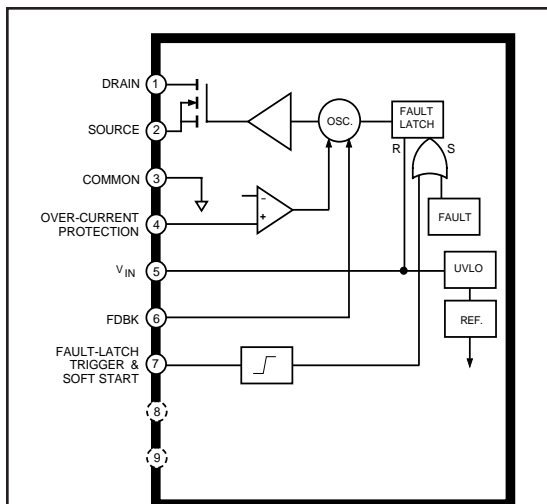


STR-S6513

OFF-LINE SWITCHING REGULATOR – WITH POWER MOSFET OUTPUT



Dwg. PK-002-2

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{IN}	35 V
Drain-Source Voltage, V_{DS}	400 V
Continuous Drain Current, I_D	10 A
1 ms Single-Pulse Drain Current, I_{DM}	40 A
Single-Pulse Avalanche Energy, E_A	400 mJ
Soft-Start/Fault-Latch Trigger Voltage, $V_{SS/FL}$	10 V
Feedback Input Current, I_{FDBK}	20 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}	-40°C to +125°C

The STR-S6513 is specifically designed to meet the requirement for increased integration and reliability in off-line flyback converters operating in the quasi-resonant ringing choke mode. The device incorporates the primary control and drive circuit with a discrete avalanche-rated 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 are 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. A similar off-line switching regulator, with an output rating of 600 V at 6 A, is also available.

