



STD30PF03L STD30PF03L-1

P-CHANNEL 30V - 0.025Ω - 24A DPAK/IPAK
STripFET™ II POWER MOSFET

PRELIMINARY DATA

TYPE	V _{DSS}	R _{DS(on)}	I _D
STD30PF03L	30 V	< 0.028Ω	24 A
STD30PF03L-1	30 V	< 0.028Ω	24 A

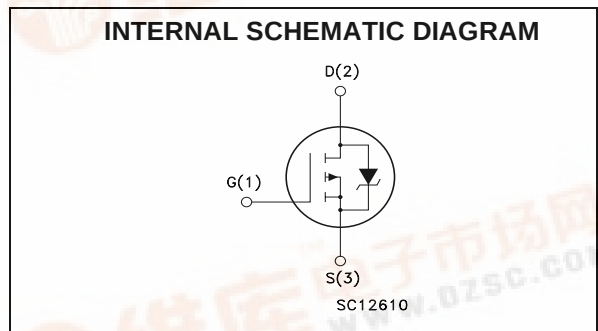
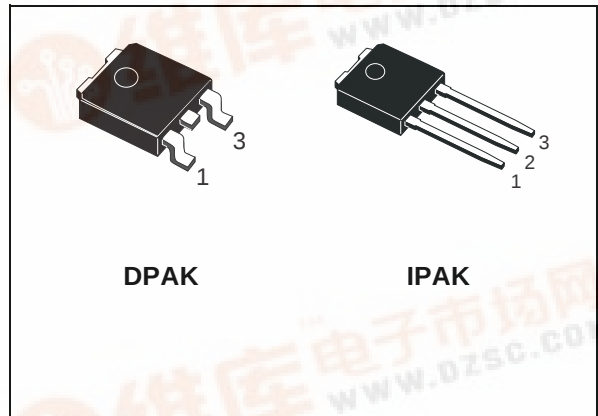
- TYPICAL R_{DS(on)} = 0.025Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE
- LOW GATE CHARGE
- EXTREMELY LOW FIGURE OF MERIT (R_{DS(on)} * Q_g)

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 and low gate charge.

APPLICATIONS

- DC-DC CONVERTERS



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	± 16	V
I _D (#)	Drain Current (continuous) at T _C = 25°C	24	A
I _D (#)	Drain Current (continuous) at T _C = 100°C	24	A
I _{DM} (●)	Drain Current (pulsed)	96	A
P _{TOT}	Total Dissipation at T _C = 25°C	70	W
	Derating Factor	0.47	W/°C
T _{stg}	Storage Temperature	- 55 to 175	°C
T _j	Max. Operating Junction Temperature	175	°C

(●) Pulse width limited by safe operating area
(#) Current limited by wire bonding

Note: For the P-CHANNEL MOSFET actual polarity of voltages and current has to be reversed

STD30PF03L - STD30PF03L-1**THERMAL DATA**

Rthj-case	Thermal Resistance Junction-case Max	2.14	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	100	°C/W
T _j	Maximum Operating Junction Temperature	275	°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max)	24	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 25 V)	350	mJ

ELECTRICAL CHARACTERISTICS (TCASE = 25 °C UNLESS OTHERWISE SPECIFIED)
OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 µA, V _{GS} = 0	30			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating, T _C = 125 °C			1 10	µA µA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 16 V			±100	nA

