



STD100NH03L

N-CHANNEL 30V - 0.005 Ω - 60A DPAK STripFET™ III POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STD100NH03L	30 V	< 0.0055 Ω	60 A(2)

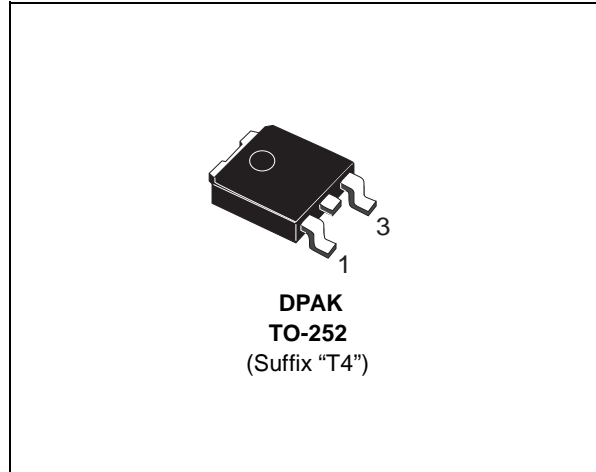
- TYPICAL R_{DS(on)} = 0.005 Ω @ 10 V
- R_{DS(ON)} * Qg INDUSTRY'S BENCHMARK
- CONDUCTION LOSSES REDUCED
- SWITCHING LOSSES REDUCED
- LOW THRESHOLD DEVICE
- SURFACE-MOUNTING DPAK (TO-252)
POWER PACKAGE IN TAPE & REEL
(SUFFIX "T4")

DESCRIPTION

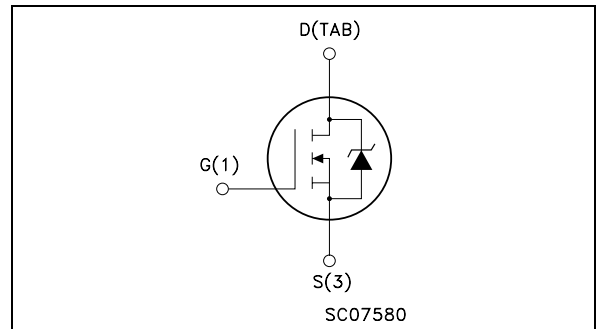
The **STD100NH03L** utilizes the latest advanced design rules of ST's proprietary STripFET™ technology. This is suitable for the most demanding DC-DC converter application where high efficiency is to be achieved.

APPLICATIONS

- SPECIFICALLY DESIGNED AND OPTIMISED FOR HIGH EFFICIENCY DC/DC CONVERTERS



INTERNAL SCHEMATIC DIAGRAM



Ordering Information

SALES TYPE	MARKING	PACKAGE	PACKAGING
STD100NH03LT4	D100NH03L	TO-252	TAPE & REEL

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	\pm 20	V
I _D (2)	Drain Current (continuous) at T _C = 25°C	60	A
I _D (2)	Drain Current (continuous) at T _C = 100°C	60	A
I _{DM} (3)	Drain Current (pulsed)	240	A
P _{tot}	Total Dissipation at T _C = 25°C	100	W
	Derating Factor	0.66	W/°C
E _{AS} (4)	Single Pulse Avalanche Energy	700	mJ
T _{stg}	Storage Temperature	-55 to 175	°C
T _j	Max. Operating Junction Temperature		

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THERMAL DATA

Rthj-case	Thermal Resistance Junction-case	Max	1.5	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max	100	°C/W
Rthj-pcb	Thermal Resistance Junction-pcb(#)	Max	43	°C/W
T _I	Maximum Lead Temperature For Soldering Purpose		275	°C

(#) When Mounted on 1 inch² FR-4 board, 2 oz of Cu.

ELECTRICAL CHARACTERISTICS (T_{CASE} = 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} = ± 20V			±100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 250 μA	1	1.8	2.5	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10 V I _D = 30 A V _{GS} = 5 V I _D = 30 A		0.005 0.0060	0.0055 0.0105	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (5)	Forward Transconductance	V _{DS} = 10 V I _D = 30 A		40		S
C _{iss} C _{oss} C _{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 15V f = 1 MHz V _{GS} = 0		4100 680 70		pF pF pF
R _G	Gate Input Resistance	f = 1 MHz Gate DC Bias = 0 Test Signal Level = 20 mV Open Drain		1.3		Ω

