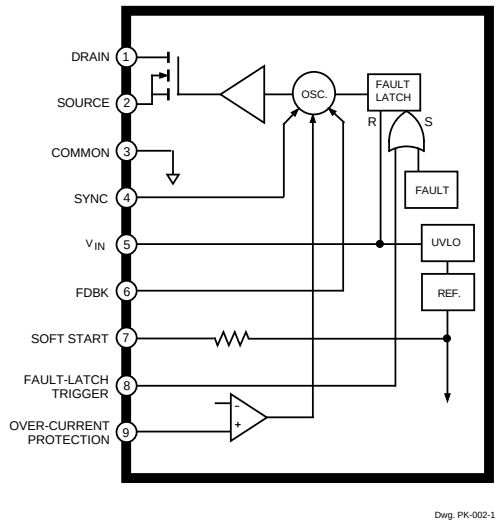
STR-S6525

Data Sheet
28102.11

OFF-LINE SWITCHING REGULATOR – WITH POWER MOSFET OUTPUT



Dwg. PK-002-1

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{IN} ..... **35 V**

Drain-Source Voltage, V_{DS} ..... **600 V**

Continuous Drain Current, I_D ..... **6.0 A**

1 ms Single-Pulse Drain Current, I_{DM} ..... **24 A**

Single-Pulse Avalanche Energy, E_A ..... **400 mJ**

Feedback Input Current, I_{FDBK} ..... **20 mA**

Fault-Latch Trig. Input Current, I_{FL} **1.0 mA**
dc ≤ 25%, I_{FLM} ..... **-50 mA**

Soft-Start Output Current, I_{SS} ..... **-3.0 mA**

Over-Current Protection Voltage, V_{OCP} ..... **3.5 V**

Insulation Voltage,$V_{WM(RMS)}$ ..... **2000 V**

Package Power Diss., P_D ..... **See Graph**

FET Junction Temperature, T_J ..... **+150°C**

Internal Frame Temperature, T_F ... **+125°C**

Operating Temperature Range, T_A ..... **-20°C to +125°C**

Storage Temperature Range, T_{stg} ..... **-30°C to +125°C**

The STR-S6525 is specifically designed to meet the requirement for increased integration and reliability in off-line flyback converters operating in a constant OFF-time mode. The device incorporates the primary control and drive circuit with a discrete avalanche-rated high-voltage power MOSFET.

Crucial system parameters such as maximum ON time and OFF time are fixed during manufacture. Local control circuit decoupling and layout are optimized within the device.

Cycle-by-cycle current limiting, soft start, under-voltage lock-out with hysteresis, over-voltage protection, and thermal shutdown protect the device during all normal and overload conditions. Over-voltage protection, thermal shutdown, or an external fault signal be latched. The dual requirements of dielectric isolation and low transient thermal impedance and steady-state thermal resistance are satisfied in an over-molded single-in-line power package.

Proven in substantial volumes, this device and its fixed-frequency counterparts represents a significant advance in off-line SMPS reliability growth and integration.

DISCONTINUED PRODUCT
— FOR REFERENCE ONLY

FEATURES

- Constant OFF-Time Converter Operating Mode
- Avalanche-Rated Power MOSFET Switch
- Pulse-by-Pulse Current Limiting
- Latched Over-Voltage and Thermal Protection
- Maximum ON Time and OFF Time Set During Manufacture
- Internal Under-Voltage Lockout with Hysteresis
- Over-Molded SIP with Integral Isolated Heat Spreader
- External Synchronization Capability

