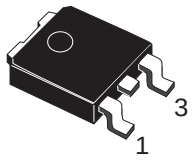
STD25NF10L

N-CHANNEL 100V - 0.030 Ω - 25A DPAK
LOW GATE CHARGE STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STD25NF10L	100 V	< 0.035 Ω	25 A

- TYPICAL $R_{DS}(on)$ = 0.030 Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- LOW THRESHOLD DEVICE
- LOGIC LEVEL DEVICE
- SURFACE-MOUNTING DPAK (TO-252) POWER PACKAGE IN TAPE & REEL (SUFFIX “T4")



DPAK
TO-252
(Suffix “T4”)

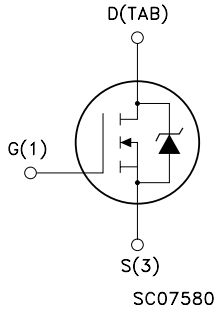
DESCRIPTION

This MOSFET series realized with STMicroelectronics unique STripFET process has specifically been designed to minimize input capacitance and gate charge. It is therefore suitable as primary switch in advanced high-efficiency, high-frequency isolated DC-DC converters for Telecom and Computer applications. It is also intended for any applications with low gate drive requirements

APPLICATIONS

- HIGH-EFFICIENCY DC-DC CONVERTERS
- UPS AND MOTOR CONTROL

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	100	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	100	V
V_{GS}	Gate- source Voltage	± 16	V
I_D(*)	Drain Current (continuous) at T_C = 25°C	25	A
I_D	Drain Current (continuous) at T_C = 100°C	25	A
I_{DM}(•)	Drain Current (pulsed)	100	A
P_{tot}	Total Dissipation at T_C = 25°C	100	W
	Derating Factor	0.67	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	20	V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	450	mJ
T_{stg}	Storage Temperature	-55 to 175	°C
T_j	Max. Operating Junction Temperature		

(•) Pulse width limited by safe operating area.
(*) Current Limited by Package

(1) I_{SD} ≤25A, di/dt ≤300A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_j ≤ T_{JMAX}
(2) Starting T_j = 25 ºC, I_D = 12.5A, V_{DD} = 50V

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case	Max	1.5	°C/W
Rthj-pcb	Thermal Resistance Junction-pcb(#)	Max	50	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose		275	°C

(#) When Mounted on 1 inch^2 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	100			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0) 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 (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} I_D = 250 µA	1		2.5	V
$R_{DS(on)}$	Static Drain-source On Resistance Static Drain-source On Resistance	V_{GS} = 10 V I_D = 12.5 A V_{GS} = 4.5 V I_D = 12.5 A		0.030 0.035	0.035 0.040	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} = 15 V I_D = 12.5 A		24		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V f = 1 MHz V_{GS} = 0		1710 250 110		pF pF pF

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} = 50 V I_D = 12.5 A R_G = 4.7 Ω V_{GS} = 5 V (Resistive Load, Figure 3)		20 40		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 80 V I_D= 25 A V_{GS}= 5 V		38 8.5 21	52	nC nC nC

SWITCHING OFF

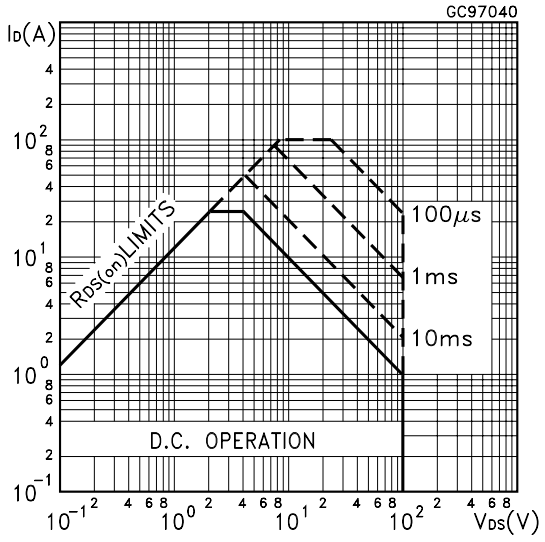
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 50 V I_D = 12.5 A R_G = 4.7Ω, V_{GS} = 5 V (Resistive Load, Figure 3)		58 20		ns ns

