



STB100NF03L-03

N-CHANNEL 30V - 0.0026Ω - 100A D²PAK

STripFET™ POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STB100NF03L-03	30 V	<0.0032 Ω	100 A

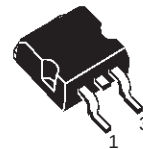
- TYPICAL R_{DS(on)} = 0.0026 Ω
- LOW THRESHOLD DRIVE
- 100% AVALANCE TESTED
- LOGIC LEVEL DEVICE

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, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

APPLICATIONS

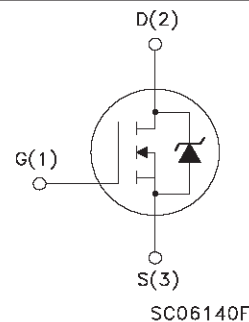
- HIGH CURRENT, HIGH SPEED SWITCHING
- MOTOR CONTROL, AUDIO AMPLIFIERS
- DC-DC & DC-AC CONVERTERS
- SOLENOID AND RELAY DRIVERS



**D²PAK
TO-263
(suffix "T4")**

ADD SUFFIX "T4" FOR ORDERING IN TAPE & REEL

INTERNAL SCHEMATIC DIAGRAM



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	±20	V
I _D	Drain Current (continuous) at T _C = 25°C	100	A
I _D	Drain Current (continuous) at T _C = 100°C	63	A
I _{DM} (●)	Drain Current (pulsed)	400	A
P _{tot}	Total Dissipation at T _C = 25°C	210	W
	Derating Factor	1.43	W/°C
E _{AS} (1)	Single Pulse Avalanche Energy	1.4	J
T _{stg}	Storage Temperature	-60 to 175	°C
T _j	Max. Operating Junction Temperature	175	°C

(●)Pulse width limited by safe operating area.

(1) Starting T_j = 25 °C, I_{AR} = 50 A , V_{DD} = 50 V

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THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.7	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^{\circ}C/W$
T_j	Maximum Lead Temperature For Soldering Purpose		300	$^{\circ}C$

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 ($V_{DS} = 0$)	$V_{GS} = \pm 15 V$			± 100	nA

ON ¹⁾

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250 \mu A$	1			V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10 V$ $I_D = 50 A$ $V_{GS} = 4.5 V$ $I_D = 50 A$		0.0026 0.0032	0.0032 0.0045	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs}^{1)}$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 10 A$	10			S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitances	$V_{DS} = 25 V$ $f = 1 MHz$ $V_{GS} = 0$		6200 1720 300		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	$V_{DD} = 15\text{ V}$ $I_D = 50\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (see test circuit, Figure 3)		35 315		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD}=24\text{V}$ $I_D=100\text{A}$ $V_{GS}=5\text{V}$		88 22.5 36		nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	$V_{DD} = 20\text{ V}$ $I_D = 50\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Resistive Load, see fig.3)		115 95		ns ns
$t_{d(off)}$ t_f t_c	Off-voltage Rise Time Fall Time Cross-over Time	$V_{clamp} = 24\text{ V}$ $I_D = 100\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$ (Inductive Load, see fig.5)		110 55 100		ns ns ns

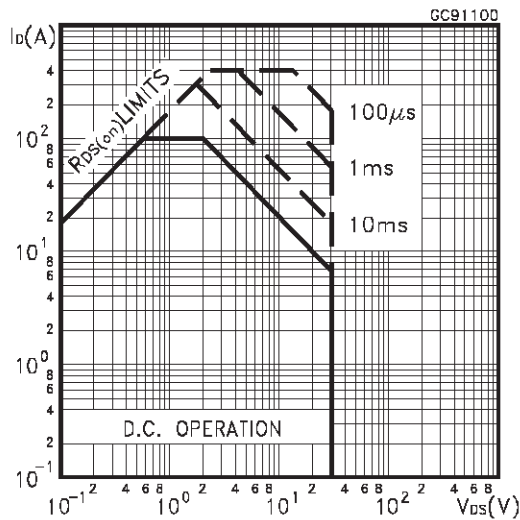
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM}(\bullet)$	Source-drain Current Source-drain Current (pulsed)				100 400	A A
V_{SD}^*	Forward On Voltage	$I_{SD} = 100\text{ A}$ $V_{GS} = 0$			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 100\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 20\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ (see test circuit, Figure 5)		75 150 4		ns nC A