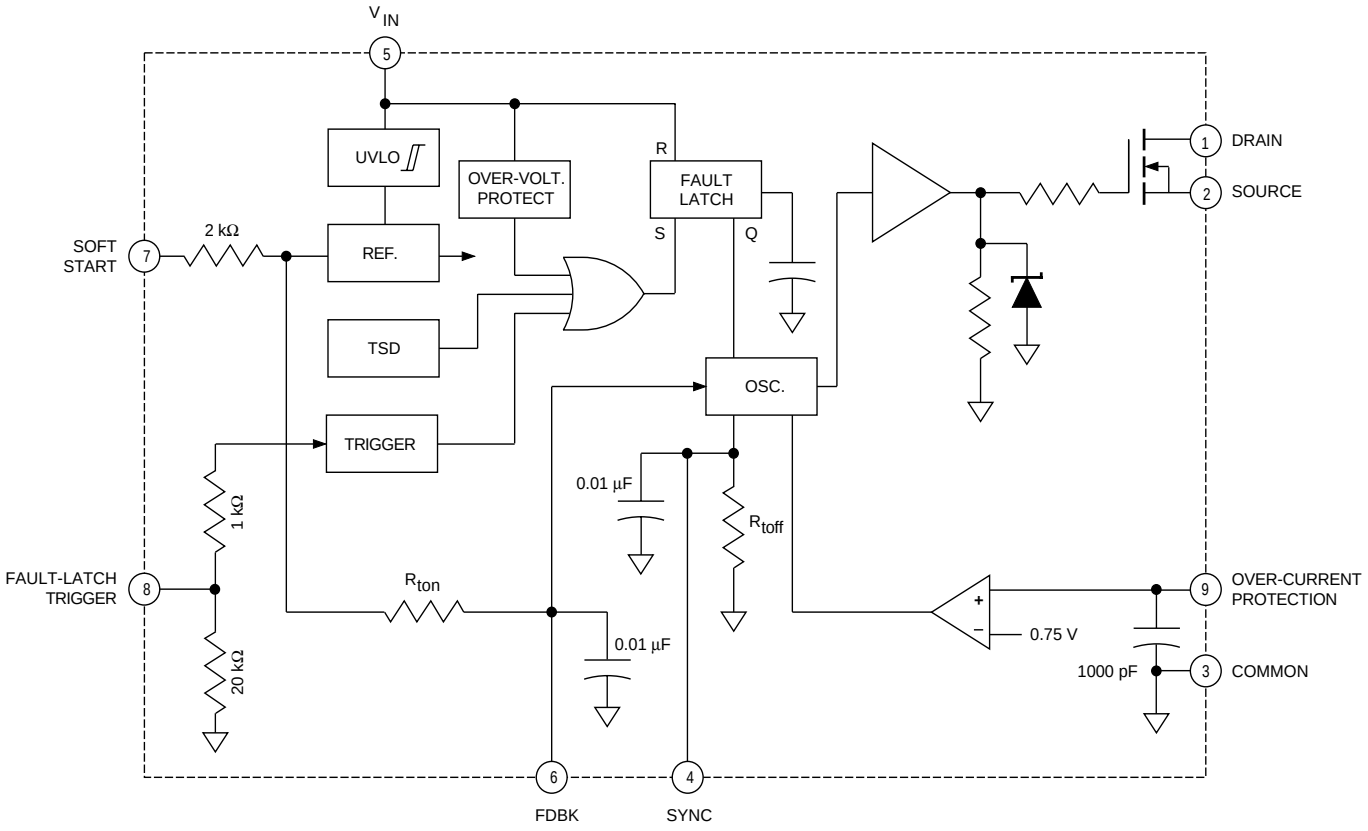
Always order by complete part number: **STR-S6525**.