SOURCE DRAIN DIODE

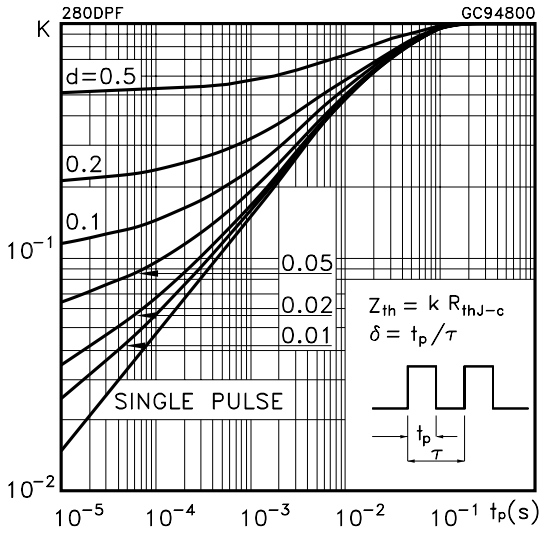
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				25 100	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 25 A V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 25 A di/dt = 100A/µs V_{DD} = 50 V T_j = 150°C (see test circuit, Figure 5)		88 317 7.2		ns nC A

(*)Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
(•)Pulse width limited by safe operating area.