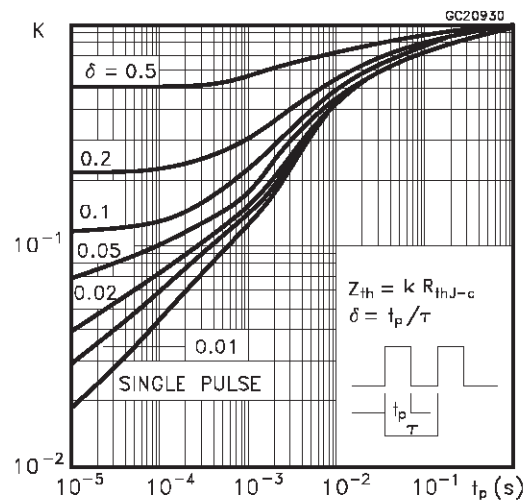
(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

($\bullet$) Pulse width limited by safe operating area.

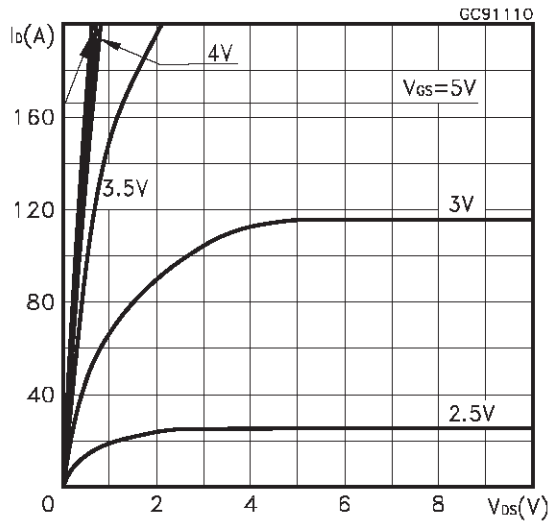
Safe Operating Area



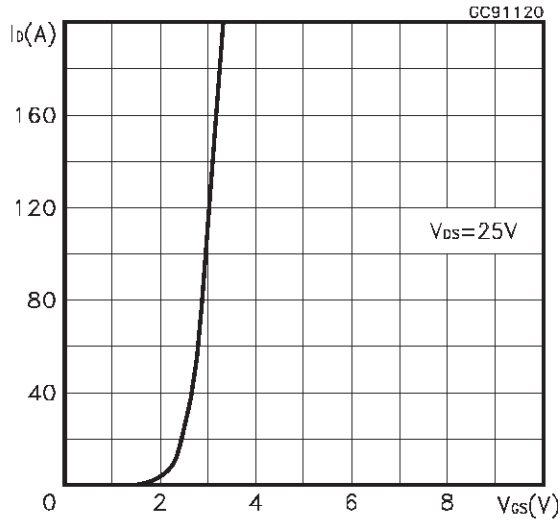
Thermal Impedance



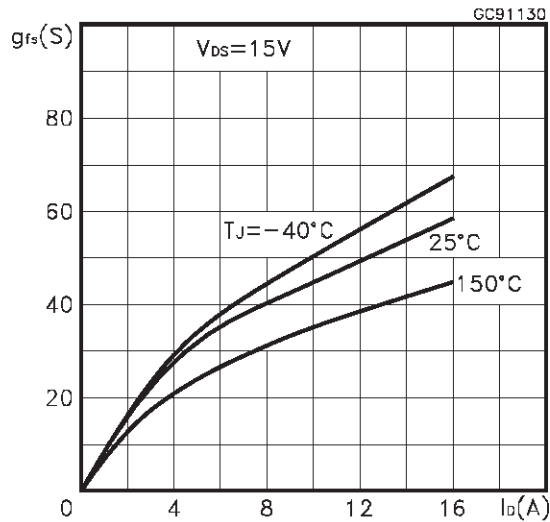
