

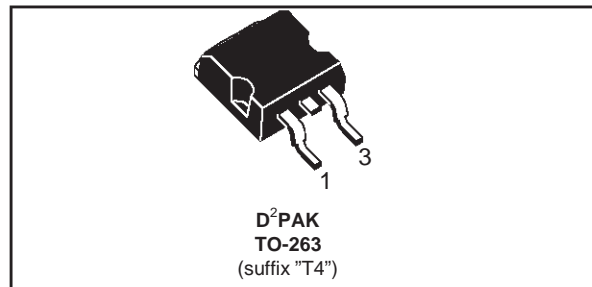


STB70NFS03L

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

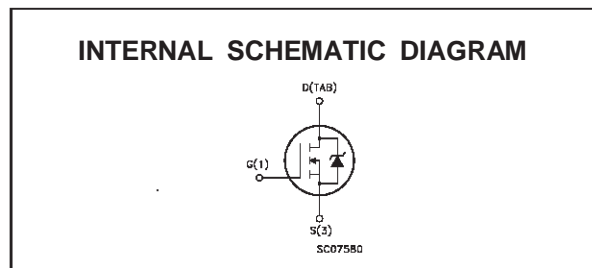
PRELIMINARY DATA

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.



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

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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	$V_{DD} = 15\text{ V}$ $I_D = 35\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, see fig. 3)		20		ns
t_r	Rise Time			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	$V_{DD} = 24\text{ V}$ $I_D = 35\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, see fig. 3)		35		ns
t_f	Fall Time			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

SCHOTTCKY 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	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

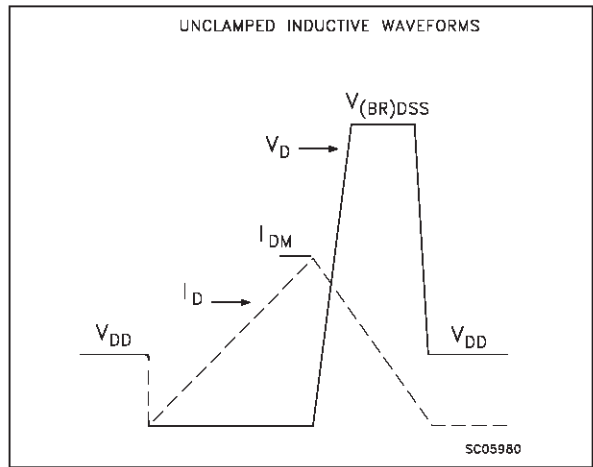


Fig. 3: Switching Times Test Circuits For Resistive Load



Fig. 4: Gate Charge test Circuit

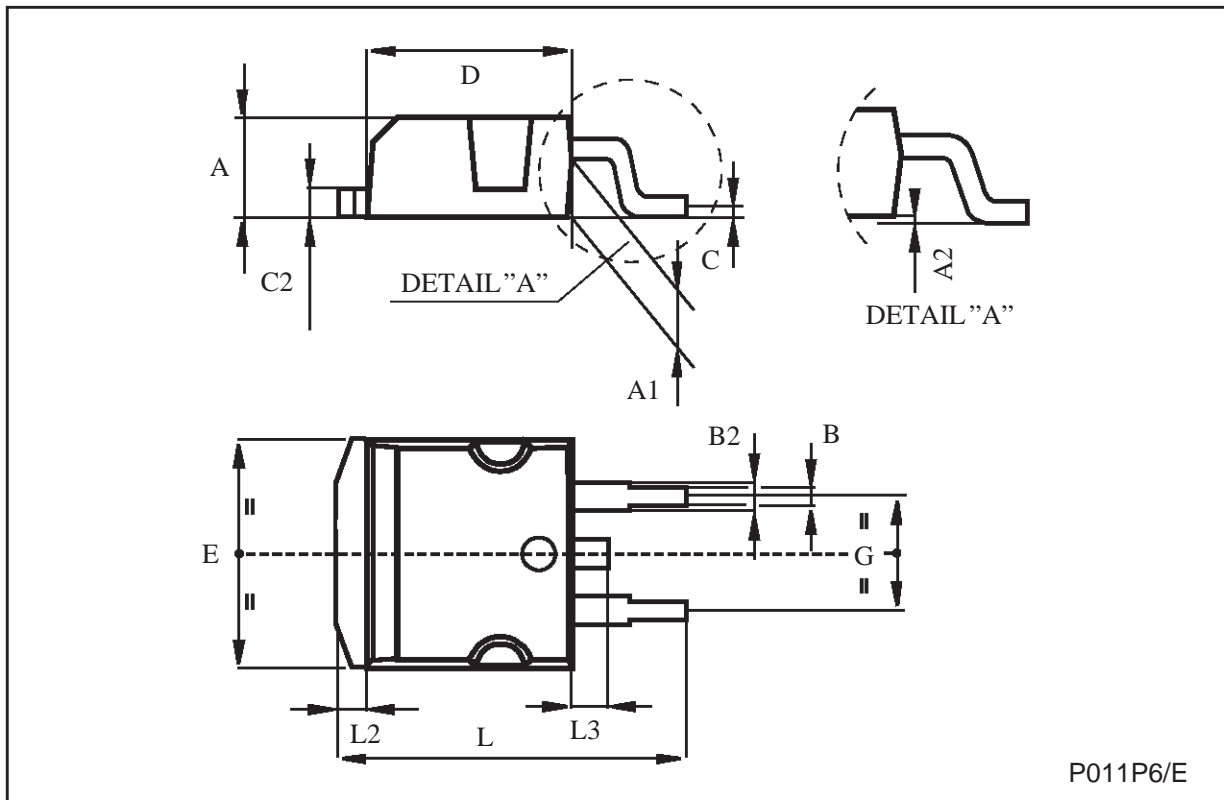


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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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