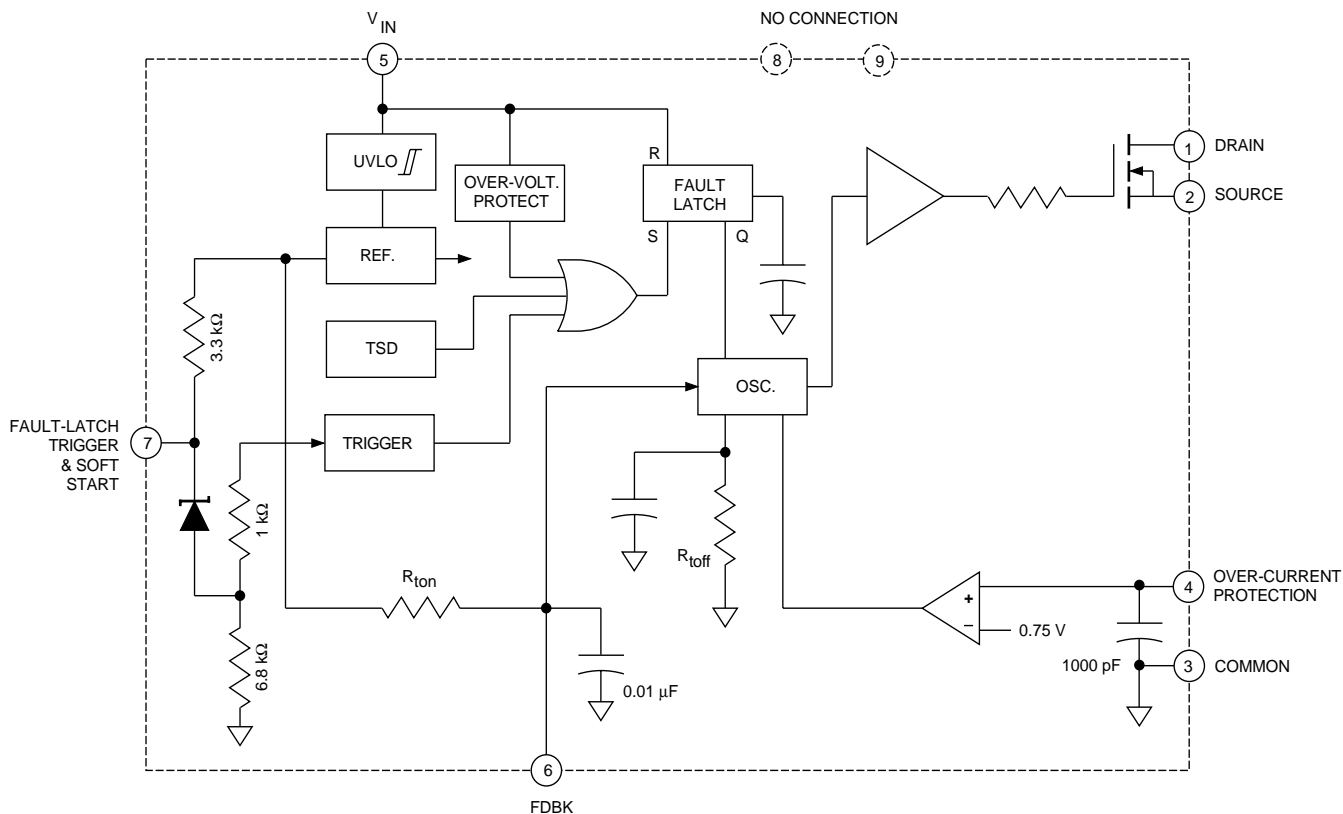
FEATURES

- Quasi-Resonant Ringing Choke Converter
- 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

Always order by complete part number: **STR-S6513**.

