



STD45NF03L

N - CHANNEL 30V - 0.011 Ω - 45A DPAK STripFET™ POWER MOSFET

PRELIMINARY DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D
STD45NF03L	30 V	< 0.013 Ω	45 A

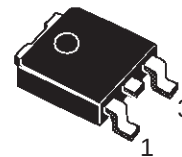
- TYPICAL R_{DS(on)} = 0.011 Ω
- LOW THRESHOLD DRIVE
- ADD SUFFIX "T4" FOR ORDERING IN TAPE & REEL

DESCRIPTION

This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

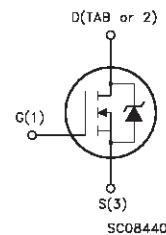
APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- MOTOR CONTROL, AUDIO AMPLIFIERS
- DC-DC & DC-AC CONVERTERS



**DPAK
TO-252**
(Suffix "T4")

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	30	V
V _{DGR}	Drain- gate Voltage (R _{GS} = 20 k Ω)	30	V
V _{GS}	Gate-source Voltage	± 20	V
I _D	Drain Current (continuous) at T _c = 25 °C	45	A
I _D	Drain Current (continuous) at T _c = 100 °C	31.5	A
I _{DM} (•)	Drain Current (pulsed)	180	A
P _{tot}	Total Dissipation at T _c = 25 °C	55	W
	Derating Factor	0.37	W/°C
E _{AS} (1)	Single Pulse Avalanche Energy	200	mJ
T _{stg}	Storage Temperature	-65 to 175	°C
T _j	Max. Operating Junction Temperature	175	°C

(•) Pulse width limited by safe operating area

(1) starting T_j = 25 °C, I_b = 22.5A, V_{DD} = 20V

STD45NF03L

THERMAL DATA

$R_{thj-pcb}$	Thermal Resistance Junction-PC Board	Max	2.7	$^{\circ}\text{C/W}$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^{\circ}\text{C/W}$
$R_{thj-sink}$	Thermal Resistance Case-sink	Typ	0.5	$^{\circ}\text{C/W}$
T_l	Maximum Lead Temperature For Soldering Purpose		275	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\ \mu\text{A}$ $V_{GS} = 0$	30			V
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating}$ $T_c = 125^{\circ}\text{C}$			1 10	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20\ \text{V}$			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\ \mu\text{A}$	1	1.5	2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10\ \text{V}$ $I_D = 22.5\ \text{A}$ $V_{GS} = 4.5\ \text{V}$ $I_D = 22.5\ \text{A}$		0.011 0.013	0.013 0.018	Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10\ \text{V}$	30			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 22.5\ \text{A}$		60		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	$V_{DS} = 25\ \text{V}$ $f = 1\ \text{MHz}$ $V_{GS} = 0\ \text{V}$		2550 630 215		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15\text{ V}$ $I_D = 22.5\text{ A}$		40		ns
t_r	Rise Time	$R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, see fig. 3)		250		ns
Q_g	Total Gate Charge	$V_{DD} = 24\text{ V}$ $I_D = 22.5\text{ A}$ $V_{GS} = 5\text{ V}$		43	58	nC
Q_{gs}	Gate-Source Charge			12		nC
Q_{gd}	Gate-Drain Charge			21		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off Delay Time	$V_{DD} = 15\text{ V}$ $I_D = 22.5\text{ A}$		60		ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, see fig. 3)		70		ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				45	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				180	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 45\text{ A}$ $V_{GS} = 0$			1.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 45\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 15\text{ V}$ $T_J = 150\text{ }^\circ\text{C}$ (see test circuit, fig. 5)		75		ns
Q_{rr}	Reverse Recovery Charge			100		nC
I_{RRM}	Reverse Recovery Current			2.6		A