ON (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250µA	1			V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10 V, I _D = 12 A V _{GS} = 5 V, I _D = 12 A		0025 0.032	0.028 0.040	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} = 15 V, I _D = 12 A		23		S
C _{iss}	Input Capacitance	V _{DS} = 25V, f = 1 MHz, V _{GS} = 0		1670		pF
C _{oss}	Output Capacitance			345		pF
C _{rss}	Reverse Transfer Capacitance			120		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 24\text{ V}$, $I_D = 24\text{ A}$		64		ns
t_r	Rise Time	$R_G = 4.7\Omega$, $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 3)		122		ns
Q_g	Total Gate Charge	$V_{DD} = 15\text{ V}$, $I_D = 24\text{ A}$,		18.5	25	nC
Q_{gs}	Gate-Source Charge	$V_{GS} = 5\text{ V}$		5.5		nC
Q_{gd}	Gate-Drain Charge			11		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	$V_{DD} = 24\text{ V}$, $I_D = 24\text{ A}$,		36		ns
t_f	Fall Time	$R_G = 4.7\Omega$, $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 3)		26		ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				24	A
$I_{SDM(2)}$	Source-drain Current (pulsed)				96	A
$V_{SD(1)}$	Forward On Voltage	$I_{SD} = 24\text{ A}$, $V_{GS} = 0$			2.3	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 24\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$,		40		ns
Q_{rr}	Reverse Recovery Charge	$V_{DD} = 24\text{ V}$, $T_j = 150\text{ }^\circ\text{C}$		52		μC
I_{RRM}	Reverse Recovery Current	(see test circuit, Figure 5)		2.6		A

Note: 1. Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.
2. Pulse width limited by safe operating area.