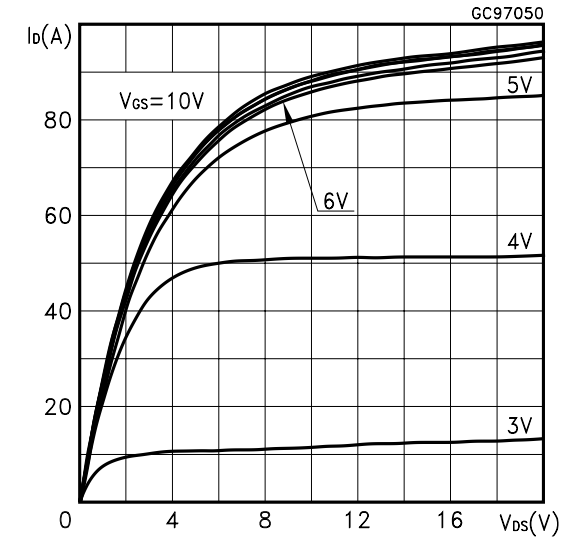
Safe Operating Area



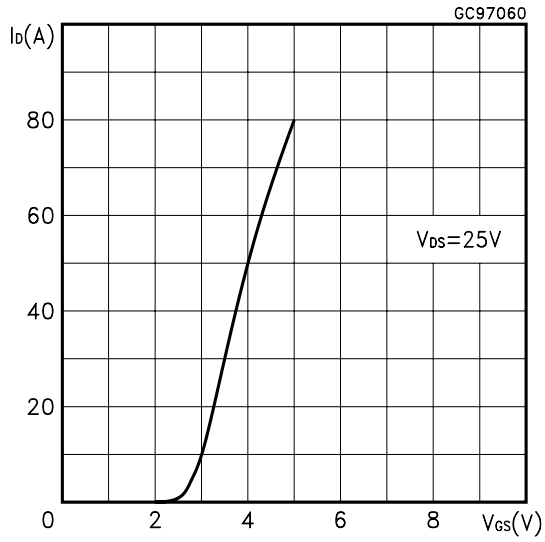
Thermal Impedance



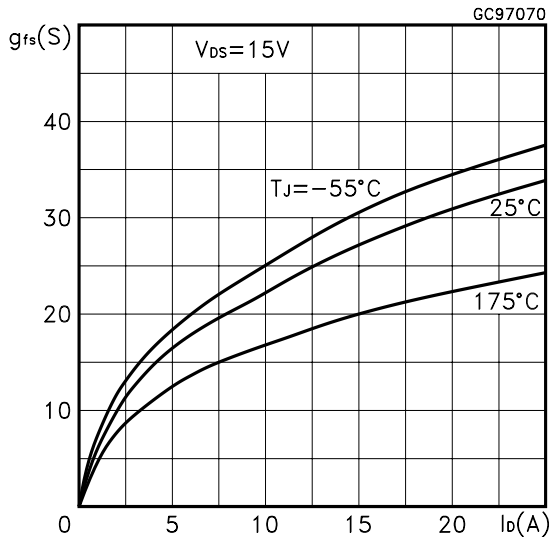
Output Characteristics



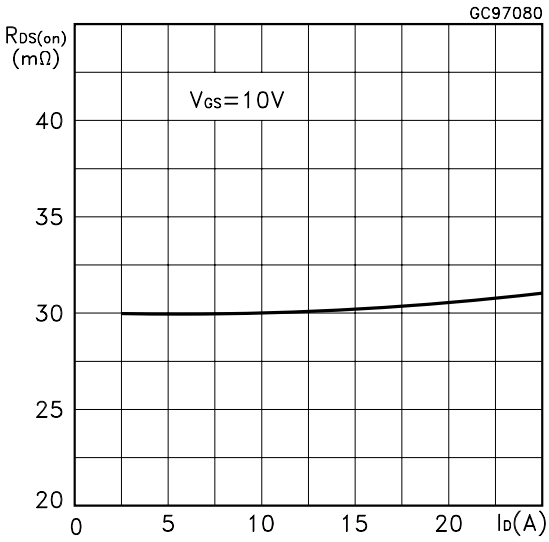
Transfer Characteristics



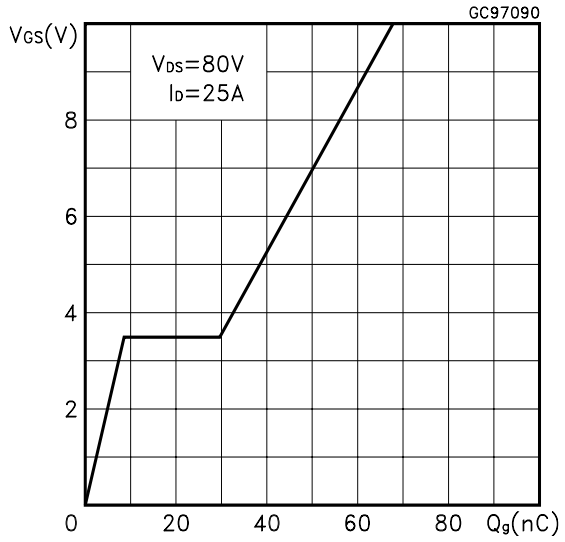
Transconductance



