

Multi-Output Switcher IC Pushes GaN To 1700 V

[Power Integrations'](#) InnoMux-2 family of single-stage, independently regulated multi-output offline power supply ICs now features what's described as the industry's first 1700-V gallium nitride (GaN) power switch, fabricated using the company's PowiGaN technology. According to the vendor, the 1700-V rating further advances the state-of-the-art for GaN power devices, previously set by Power Integrations' own 900-V and 1250-V devices, both launched in 2023 (see the table).

The 1700-V InnoMux-2 IC, part number IMX2353F, easily supports 1000-Vdc nominal input voltage in a flyback configuration and achieves over 90% efficiency in applications requiring one, two or three supply voltages. Each output is regulated within 1% accuracy, eliminating post regulators and further improving system efficiency by approximately 10% (Fig. 1).

The device replaces expensive SiC transistors in power supply applications such as automotive chargers, solar inverters, three-phase meters and a wide variety of industrial power systems, says the vendor. The 1700-V InnoMux-2 IC also replaces InnoMux-2 devices used in combination with an external StackFET to achieve higher voltage ratings. Fig. 2 depicts the efficiency gain achieved by eliminating the StackFET.

Radu Barsan, vice president of technology at Power Integrations, said, "Our rapid pace of GaN development has delivered three world-first voltage ratings in a span of less than two years: 900 V, 1250 V and now 1700 V. Our new InnoMux-2 ICs combine 1700-V GaN and three other recent innovations: independent, accurate, multi-output regulation; FluxLink, our secondary-side regulation (SSR) digital isolation communications technology; and zero voltage switching (ZVS) without an active-clamp, which all but eliminates switching losses."

"1700-V rating is substantially higher than any other commercially available GaN HEMT that we are aware of," said Ezgi Dogmus, activity manager, compound semiconductors at the Yole Group. "The Power GaN device market is poised to reach \$2 billion by decade's end, expanding across various application spaces with potentially attractive cost advantages over SiC."

Note, however, that the 1700-V InnoMux-2 IC applies GaN in low power applications, not in the high-power applications where SiC is typically applied such as traction inverters, OBCs and dc-dc converters in EVs. The power limit for switchers using the IMX2353F is around 60 to 70 W (see the table). An initial application for this chip is in energy metering and other potential applications include appliances, industrial motors, energy storage and solar power. But, when used in the higher power applications, the 1700-V InnoMux-2 chip will likely be used to generate supply rails for the electronics circuitry, rather than providing power conversion in the main power stages, which may process many kilowatts of power.

While InnoMux-2 is not an automotive-qualified device and therefore not meant for such applications, another obvious use for a 1700-V switcher is in EV applications employing 800-V and higher battery buses. Power Integrations serves such applications with its InnoSwitch devices. According to David Chen, Sr. director, applications engineering at Power Integrations, it's likely that the 1700-V PowiGaN switch will be migrated into the InnoSwitch family in the future.

Two package options are offered—an 'F' package that enables the chip's full voltage isolation and a legacy 'C' package for applications that don't require that level of isolation (see Fig. 1 again).

Pricing for InnoMux-2 1700-V ICs starts at \$4.90 for 10,000-unit quantities. A reference design, RDR-1053, which describes a 60-W dual-output (5 V and 24 V) power supply, can be downloaded from the Power Integrations website at no cost. For more information, see the InnoMux2-EP [page](#) and the RDR-1053 [page](#). For sample ICs and evaluation boards, contact a Power Integrations sales representative or one of the company's authorized worldwide distributors—[DigiKey](#), [Newark](#), [Mouser](#) and [RS Components](#).

Table. Comparing ratings of the 1700-V GaN InnoMux-2 IC versus other InnoMux-2 IC family members.

Product	1 CV & 1 CC Output		
	230 VAC ±15%	85-265 VAC	385 VDC (PFC Input)
650 V MOSFET			
IMX2267C	40 W	36 W	
IMX2268C	55 W	50 W	
750 V PowiGaN			
IMX2278F	77 W	60 W	85 W
IMX2279F	88 W	70 W	97 W
IMX2270F	100 W	80 W	110 W
2 & 3 CV Outputs			
725 V MOSFET			
IMX2174F	20 W	15 W	
IMX2175F	25 W	20 W	
IMX2176F	35 W	27 W	
IMX2177F	40 W	36 W	
750 V PowiGaN			
IMX2378F	70 W	55 W	77 W
IMX2379F	80 W	65 W	88 W
IMX2370F	90 W	75 W	100 W
1700 V PowiGaN			
	85-670 VAC Peak or Open Frame	200-1000 VDC Peak or Open Frame	
IMX2353F	65 W	70 W	