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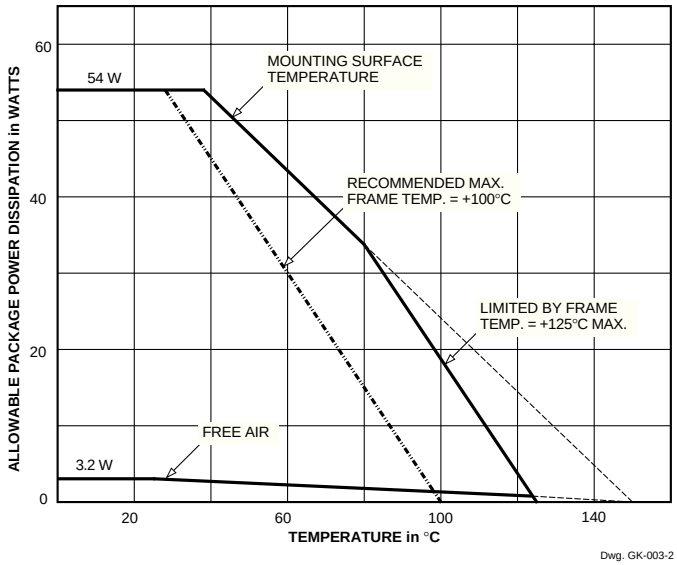
STR-S6525
OFF-LINE
SWITCHING REGULATOR

FUNCTIONAL BLOCK DIAGRAM



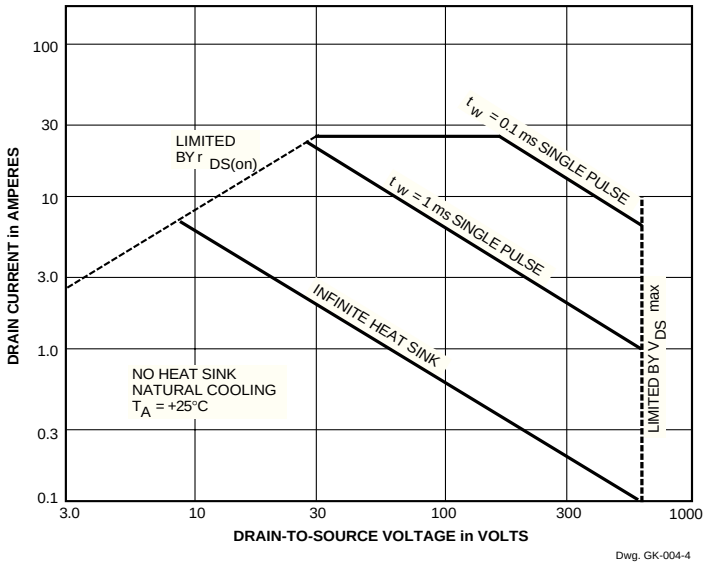
Dwg. FK-002-1

ALLOWABLE PACKAGE POWER DISSIPATION



Dwg. GK-003-2

MAXIMUM SAFE OPERATING AREA



Dwg. GK-004-4

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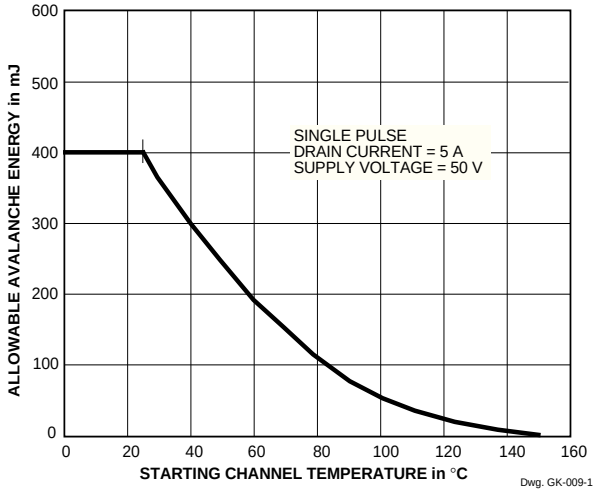
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STR-S6525
OFF-LINE SWITCHING REGULATOR