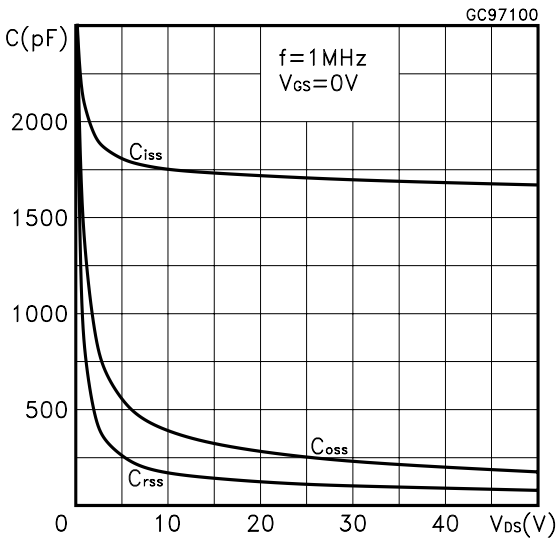
Static Drain-source On Resistance



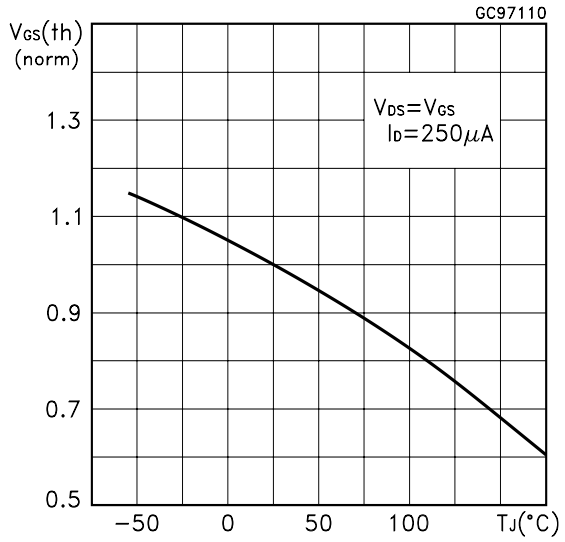
Gate Charge vs Gate-source Voltage



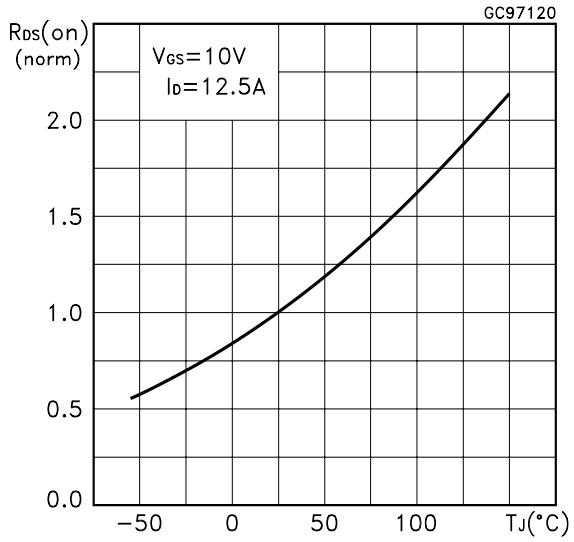
Capacitance Variations



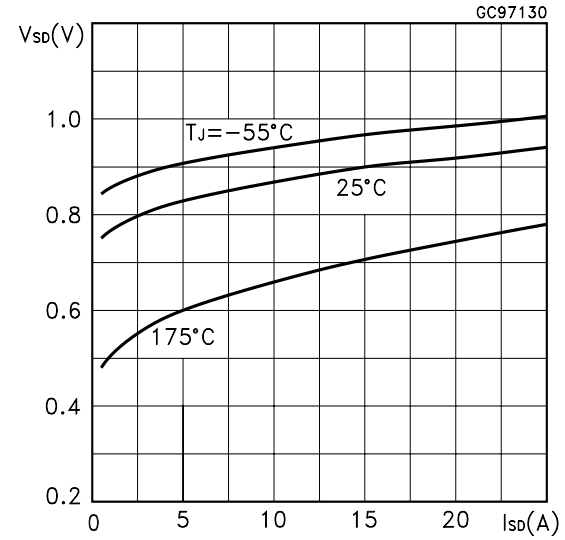
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage vs Temperature