Output Characteristics



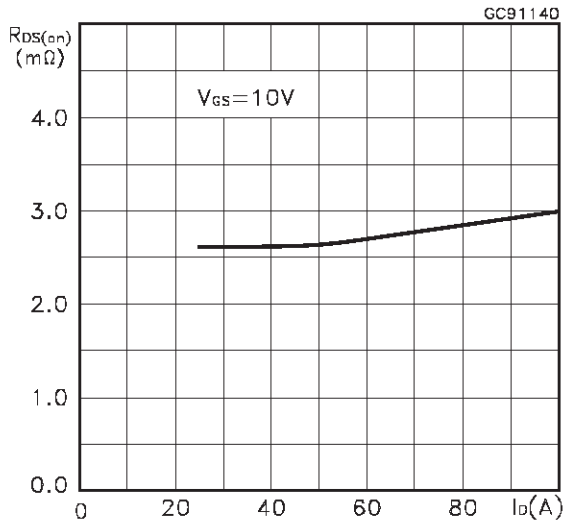
Transfer Characteristics



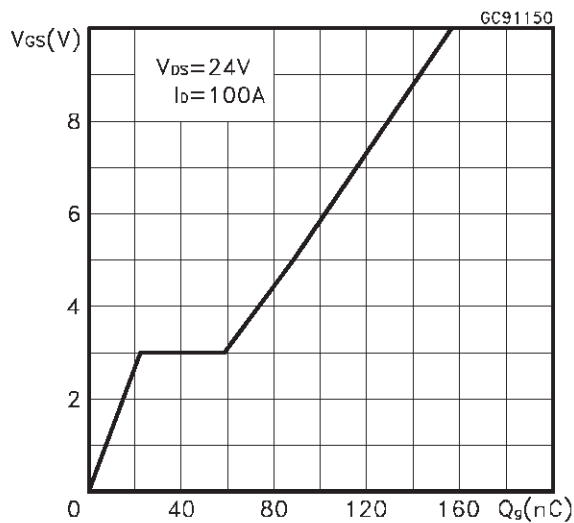
Transconductance



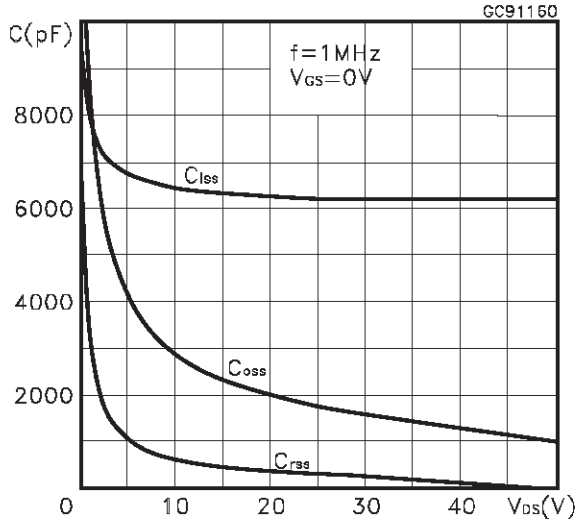
Static Drain-source On Resistance



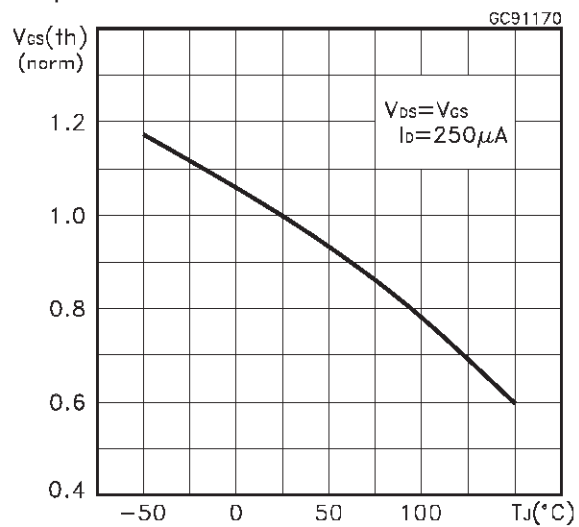
Gate Charge vs Gate-source Voltage