ALLOWABLE AVALANCHE ENERGY

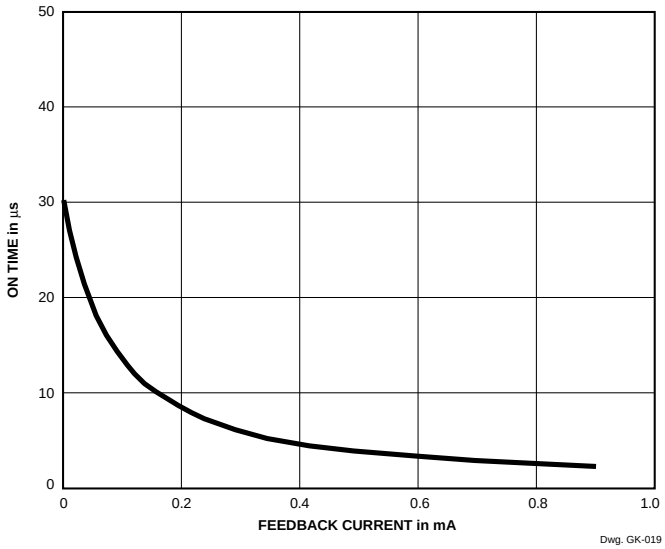


ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_{IN} = 18 V, voltage measurements are referenced to Common (pin 3) (unless otherwise noted).

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
On-State Voltage	V_{INT}	Turn-on, increasing V_{IN}	14.4	–	17.6	V
Under-Voltage Lockout	V_{INQ}	Turn-off, decreasing V_{IN}	9.0	–	11	V
Over-Voltage Threshold	$V_{OVP(th)}$		26	–	31	V
FET Leakage Current	I_{DSS}	V_{DS} = 600 V	–	–	300	µA
FET ON Resistance	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 3 A	–	1.0	1.25	Ω
Output Fall Time	t_f	V_{DD} = 200 V, I_D = 5 A, 10% to 90% V_{DS}	–	–	250	ns
Maximum ON Time	t_{on}	I_{FDBK} = 0	27	–	33	µs
Minimum OFF Time	t_{off}		50	–	62	µs
Over-Current Threshold	$V_{OCP(th)}$		700	–	800	mV
Feedback Threshold	$V_{FDBK(th)}$		–	750	–	mV
Soft-Start Voltage	V_{SS}		8.7	–	9.7	V
Sync. Trigger Threshold Volt.	$V_{SYNC(th)}$		–	3.0	–	V
Fault-Latch Trig. Threshold	$V_{FL(th)}$		680	–	880	mV
Fault-Latch Holding Current	I_{INH}	V_{IN} reduced from 31 V to 8.5 V	–	340	400	µA
Fault-Latch Reset Voltage	V_{INQ}	$I_{IN} \leq$ 20 µA, V_{IN} reduced from 31 V	6.5	–	8.5	V
Insulation RMS Voltage	$V_{WM(RMS)}$	All terminals simultaneous reference metal plate against backside	2000	–	–	V
Supply Current	$I_{IN(ON)}$	Operating	9.0	–	15	mA
	$I_{IN(OFF)}$	Start up, V_{IN} =14 V	–	–	200	µA
Thermal Shutdown	T_J		125	150	–	°C
Thermal Resistance	$R_{\theta JM}$	FET junction to mounting surface	–	2.0	–	°C/W

NOTES: Negative current is defined as coming out of (sourcing) the specified device terminal.
Typical Data is for design information only.

