

145A DC-DC Step-Down Power Converter Chip-Scale Module

Features

- 16 phase buck converter with fully integrated power switches and inductors
- Peak efficiency of 90.5 % for 1.8 V to 0.75 V conversion with 100 A output current
- Efficiency of 89 % for 1.8 V to 0.75 V conversion with 145 A output current
- Loop bandwidth: 5MHz
- Differential point-of-load (PoL) sensing
- Gang Operation: up to 64 devices in parallel
- Automatic Phase Shedding
- Telemetry: Input Voltage, Output Voltage, Output Current and Temperature
- Fault response: UVLO, OVP, UVP, OCP, OCP Warn, VRHOT, and OTP
- 1 MHz PMBus 1.4 compliant serial interface
- 50 MHz AVSBus 2.0 compliant serial interface enabling Dynamic Voltage Scaling (DVS)

General Description

Fe1767 is a single output, 16-phase interleaved buck converter with a fully integrated powertrain, including power inductors. Fe1767's digital interface provides complete power management and monitoring with fast and precise voltage control, fast transient response times, and high bandwidth regulation. Its high switching frequency powertrain includes high performance FETs and capacitors that drive the industry's most advanced power inductors, all in a single device. The Fe1767 has V_{IN} pins on one side of the devices and V_{OUT} pins on the other, enabling the option of true vertical power delivery with input power brought to one side of the device and output power coming from the other side of the device.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
VIN Voltage Range	V_{IN}	$AVDD18 \geq V_{IN}$	1.2	1.8	2.0	V
Output Voltage Range	V_{OUT}	$V_{IN} \geq 1.8V$	0.25		1.5	V
Conversion Ratio	$M = \frac{V_{OUT}}{V_{IN}}$	$V_{IN} < 1.8V$			83.3	%
Output Voltage Resolution	$V_{OUT,RES}$			1.7		mV
Steady State Output Current	I_{OUT}				145	A
Number of Powertrain Phases	N_{PHASES}		2		16	Phases
Width	W		5.550	5.600	5.650	mm
Length	L		8.850	8.900	8.950	mm
Area	A			49.8		mm ²
Thickness	T		1.180	1.200	1.220	mm
Current Density (TDC)	$j_{max,TDC}$				2.9	$\frac{A}{mm^2}$
DC Line Regulation	$\left(\frac{\Delta V_{OUT}}{V_{OUT}}\right)_{Line}$	$V_{IN}=[1.2,2.0]V$		± 0.5		%
DC Load Regulation	$\left(\frac{\Delta V_{OUT}}{V_{OUT}}\right)_{Load}$	$I_{OUT}=[0,120]A$		± 0.5		%
Switching Frequency	f_{SW}		5	15	60	MHz
Junction Temperature	T_J		-40		125	°C
Thermal Resistance Junction-VINSide	$\Theta_{JC,VIN}$			0.2		$\frac{^{\circ}C}{W}$
Thermal Resistance Junction-VOUTSide	$\Theta_{JC,VOUT}$			2.6		$\frac{^{\circ}C}{W}$