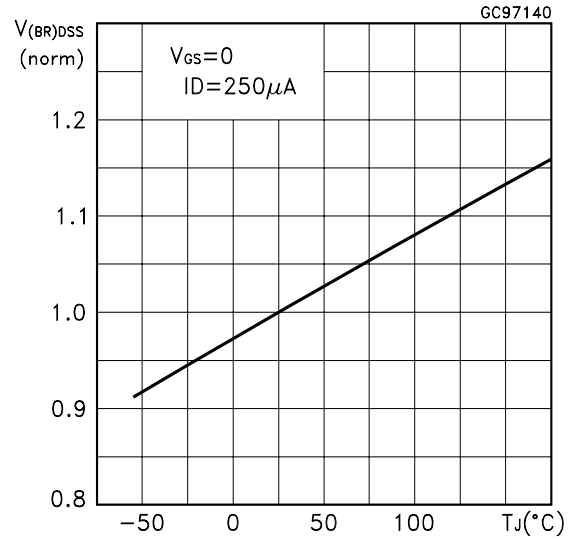


Fig. 1: Unclamped Inductive Load Test Circuit

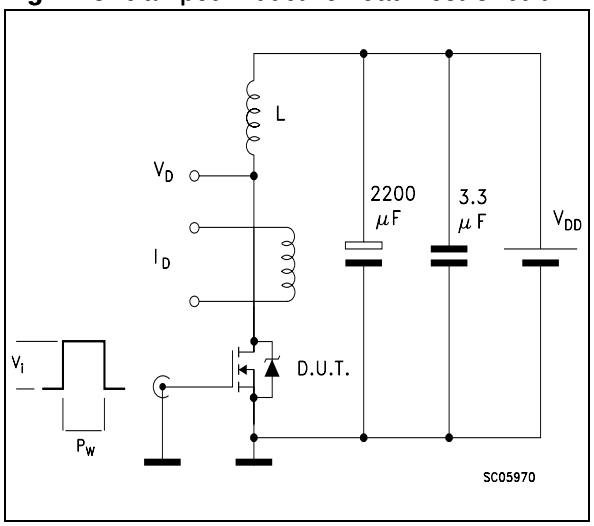


Fig. 2: Unclamped Inductive Waveform

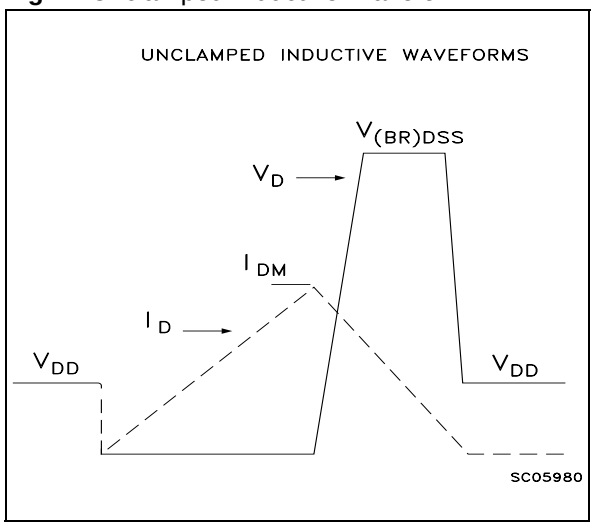


Fig. 3: Switching Times Test Circuits For Resistive Load

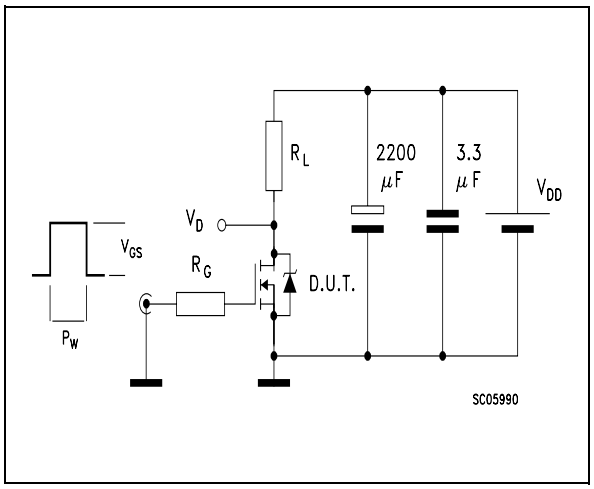


Fig. 4: Gate Charge test Circuit

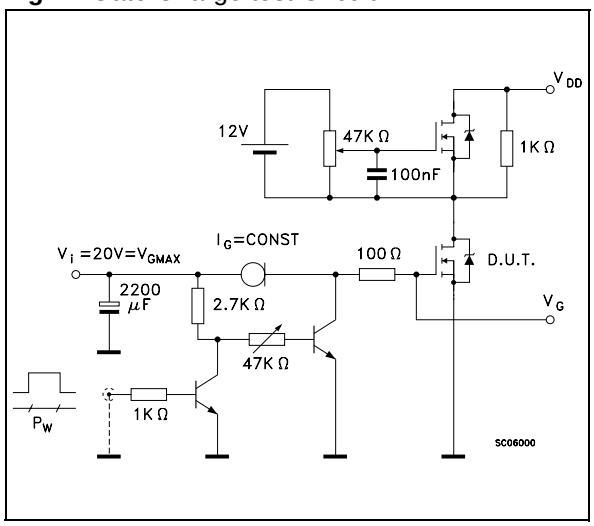
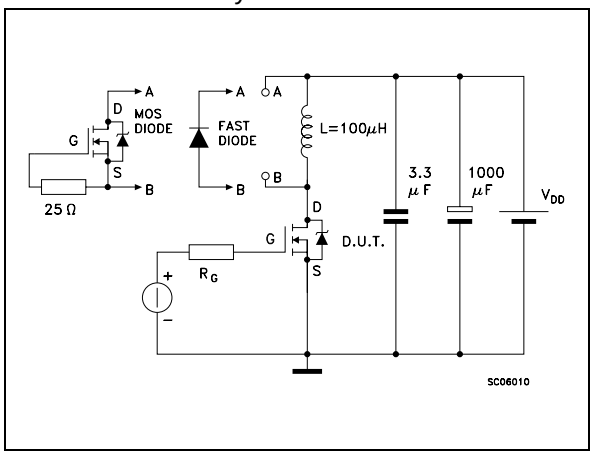
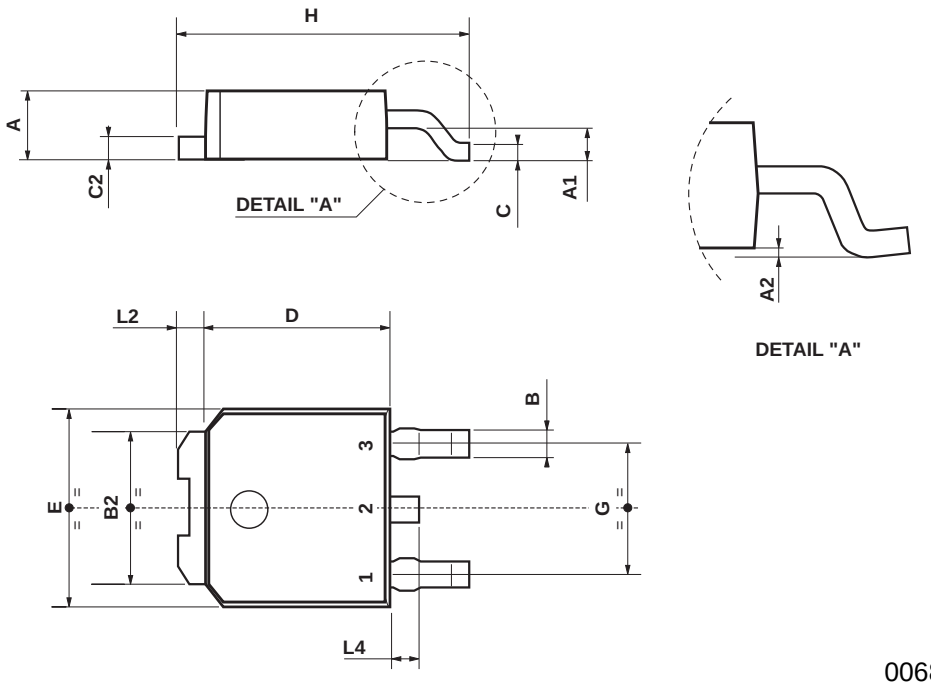