Fig. 1: Unclamped Inductive Load Test Circuit

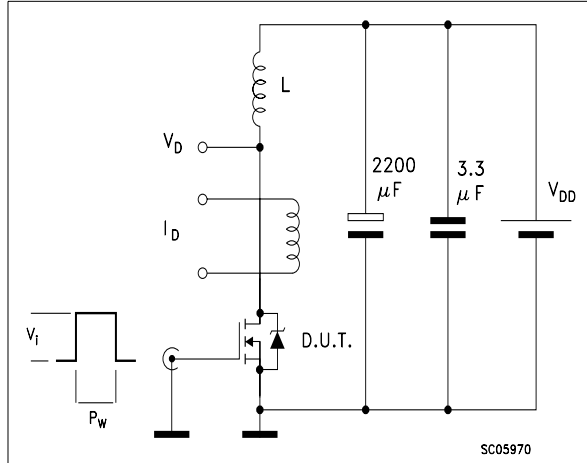


Fig. 2: Unclamped Inductive Waveform

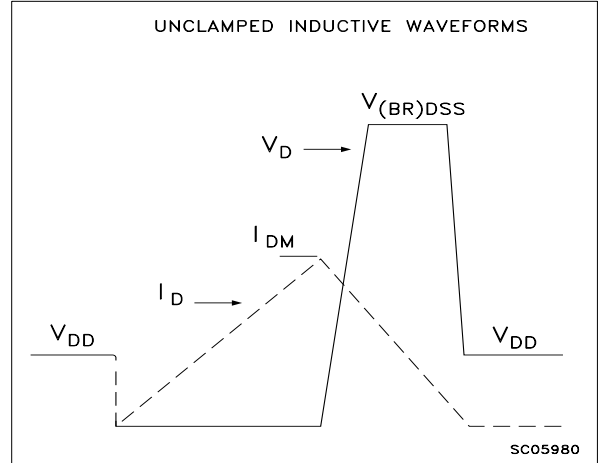


Fig. 3: Switching Times Test Circuit For Resistive Load

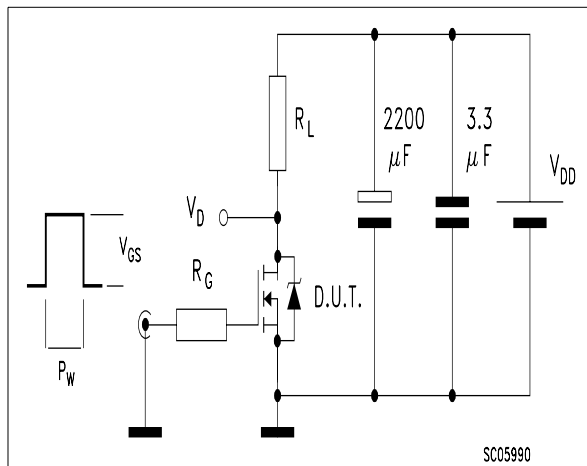


Fig. 4: Gate Charge test Circuit

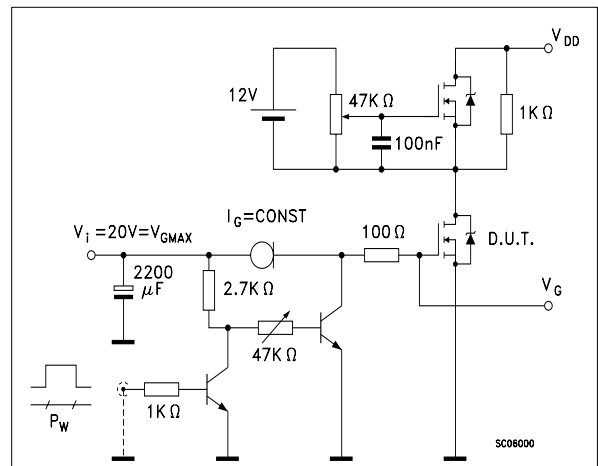
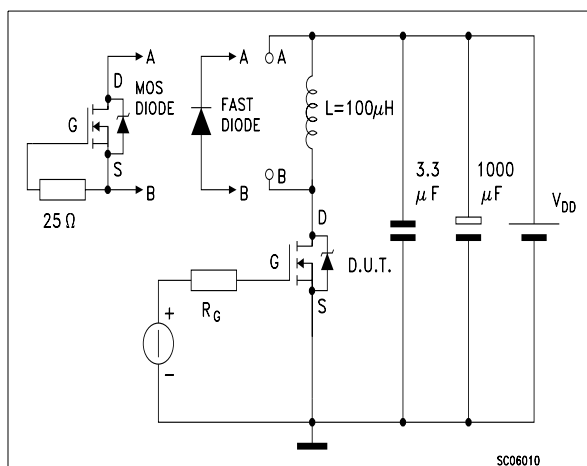
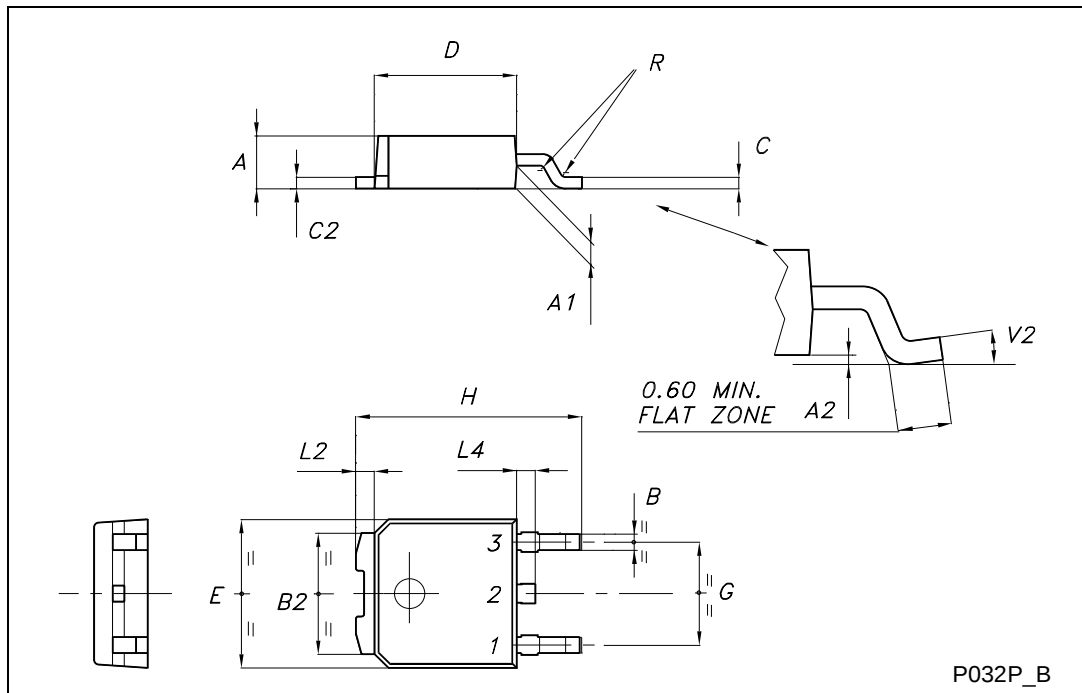