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ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	$V_{DD} = 15\text{ V}$ $I_D = 30\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		16 95		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Source Gate Charge Gate-Drain Charge	$V_{DD} = 15\text{ V}$ $I_D = 60\text{ A}$ $V_{GS} = 10\text{ V}$		57 11.8 7.3	77	nC nC nC
$Q_{oss}^{(6)}$	Output Charge	$V_{DS} = 16\text{ V}$ $V_{GS} = 0\text{ V}$		27		nC
$Q_{gls}^{(7)}$	Third-quadrant Gate Charge	$V_{DS} < 0\text{ V}$ $V_{GS} = 10\text{ V}$		55		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	$V_{DD} = 15\text{ V}$ $I_D = 30\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		48 23		ns ns

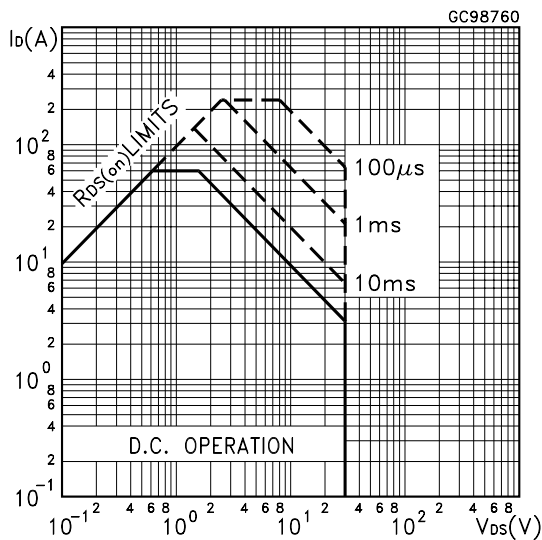
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM}	Source-drain Current Source-drain Current (pulsed)				60 240	A A
$V_{SD}^{(5)}$	Forward On Voltage	$I_{SD} = 30\text{ A}$ $V_{GS} = 0$			1.4	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 60\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		46 64 2.8	62 86	ns nC A

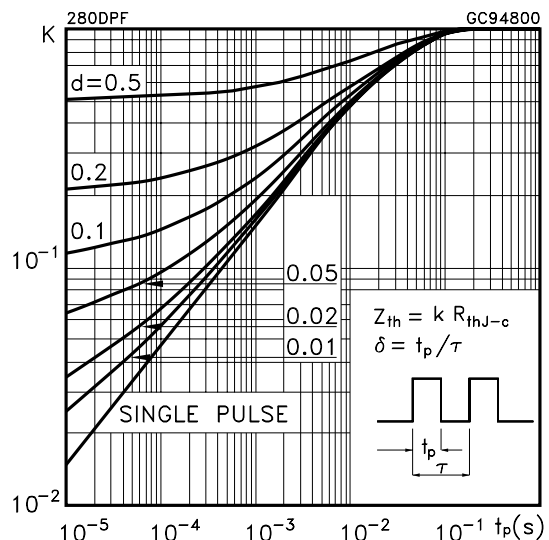
(2) Value limited by wire bonding
 (3) Pulse width limited by safe operating area.
 (4) Starting $T_j = 25^\circ\text{C}$, $I_D = 30\text{A}$, $V_{DD} = 15\text{V}$

(5) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.
 (6) $Q_{oss} = C_{oss} \cdot \Delta V_{in}$, $C_{oss} = C_{gd} + C_{ds}$. See Appendix A
 (7) Gate charge for synchronous operation

