



STB70NFS03L

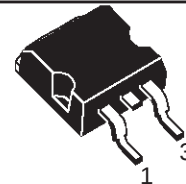
N - CHANNEL 30V - 0.008Ω - 70A D²PAK STripFETTM MOSFET PLUS SCHOTTKY RECTIFIER

PRELIMINARY DATA

MAIN PRODUCT CHARACTERISTICS			
MOSFET	V _{DSS}	R _{DS(on)}	I _D
	30V	<0.01Ω	70A
SCHOTTKY	I _{F(AV)}	V _{RRM}	V _{F(MAX)}
	3A	30V	0.51V

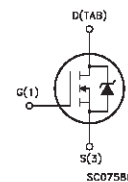
DESCRIPTION:

This product associates a Power MOSFET of the third generation of STMicroelectronics unique "Single Feature Size" strip-based process and a low drop Schottky diode. The transistor shows the best trade-off between on-resistance and gate charge. Used as low side in buck regulators, the product is the best solution in terms of conduction losses and space saving.



D²PAK
TO-263
(suffix "T4")

INTERNAL SCHEMATIC DIAGRAM



MOSFET 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 kΩ)	30	V
V _{GS}	Gate-source Voltage	± 22	V
I _D	Drain Current (continuous) at T _c = 25 °C	70	A
I _D	Drain Current (continuous) at T _c = 100 °C	50	A
I _{DM} (•)	Drain Current (pulsed)	280	A
P _{tot}	Total Dissipation at T _c = 25 °C	100	W
	Derating Factor	0.67	W/°C
T _{stg}	Storage Temperature	-65 to 175	°C
T _j	Max. Operating Junction Temperature	175	°C

(•) Pulse width limited by safe operating area

SCHOTTKY ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage		30	V
I _{F(RMS)}	RMS Forward Current		20	A
I _{F(AV)}	Average Forward Current	T _L =125 °C δ =0.5	3	A
I _{FSM}	Surge Non Repetitive Forward Current	tp= 10 ms Sinusoidal	75	A
dv/dt	Critical Rate Of Rise Of Reverse Voltage		10000	V/μs

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.5	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^{\circ}C/W$
T_l	Maximum Lead Temperature For Soldering Purpose		175	$^{\circ}C$

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

OFF

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

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250 \mu A$	1			V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10 V$ $I_D = 35 A$ $V_{GS} = 5 V$ $I_D = 18 A$		0.008 0.015	0.01 0.018	Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10 V$	70			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 35 A$		40		S
C_{iss}	Input Capacitance	$V_{DS} = 25 V$ $f = 1 MHz$ $V_{GS} = 0$		1470		pF
C_{oss}	Output Capacitance			490		pF
C_{rss}	Reverse Transfer Capacitance			110		pF

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 15\text{ V}$ $I_D = 35\text{ A}$		20		ns
t_r	Rise Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, see fig. 3)		350		ns
Q_g	Total Gate Charge	$V_{DD} = 24\text{ V}$ $I_D = 46\text{ A}$ $V_{GS} = 10\text{ V}$		35	45	nC
Q_{gs}	Gate-Source Charge			5		nC
Q_{gd}	Gate-Drain Charge			10		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Off-voltage Rise Time	$V_{DD} = 24\text{ V}$ $I_D = 35\text{ A}$		35		ns
t_f	Fall Time	$R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, see fig. 3)		65		ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				70	A
$I_{SDM}(\bullet)$	Source-drain Current (pulsed)				280	A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 70\text{ A}$ $V_{GS} = 0$			1.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 70\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 15\text{ V}$ $T_J = 150\text{ }^\circ\text{C}$ (see test circuit, figure 5)		70		ns
Q_{rr}	Reverse Recovery Charge			105		nC
I_{RRM}	Reverse Recovery Current			2.4		A

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

(\bullet) Pulse width limited by safe operating area

SCHOTTKY STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_R(*)$	Reversed Leakage Current	$T_J = 25\text{ }^\circ\text{C}$ $V_R = 30\text{ V}$ $T_J = 125\text{ }^\circ\text{C}$ $V_R = 30\text{ V}$		0.03	0.2 100	mA mA
$V_F(*)$	Forward Voltage drop	$T_J = 25\text{ }^\circ\text{C}$ $I_F = 3\text{ A}$ $T_J = 125\text{ }^\circ\text{C}$ $I_F = 3\text{ A}$		0.38	0.51 0.46	V V

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

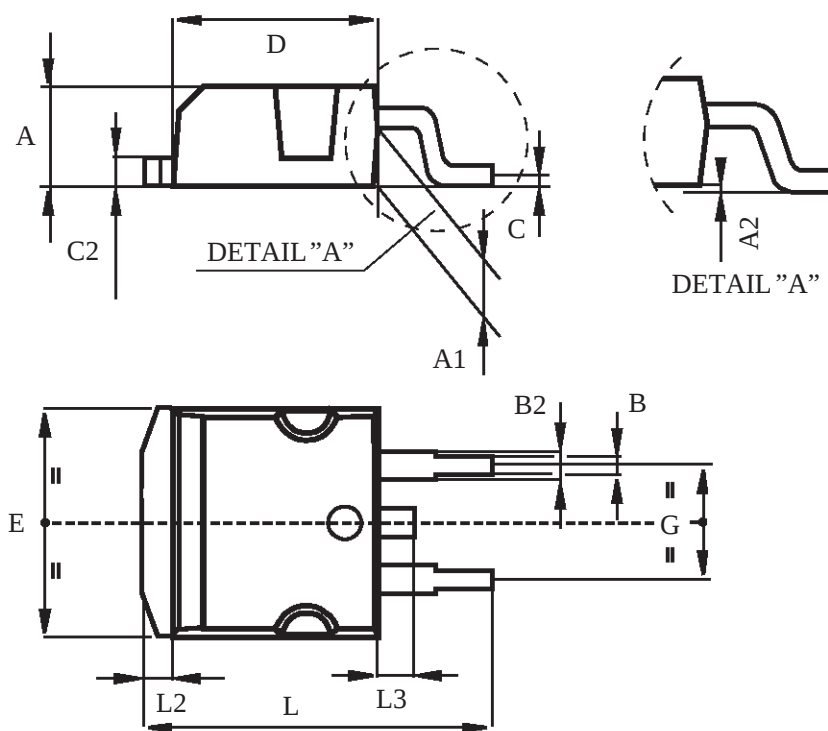


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



TO-263 (D²PAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.21		1.36	0.047		0.053
D	8.95		9.35	0.352		0.368
E	10		10.4	0.393		0.409
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068



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