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



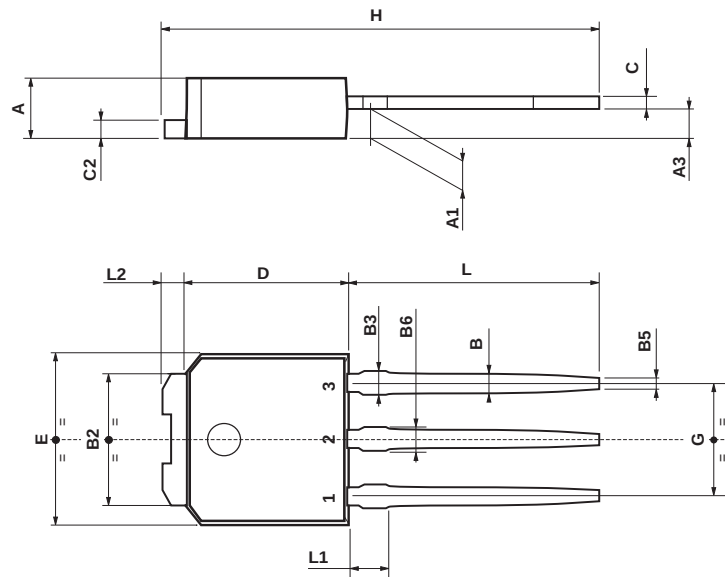
TO-252 (DPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.398
L2		0.8			0.031	
L4	0.60		1.00	0.024		0.039
V2	0°		8°	0°		0°



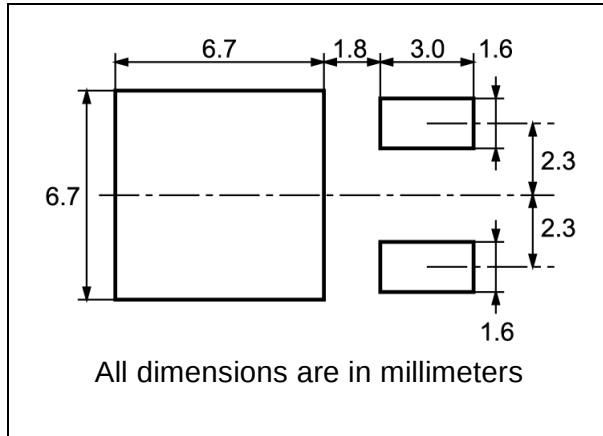
TO-251 (IPAK) MECHANICAL DATA

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
A3	0.7		1.3	0.027		0.051
B	0.64		0.9	0.025		0.031
B2	5.2		5.4	0.204		0.212
B3			0.85			0.033
B5		0.3			0.012	
B6			0.95			0.037
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	15.9		16.3	0.626		0.641
L	9		9.4	0.354		0.370
L1	0.8		1.2	0.031		0.047
L2		0.8	1		0.031	0.039