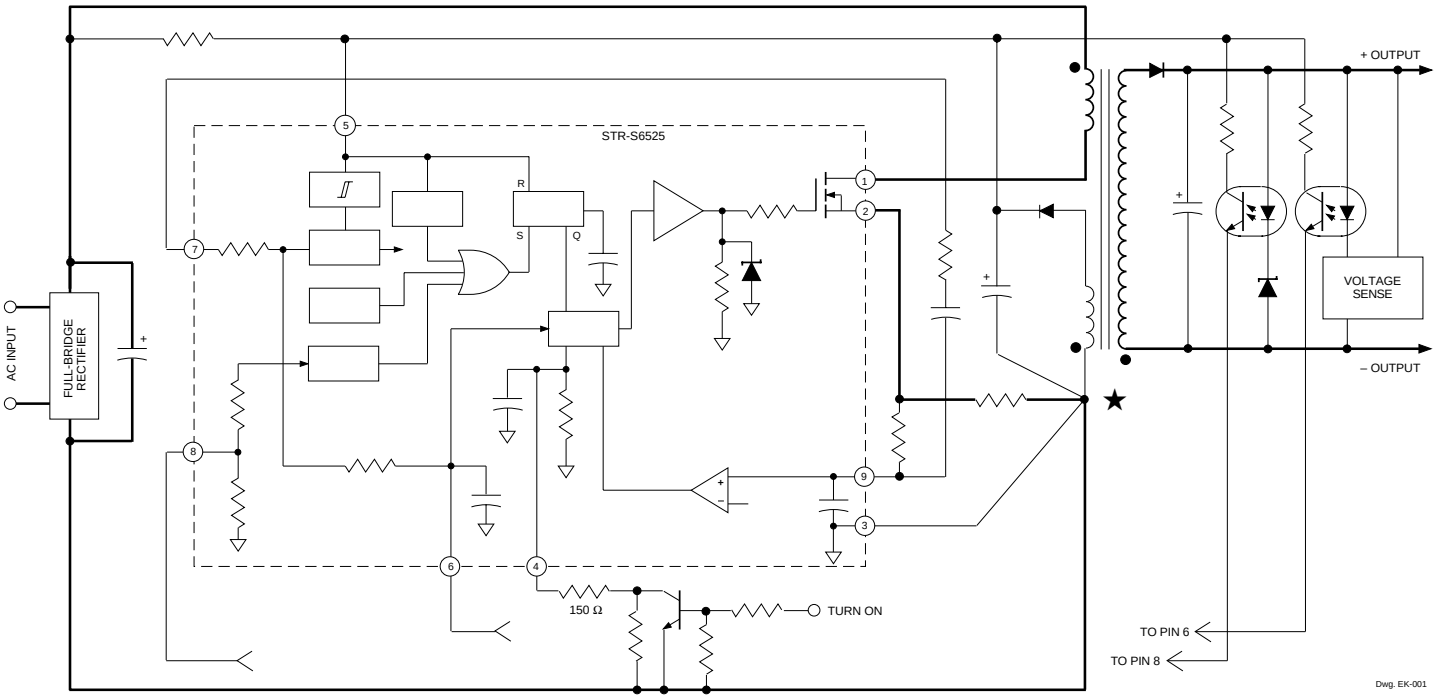
TYPICAL CHARACTERISTICS



STR-S6525
OFF-LINE
SWITCHING REGULATOR

TYPICAL APPLICATION

WARNING: lethal potentials are present. See text.



APPLICATIONS INFORMATION

WARNING — These devices are designed to be operated at lethal voltages and energy levels. Circuit designs that embody these components must conform with applicable safety requirements. Precautions must be taken to prevent accidental contact with power-line potentials. Do not connect grounded test equipment.

The use of an isolation transformer is recommended during circuit development and breadboarding.

The power MOSFET outputs of these devices are similar to the International Rectifier type IRFBC40. These devices feature an excellent combination of fast switching, ruggedized device design, low on-resistance, and cost effectiveness.