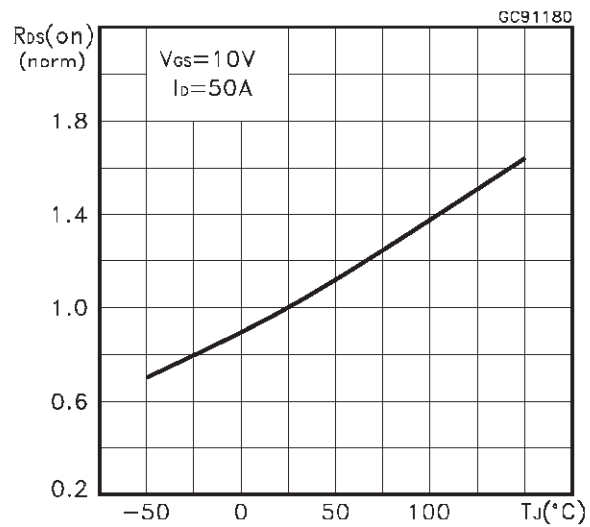
Capacitance Variations



Normalized Gate Threshold Voltage vs Temperature



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

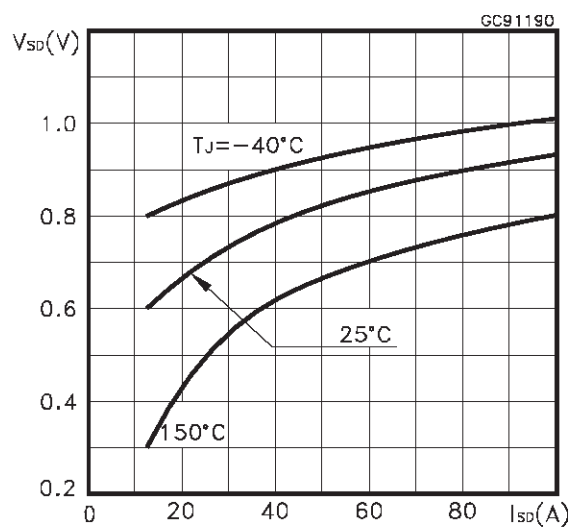


Fig. 1: Unclamped Inductive Load Test Circuit

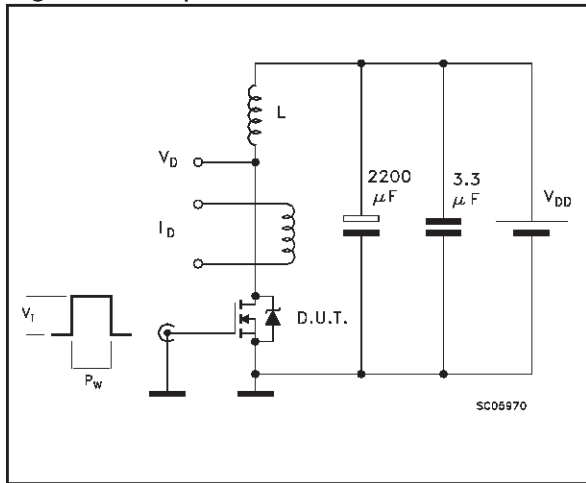