Safe Operating Area

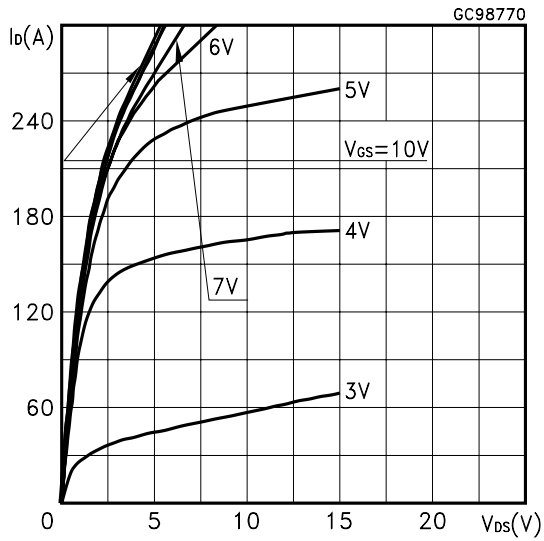


Thermal Impedance

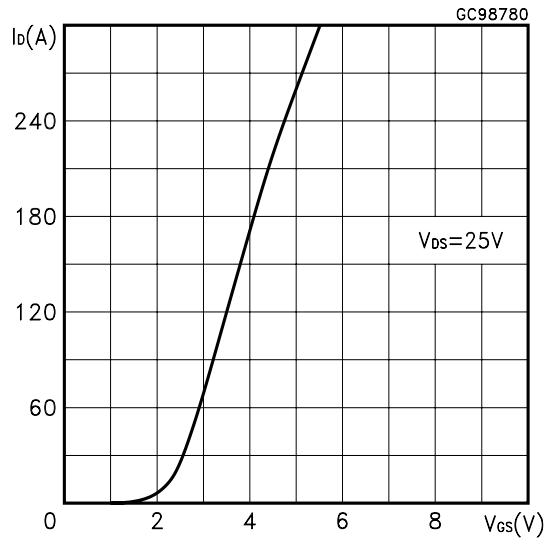


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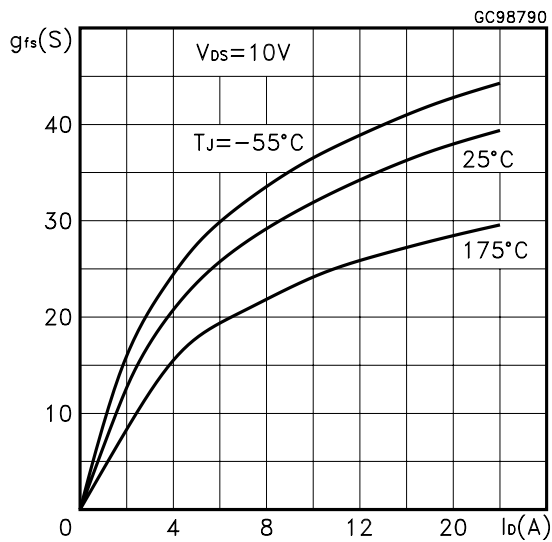
Output Characteristics