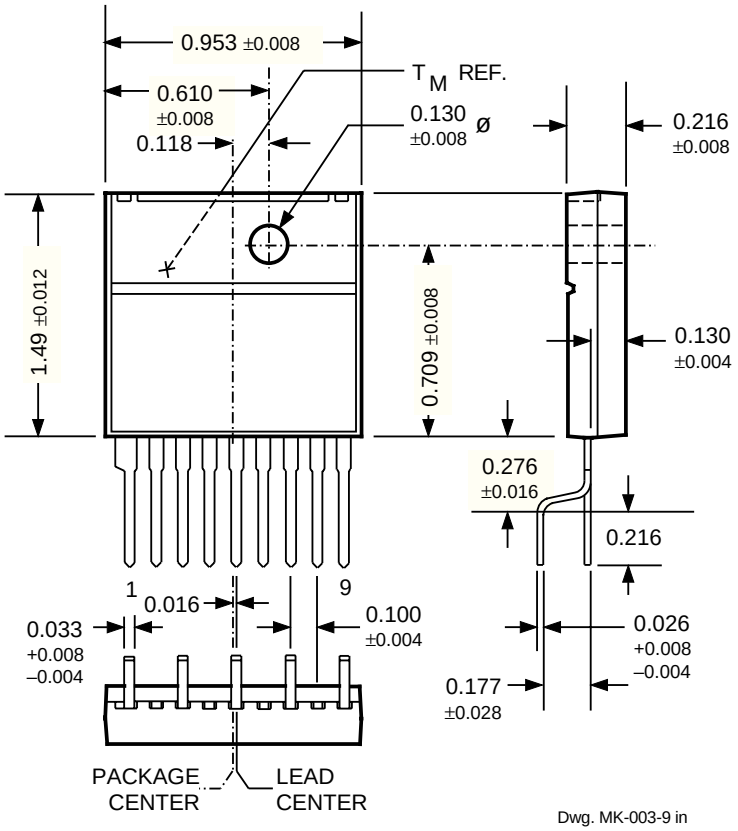
Recommended mounting hardware torque:

4.34 – 5.79 lbf•ft (6 – 8 kg•cm or 0.588 – 0.784 Nm).

Recommended metal-oxide-filled, alkyl-degenerated oil base, silicone grease:

Dow Corning 340, or equivalent

Dimensions in Inches
(for reference only)

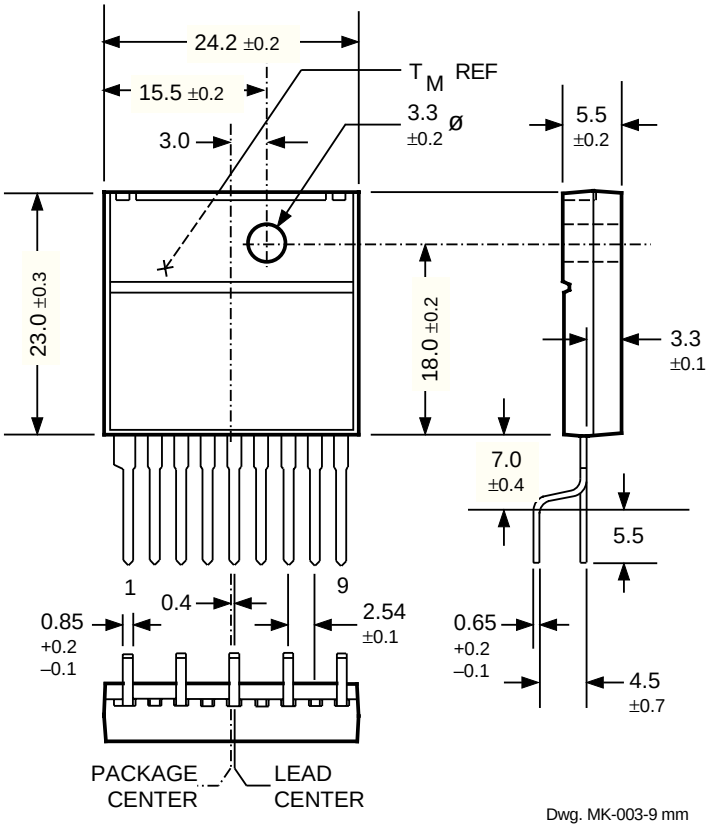


Dwg. MK-003-9 in

NOTE: Exact body and lead configuration at vendor's option within limits shown.