(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

(\bullet) Pulse width limited by safe operating area

Fig. 1: Unclamped Inductive Load Test Circuit

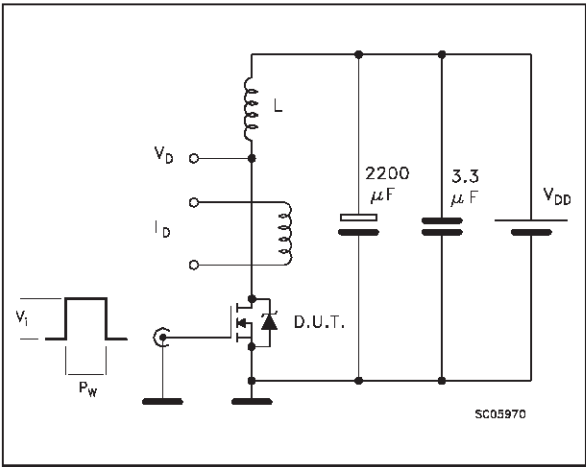


Fig. 2: Unclamped Inductive Waveform

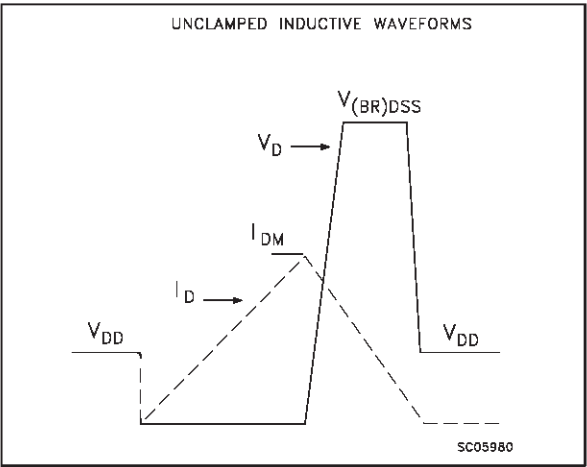


Fig. 3: Switching Times Test Circuits For Resistive Load

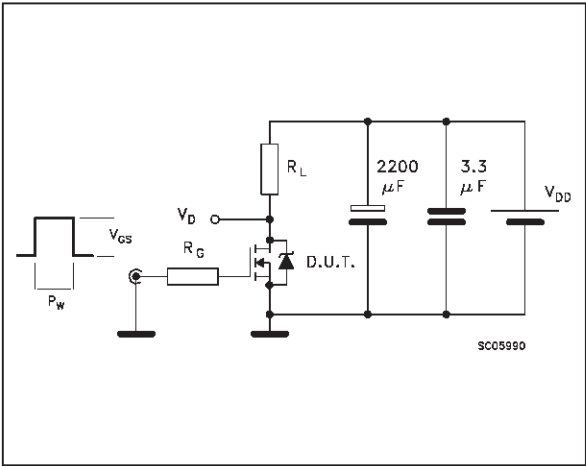


Fig. 4: Gate Charge test Circuit

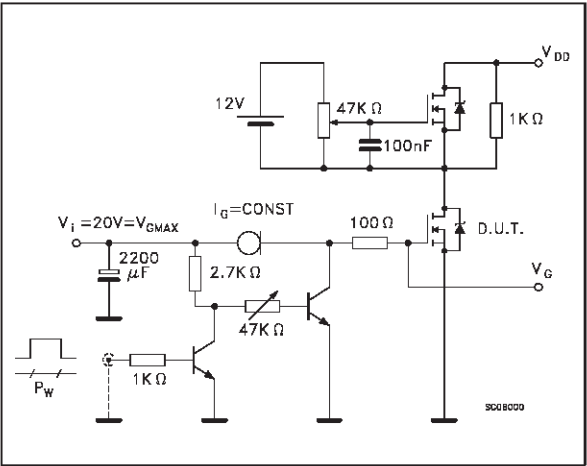
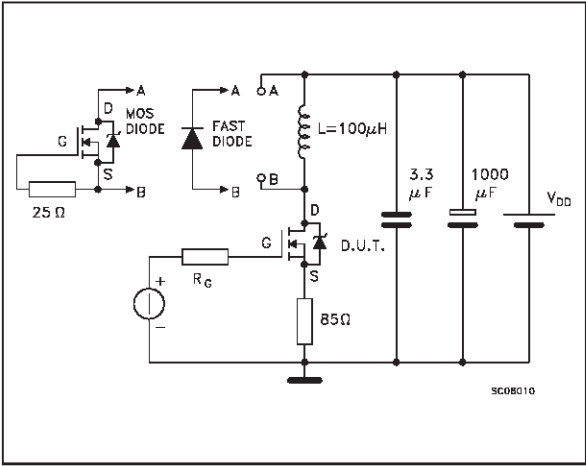
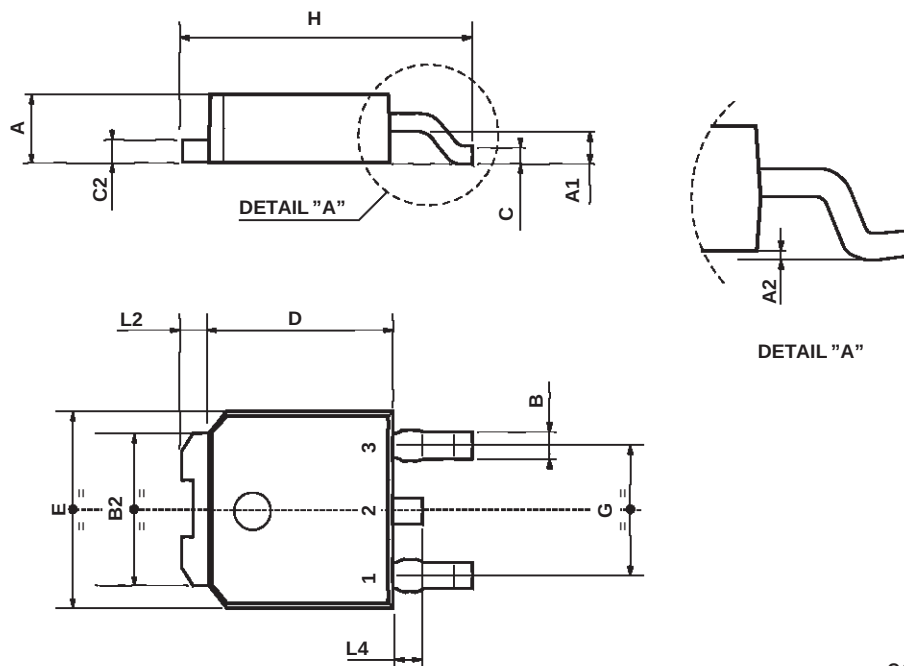


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



TO-252 (DPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
B2	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L2		0.8			0.031	
L4	0.6		1	0.023		0.039



0068772-B

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 1999 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco -
Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.