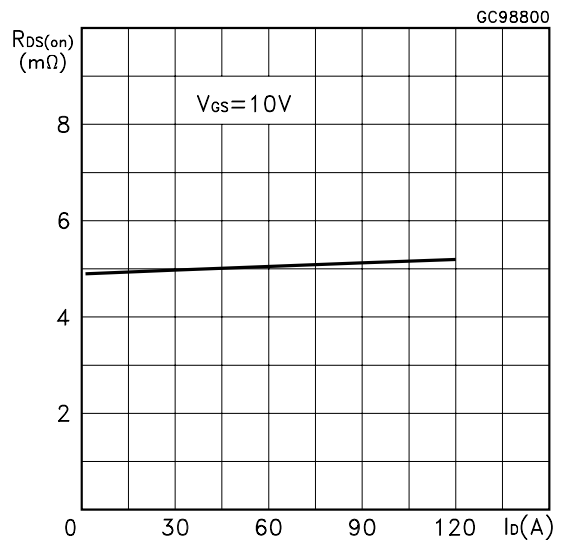
Transfer Characteristics



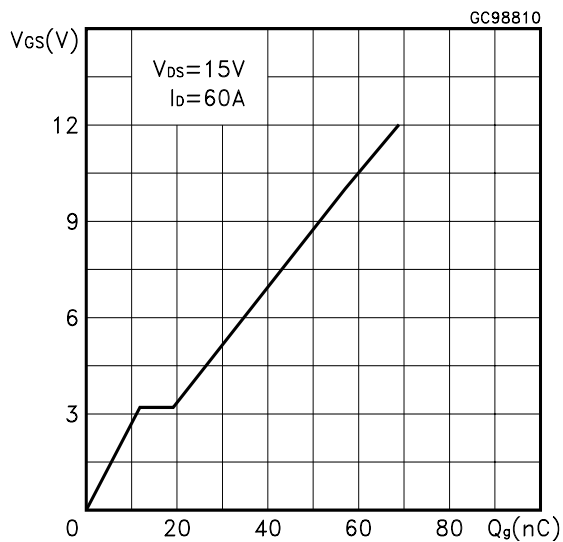
Transconductance



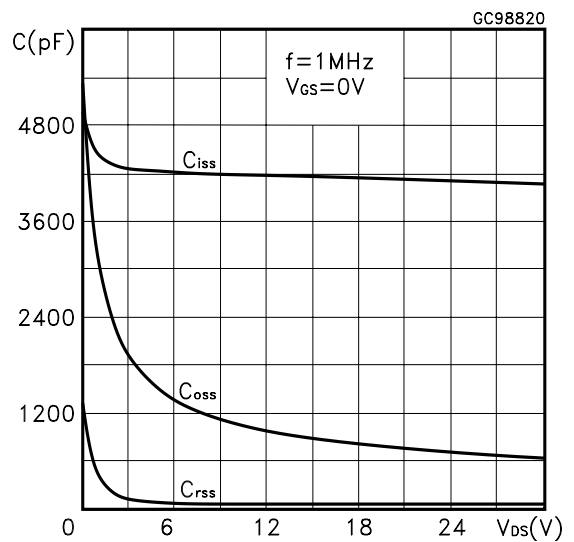
Static Drain-source On Resistance



Gate Charge vs Gate-source Voltage

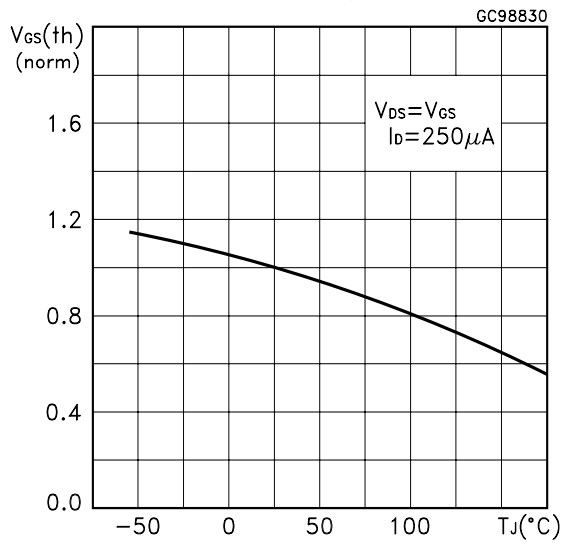


Capacitance Variations

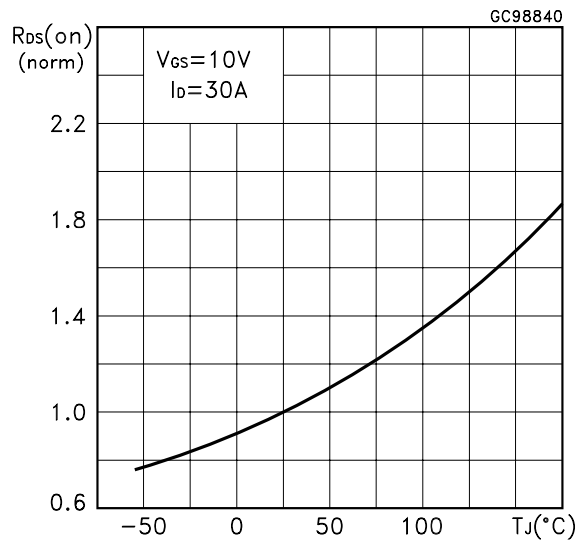


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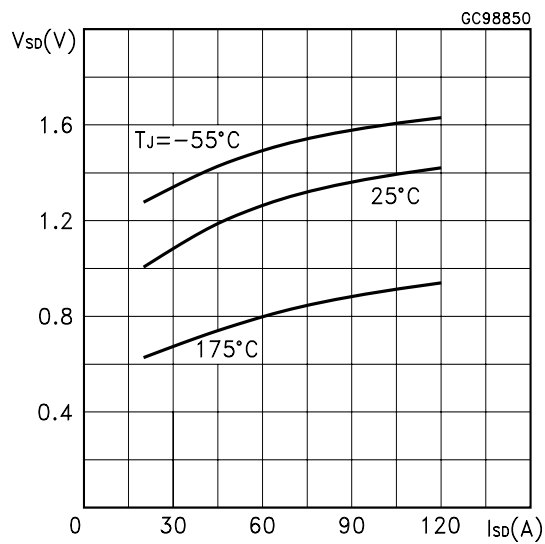
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage vs Temperature