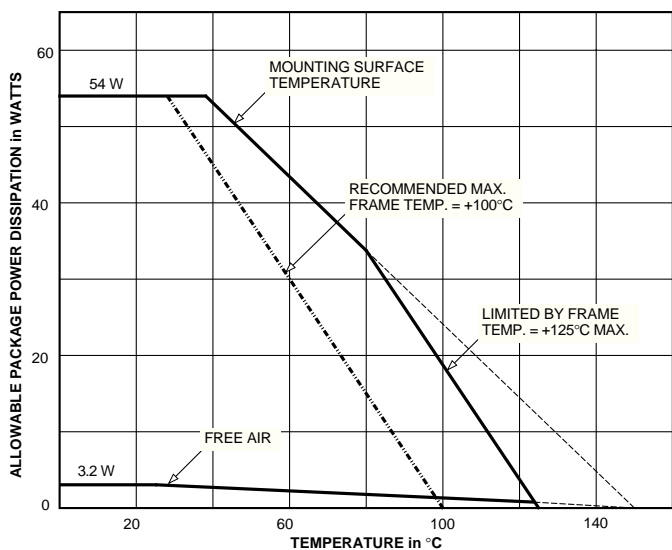
STR-S6513 OFF-LINE SWITCHING REGULATOR

FUNCTIONAL BLOCK DIAGRAM



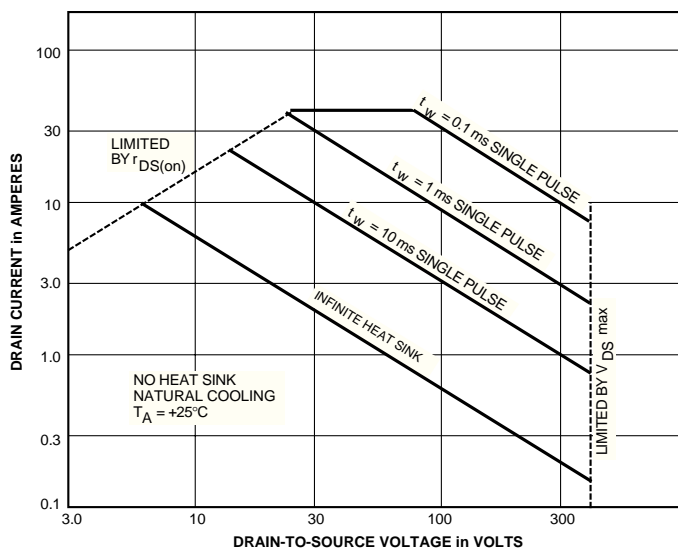
Dwg. FK-002-3

ALLOWABLE PACKAGE POWER DISSIPATION



Dwg. GK-003-2

MAXIMUM SAFE OPERATING AREA



Dwg. GK-004-3



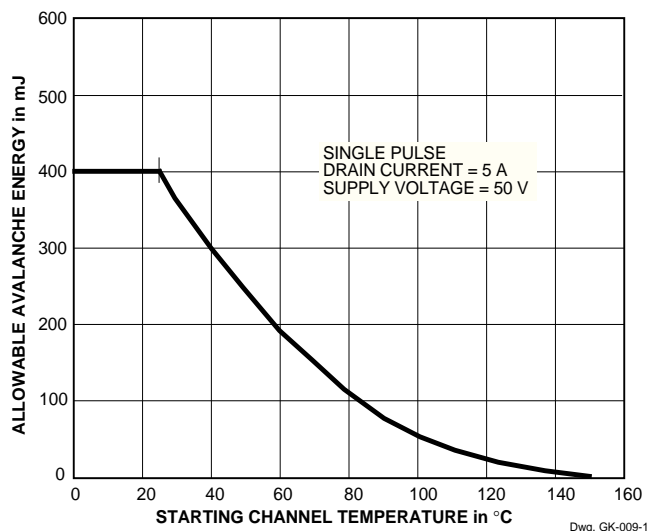
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STR-S6513

OFF-LINE SWITCHING REGULATOR

ALLOWABLE AVALANCHE ENERGY



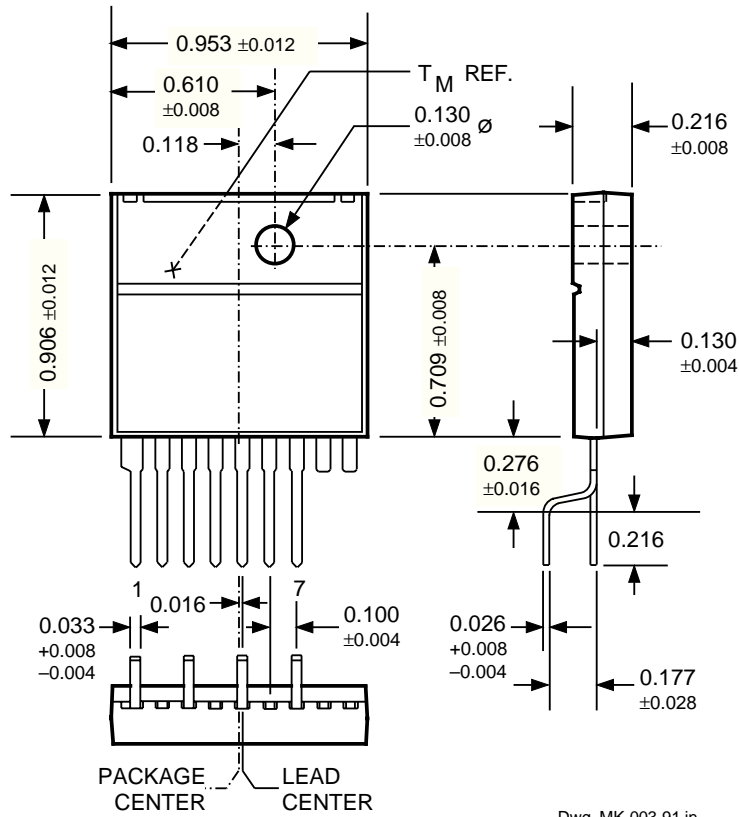
ELECTRICAL CHARACTERISTICS at $T_A = +25^\circ\text{C}$, $V_{IN} = 18\text{ V}$, voltage measurements are referenced to Common (pin 3) (unless otherwise noted).