STR-S6525
OFF-LINE
SWITCHING REGULATOR

Dimensions in Millimeters
(controlling dimensions)



NOTE: Exact body and lead configuration at vendor's option within limits shown.

The products described here are manufactured in Japan by Sanken Electric Co., Ltd. for sale by Allegro MicroSystems, Inc.

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STR-S6525
OFF-LINE
SWITCHING REGULATOR

POWER CONVERSION/POWER MANAGEMENT SELECTION GUIDES

SWITCHING REGULATOR PMCMs

Part Number*	Application	V_I	Max P_O		Power Switch	
3002M	5 V Switching Regulator and a 9 V Switching Regulator†	7.0-33 V	–	– –	500 mA 400 mA	Bipolar Bipolar
3004M	5 V Switching Regulator and Dual 9 V Switching Regulator	7.0-33 V	–	– –	500 mA 2 x 400 mA	Bipolar Bipolar
S5703	Quasi-Resonant Flyback Converter	110/120 V	140 W	500 V	6 A	Bipolar
S5707	Quasi-Resonant Flyback Converter	85-265 V 220/240V	90 W 140 W	850 V	6 A	Bipolar
S5708	Quasi-Resonant Flyback Converter	85-265 V 220/240 V	120 W 180 W	850 V	7.5 A	Bipolar
F6624	Quasi-Resonant Flyback Converter	100/120 V	130 W	450 V	0.92 Ω	MOSFET
F6626	Quasi-Resonant Flyback Converter	100/120 V	190 W	450 V	0.58 Ω	MOSFET
F6628	Quasi-Resonant Flyback Converter	100/120 V	290 W	450 V	0.35 Ω	MOSFET
F6652	Quasi-Resonant Flyback Converter	85-265 V	86 W	650 V	2.8 Ω	MOSFET
F6653	Quasi-Resonant Flyback Converter	85-265 V	120 W	650 V	1.95 Ω	MOSFET
F6654	Quasi-Resonant Flyback Converter	85-265 V	190 W	650 V	1.15 Ω	MOSFET
F6656	Quasi-Resonant Flyback Converter	85-265 V	300 W	650 V	0.71 Ω	MOSFET
F6672	Quasi-Resonant Flyback Converter	200/220 V	50 W	900 V	7.7 Ω	MOSFET
F6674	Quasi-Resonant Flyback Converter	85-265 V	76 W	900 V	4.49 Ω	MOSFET
F6676	Quasi-Resonant Flyback Converter	85-265 V	115 W	900 V	2.81 Ω	MOSFET
S6703	Quasi-Resonant Flyback Converter	110/120V	140 W	500 V	6 A	Bipolar
S6704	Quasi-Resonant Flyback Converter	110/120 V	100 W	500 V	5 A	Bipolar
S6707	Quasi-Resonant Flyback converter	85-265 V 220/240 V	90 W 140 W	850 V	6 A	Bipolar
S6708	Quasi-Resonant Flyback Converter	85-265 V 220/240 V	120 W 180 W	850 V	7.5 A	Bipolar
S6709	Quasi-Resonant Flyback Converter	85-265 V 220/240 V	160 W 220 W	850 V	10 A	Bipolar
8033S	3.3 V Switching Regulator	5.5-28 V	–	–	3 A	Bipolar
8050S	5.0 V Switching Regulator	7.0-40 V	–	–	3 A	Bipolar
8090S	9.0 V Switching Regulator	12-40V	–	–	3 A	Bipolar
8120S	12 V Switching Regulator	15-40 V	–	–	3 A	Bipolar
8150S	15 V Switching Regulator	18-40 V	–	–	3 A	Bipolar

* Complete part number includes additional characters to indicate operating temperature range and/or package style.

† Also includes linear regulator output for 15.7 V at 1.0 A.

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