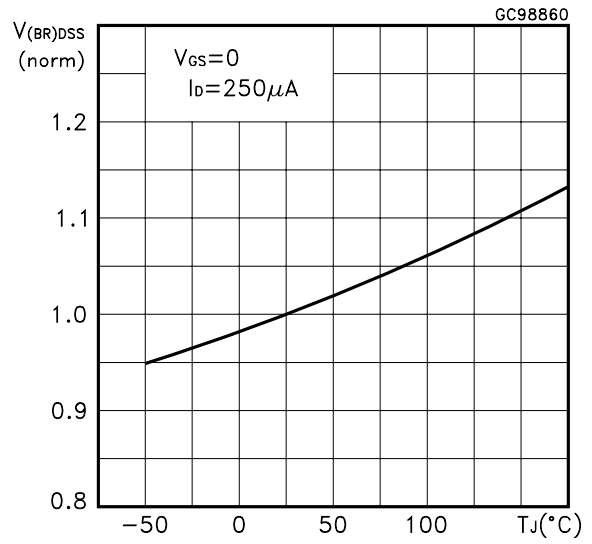


Fig. 1: Unclamped Inductive Load Test Circuit



Fig. 2: Unclamped Inductive Waveform



Fig. 3: Switching Times Test Circuits For Resistive Load



Fig. 4: Gate Charge test Circuit

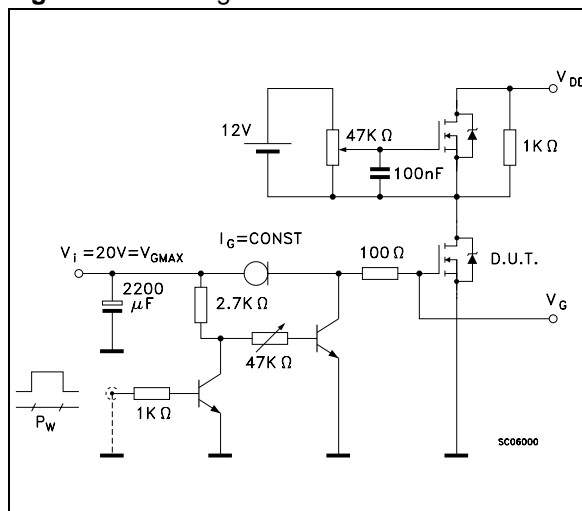
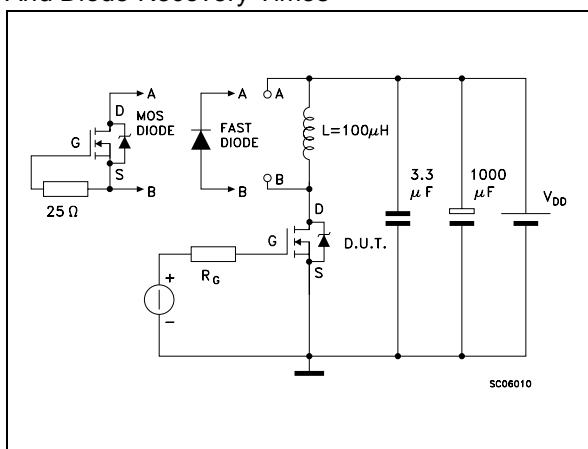
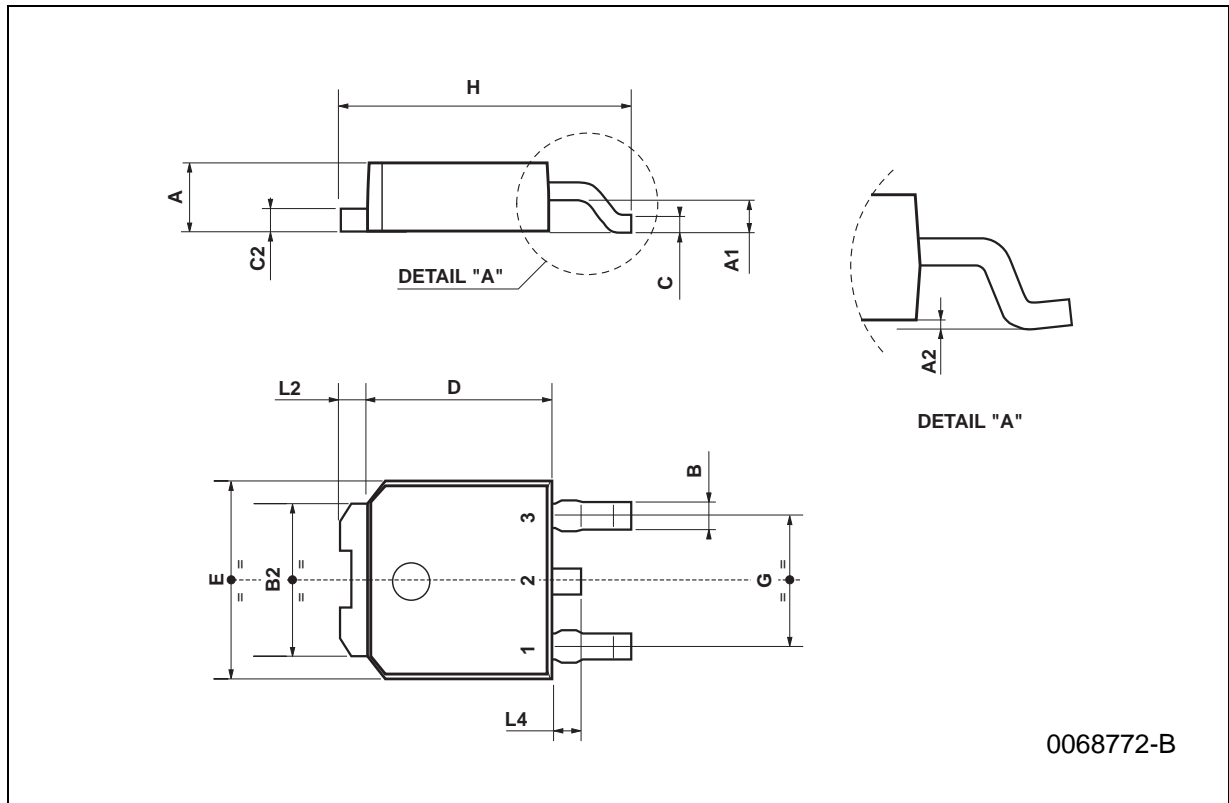