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



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



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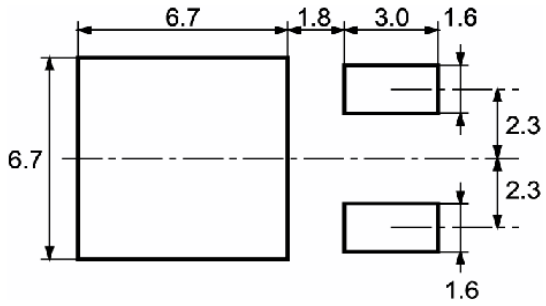
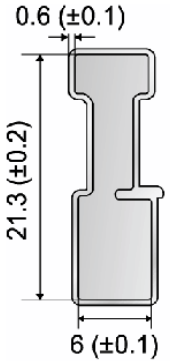
DPAK FOOTPRINT



All dimensions are in millimeters

TUBE SHIPMENT (no suffix)*



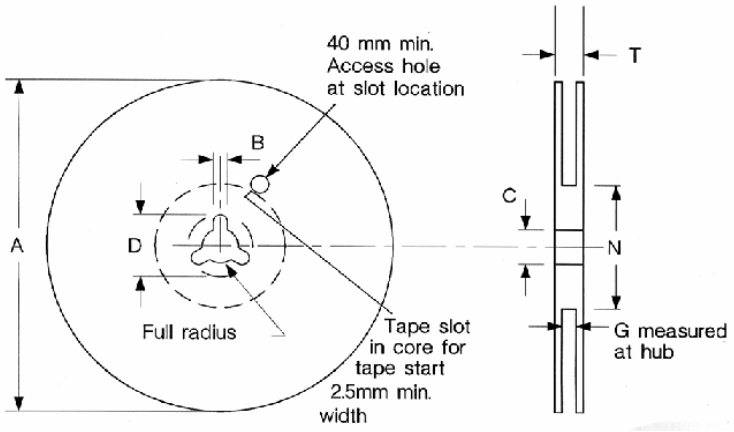
BASE QTY
75

BULK QTY
3000

Tube length 532 (±0.5)

All dimensions are in millimeters

TAPE AND REEL SHIPMENT (suffix "T4")*



REEL MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0.795	
G	16.4	18.4	0.645	0.724
N	50		1.968	
T		22.4		0.881

BASE QTY	BULK QTY
1000	1000

TAPE MECHANICAL DATA

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
P1	7.9	8.1	0.311	0.319
P2	1.9	2.1	0.075	0.082
R	40		1.574	
W	15.7	16.3	0.618	0.641