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}	$V_{DS} = 400\text{ V}$	–	–	300	μA
FET ON Resistance	$r_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 5.5\text{ A}$	–	0.45	0.58	Ω
Output Fall Time	t_f	$V_{DD} = 200\text{ V}$, $I_D = 5\text{ A}$, 10% to 90% V_{DS}	–	–	250	ns
Maximum ON Time	t_{on}		18	–	22	μs
Minimum OFF Time	t_{off}		0.6	–	1.6	μs
Over-Current Threshold	$V_{OCP(th)}$		700	–	800	mV
Feedback Threshold	$V_{FDBK(th)}$		–	750	–	mV
Soft-Start Current	I_{SS}	$V_{SS} = 0\text{ V}$	-2.2	–	-3.4	mA
Fault-Latch Threshold Volt.	$V_{FL(th)}$		6.9	–	7.7	V
Fault-Latch Holding Current	I_{INH}	V_{IN} reduced to 8.5 V	–	340	400	μA
Fault-Latch Reset Voltage	V_{INQ}	$I_{IN} < 20\ \mu\text{A}$, 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	18	–	28	mA
	$I_{IN(OFF)}$	Start up, $V_{IN} = 14\text{ V}$	–	–	100	μA
Thermal Shutdown	T_J		125	150	–	$^\circ\text{C}$
Thermal Resistance	$R_{\theta JM}$	FET junction to mounting surface	–	2.0	–	$^\circ\text{C/W}$

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

STR-S6513
OFF-LINE
SWITCHING REGULATOR

Dimensions in Inches
(for reference only)

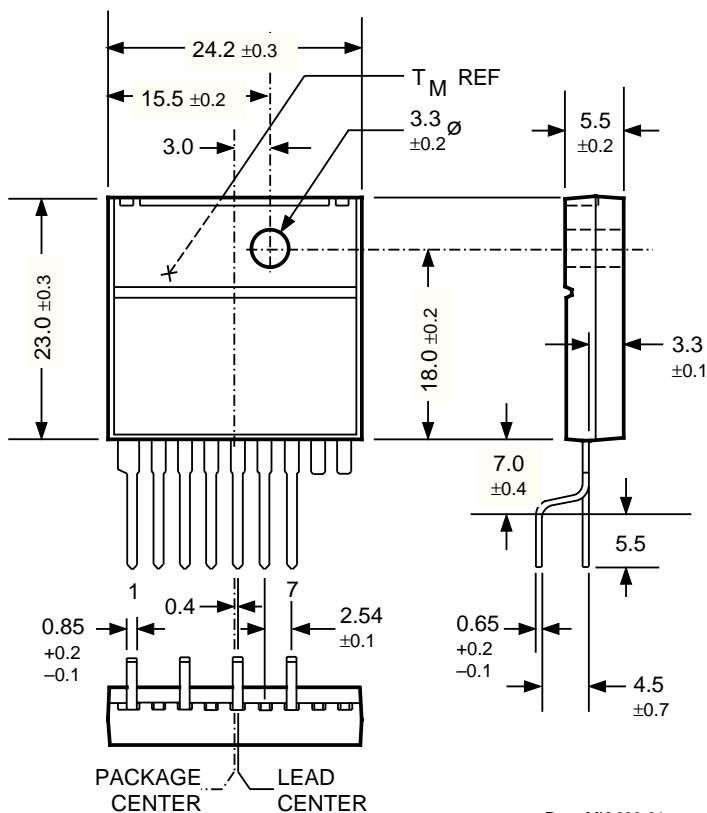


Dwg. MK-003-91 in

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

STR-S6513 OFF-LINE SWITCHING REGULATOR

Dimensions in Millimeters (controlling dimensions)



Dwg. MK-003-91 mm

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

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