°C
IKD04N60RA	DPAK	600V	4A	1.65V	1.85V	1.7V	0.22 / 0.52µC
IKD06N60RA			6A				0.37 / 0.80µC
IKD10N60RA			10A				0.56 / 1.22µC
IKD15N60RA			15A				0.76 / 1.70µC
IKD03N60RFA			2.5A	2.2V	2.3V	2.1V	0.06 / 0.19µC
IKD04N60RFA			4A				0.09 / 0.26µC
IKD06N60RFA			6A				0.16 / 0.34µC
IKD10N60RFA			10A				0.27 / 0.62µC
IKD15N60RFA			15A	0.42 / 1.00µC			

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