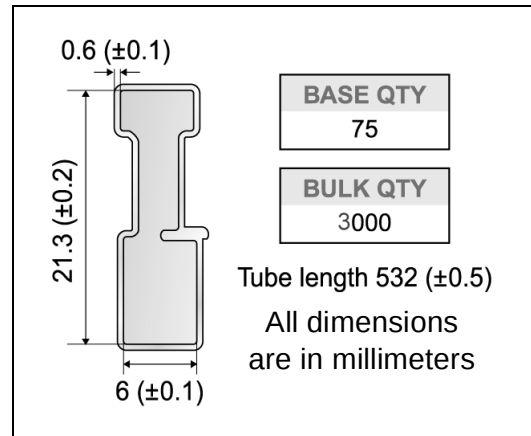


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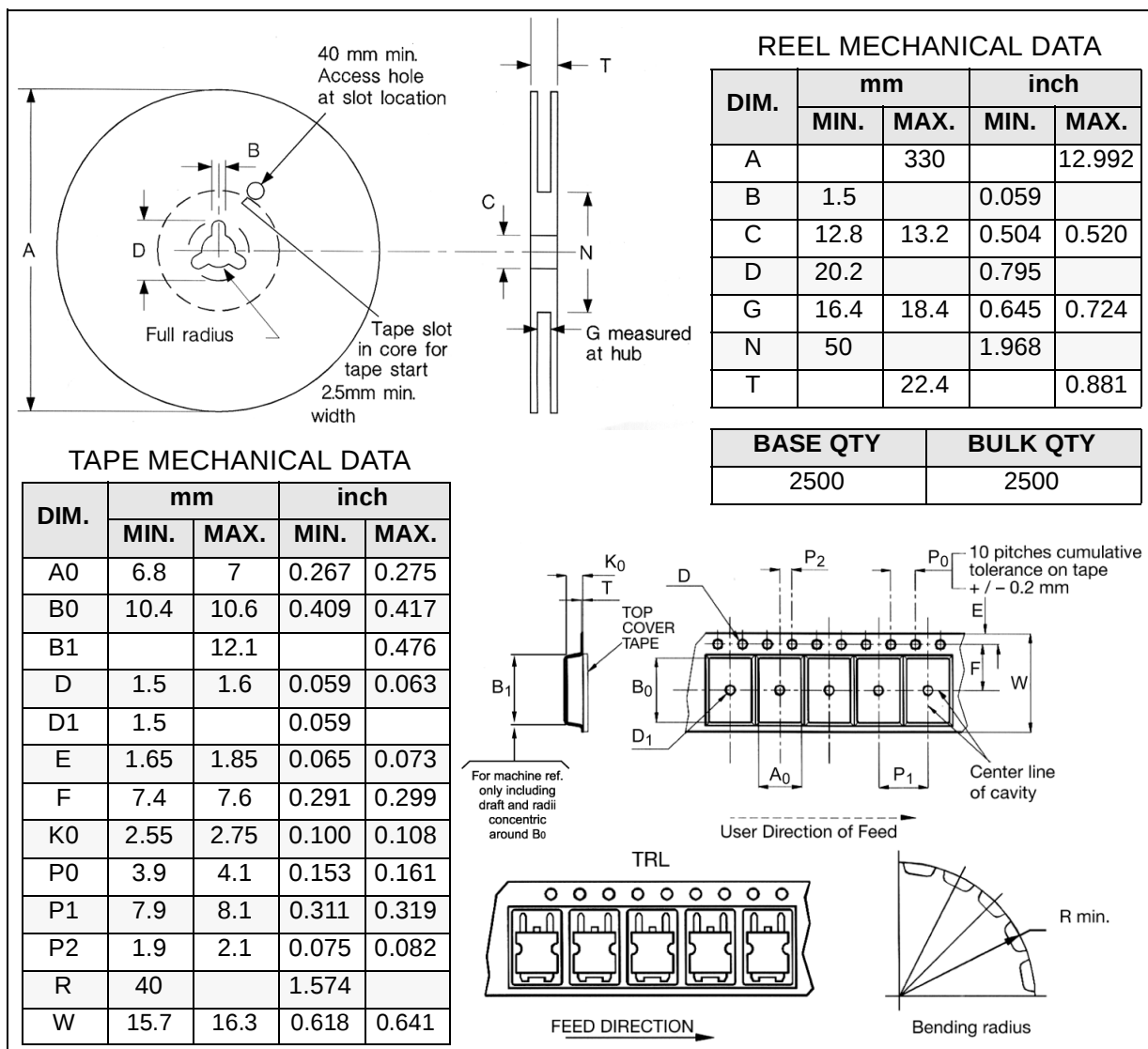
DPAK FOOTPRINT



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TAPE AND REEL SHIPMENT (suffix "T4")*



* on sales type

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