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# STL27N15 N-CHANNEL 150V - 0.045 Ω - 27A PowerFLAT™ LOW GATE CHARGE STripFET™ MOSFET

TARGET DATA

TYPE	V <sub>DSS</sub>	R <sub>DS(on)</sub>	ID	
STL15N15	150 V	<0.060 Ω	27 A(1)	

- TYPICAL  $R_{DS}(on) = 0.045 \Omega$
- IMPROVED DIE-TO-FOOTPRINT RATIO
- VERY LOW PROFILE PACKAGE (1mm MAX)
- VERY LOW THERMAL RESISTANCE
- VERY LOW GATE CHARGE

#### DESCRIPTION

This MOSFET series realized with STMicroelectronics unique "STripFET™" process has specifically been designed to minimize input capacitance and gate charge. It's therefore suitable as primary switch in advanced high efficiency, high frequency isolated DC-DC converter for telecom an computer application. The new PowerFLAT™ package allows e significant reduction in a board space without compromising performance.

#### **APPLICATIONS**

- HIGH-EFFICIENCY ISOLATED DC-DC CONVERTERS
- TELECOM AND BATTERY CHARGER ADAPTOR
- SYNCHRONOUS RECTIFICATION

#### **Ordering Information**

SALES TYPE	MARKING	PACKAGE	PACKAGING						
STL27N15	L27N15	PowerFLAT	TAPE & REEL						

#### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-source Voltage (V <sub>GS</sub> = 0)	150	V
V <sub>DGR</sub>	Drain-gate Voltage ( $R_{GS}$ = 20 k $\Omega$ )	150	V
V <sub>GS</sub>	Gate- source Voltage	± 20	V
Ι <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 25°C (Steady State)	6	A
Ι <sub>D</sub>	Drain Current (continuous) at T <sub>C</sub> = 100°C	4	A
I <sub>DM</sub> (3)	Drain Current (pulsed)	24	A
P <sub>tot</sub> <sup>(2)</sup>	Total Dissipation at $T_C = 25^{\circ}C$ (Steady State)	4	W
P <sub>tot</sub> <sup>(1)</sup>	Total Dissipation at $T_C = 25^{\circ}C$	80	W
	Derating Factor	0.03	W/°C
dv/dt (5)	Peak Diode Recovery voltage slope	TBD	V/ns
T <sub>stg</sub>	Storage Temperature	-55 to 150	°C
Тj	Operating Junction Temperature	00 10 100	Ũ

June 2003

This is preliminary information on a new product forseen to be developped. Details are subject to change without notice



#### INTERNAL SCHEMATIC DIAGRAM



1/6

### STL27N15

#### THERMAL DATA

Rthj-F	Thermal Resistance Junction-Foot (Drain)	1.56	°C/W
Rthj-pcb(2)	Thermal Operating Junction-pcb	31.2	°C/W

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#### **ELECTRICAL CHARACTERISTICS** (T<sub>case</sub> = 25 °C unless otherwise specified)

#### OFF

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
V <sub>(BR)DSS</sub>	Drain-source Breakdown Voltage	I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0	100			V
IDSS	Zero Gate Voltage Drain Current (V <sub>GS</sub> = 0)	$V_{DS}$ = Max Rating $V_{DS}$ = Max Rating T <sub>C</sub> = 125°C			1 10	μΑ μΑ
IGSS	Gate-body Leakage Current (V <sub>DS</sub> = 0)	$V_{GS} = \pm 20 V$			±100	nA

#### ON (6)

Symbol	Parameter	Test Conditions		Min.	Тур.	Max.	Unit
V <sub>GS(th)</sub>	Gate Threshold Voltage	$V_{DS} = V_{GS}$	I <sub>D</sub> = 250 μA	1			V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> = 10 V	I <sub>D</sub> = 3 A		0.045	0.060	Ω

#### DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
g <sub>fs</sub> <sup>(6)</sup>	Forward Transconductance	$V_{DS} = 50 \text{ V}$ $I_D = 5 \text{ A}$		TBD		S
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V <sub>DS</sub> = 25V, f = 1 MHz, V <sub>GS</sub> = 0		TBD TBD TBD		pF pF pF



#### ELECTRICAL CHARACTERISTICS (continued)

#### SWITCHING ON

	Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
www.datas	t <sub>d(on)</sub> t <sub>r</sub>	Turn-on Delay Time Rise Time			TBD TBD		ns ns
	Q <sub>g</sub> Q <sub>gs</sub> Q <sub>gd</sub>	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V <sub>DD</sub> = 50V I <sub>D</sub> = 6A V <sub>GS</sub> =10V		TBD TBD TBD	28	nC nC nC

#### SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
t <sub>d(off)</sub> t <sub>f</sub>	Turn-off Delay Time Fall Time	$ \begin{array}{ll} V_{DD}=50 \ V & I_{D}=3 \ A \\ R_{G}=4.7 \Omega, & V_{GS}=10 \ V \\ (\text{Resistive Load, Figure 3}) \end{array} $		TBD TBD		ns ns

#### SOURCE DRAIN DIODE

Symbol	Parameter	Test Condit	Min.	Тур.	Max.	Unit	
I <sub>SD</sub> I <sub>SDM</sub> <sup>(3)</sup>	Source-drain Current Source-drain Current (pulsed)					6 24	A A
V <sub>SD</sub> (6)	Forward On Voltage	$I_{SD} = 3 A V_{GS}$	s = 0			1.2	V
t <sub>rr</sub> Q <sub>rr</sub> I <sub>RRM</sub>	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 6 A$ di/d $V_{DD} = 30 V$ j (see test circuit, Fig	t = 100A/µs = 150°C jure 5)		TBD TBD TBD		ns nC A

57

 $\begin{array}{c} & \\ (1) \mbox{ The value is rated according $R_{thj}$-F.} \\ (2) \mbox{ When Mounted on $FR$-4 board of 1 inch$^2$, 2oz Cu} \\ (3) \mbox{ Pulse width limited by safe operating area.} \\ (5) \mbox{ I}_{SD} \leq 6A, \mbox{ di/dt } \leq 300A/\mu s, \mbox{ V}_{DD} \leq V_{(BR)DSS}, \mbox{ T}_j \leq T_{JMAX}. \\ (6) \mbox{ Pulse duration = 300 } \mu s, \mbox{ duty cycle 1.5 } \%. \end{array}$ 

## STL27N15

#### Fig. 1: Unclamped Inductive Load Test Circuit



**Fig. 3:** Switching Times Test Circuits For Resistive Load



**Fig. 5:** Test Circuit For Inductive Load Switching And Diode Recovery Times



4/6

#### Fig. 2: Unclamped Inductive Waveform



Fig. 4: Gate Charge test Circuit



57

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	DIM		mm.			inch	
	LAUNT.	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
	A	0.80		1.00	0.031		0.039
	A1		0.02			0.001	
	b	0.35		0.47	0.014		0.018
	С		1.61			0.063	
	D		5.00			0.197	
	D2	4.15		4.25	0.163		0.167
	ш		6.00			0.236	
	E2	3.55		3.65	0.140		0.144
	e		1.27			0.049	
	F		1.99			0.078	
	G		2.20			0.006	
	н		0.40			0.015	
			0.219			0.0086	
	L	0.70		0.90	0.028		0.035

## PowerFLAT™(6x5) MECHANICAL DATA



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