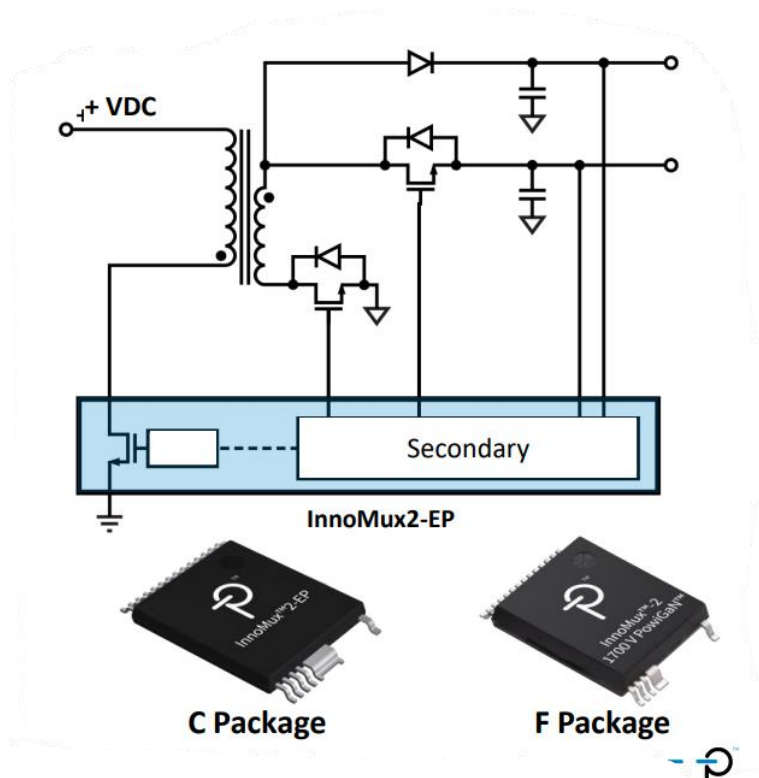


Fig. 1. Incorporating a 1700-V GaN power switch, InnoMux-2 IC delivers efficiency of better than 90% from a 1000-Vdc bus, supplying up to 60 W from three accurately regulated outputs.

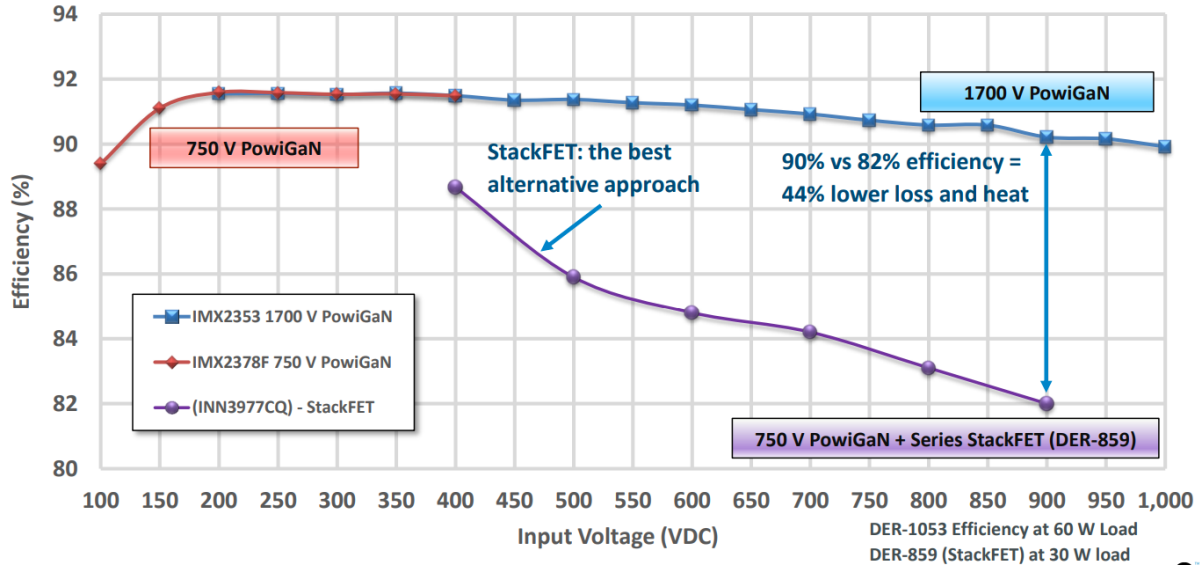


Fig. 2. Some applications previously employed an InnoMux-2 with a 750-V PowiGaN switch in combination with Power Integrations' external StackFET to achieve higher voltage ratings in their power supply applications. The 1700-V InnoMux-2 eliminates the need for that StackFET up to 1000 V and beyond, enabling a significant boost in power supply efficiency.