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times

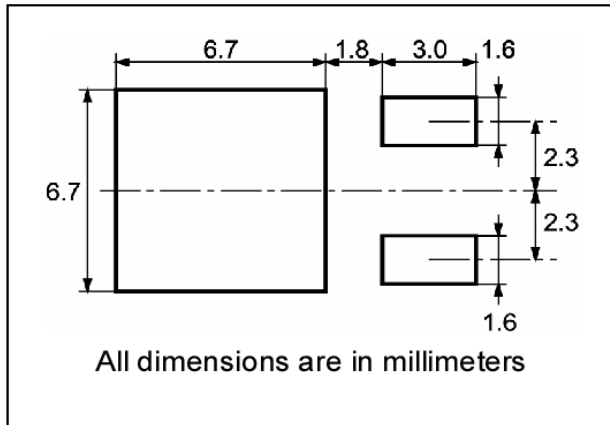


TO-252 (DPAK) MECHANICAL DATA

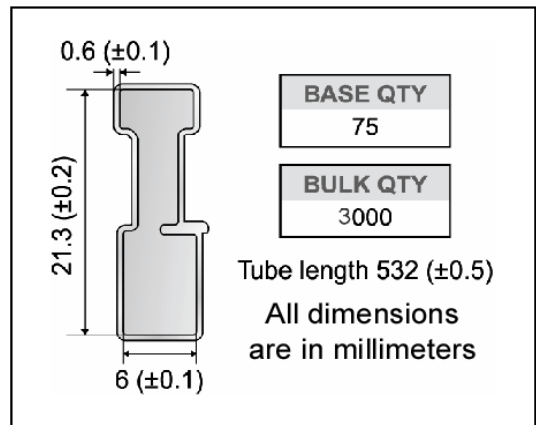
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
B2	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	9.35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



DPAK FOOTPRINT



TUBE SHIPMENT (no suffix)*



TAPE AND REEL SHIPMENT (suffix "T4")*

330		12.992
	0.059	
13.2	0.504	0.520
	0.795	
18.4	0.645	0.724
	1.968	
22.4		0.881

Y	BULK QTY
	1000

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A0	6.8	7	0.267	0.275
B0	10.4	10.6	0.409	0.417
B1		12.1		0.476
D	1.5	1.6	0.059	0.063
D1	1.5		0.059	
E	1.65	1.85	0.065	0.073
F	7.4	7.6	0.291	0.299
K0	2.55	2.75	0.100	0.108
P0	3.9	4.1	0.153	0.161

REEL MECHANICAL DATA	
A	
B	1.5
C	12.8
D	20.2
G	16.4
N	50
T	
BASE QT	
	1000

40 mm min. Access hole

Full radius

Tape slot in core for tape start 2.5mm min. width

G measured at hub

TOP COVER TAPE

For machine ref. only including draft and radii concentric around B0

User Direction of F

TRL

Center line of cavity

10 pitches cumulative tolerance on tape +/- 0.2 mm