Fig. 2: Unclamped Inductive Waveform

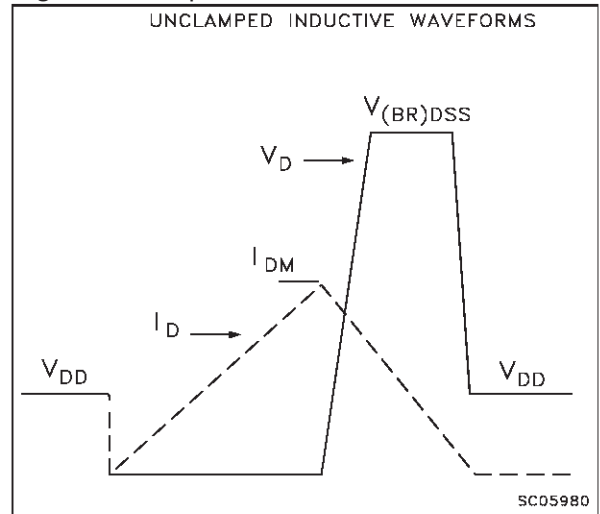


Fig. 3: Switching Times Test Circuits For Resistive Load

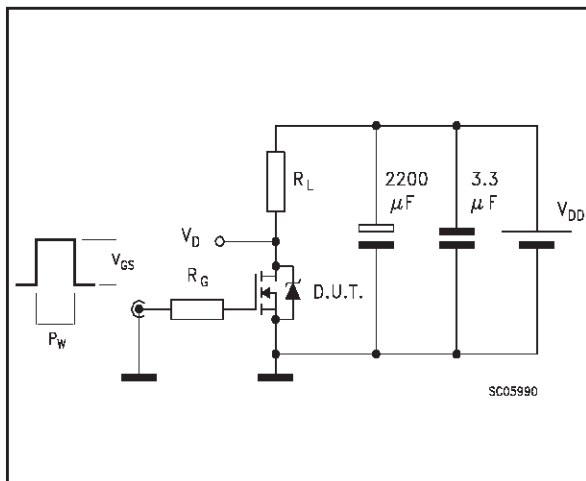


Fig. 4: Gate Charge test Circuit

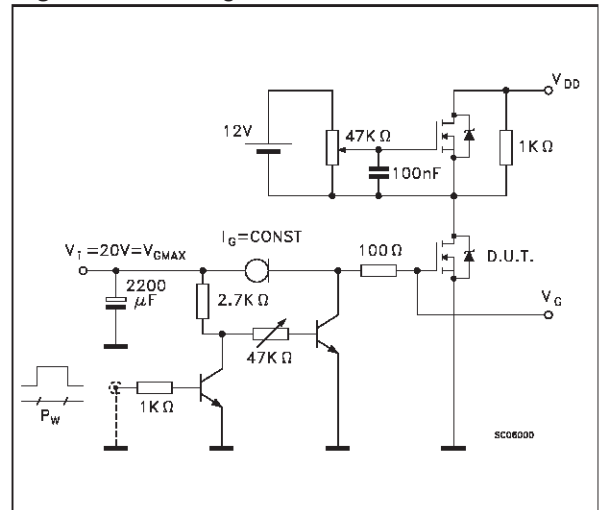
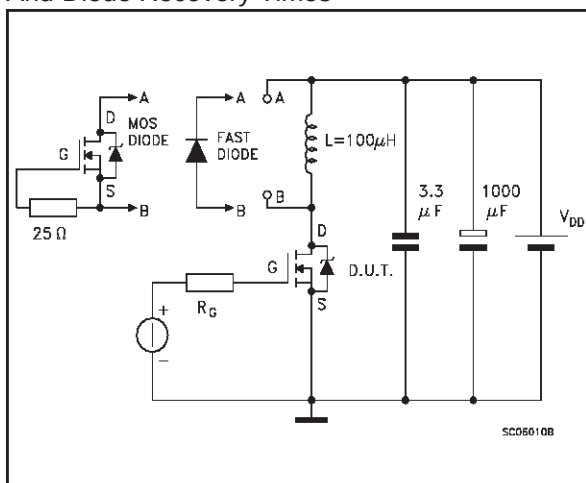
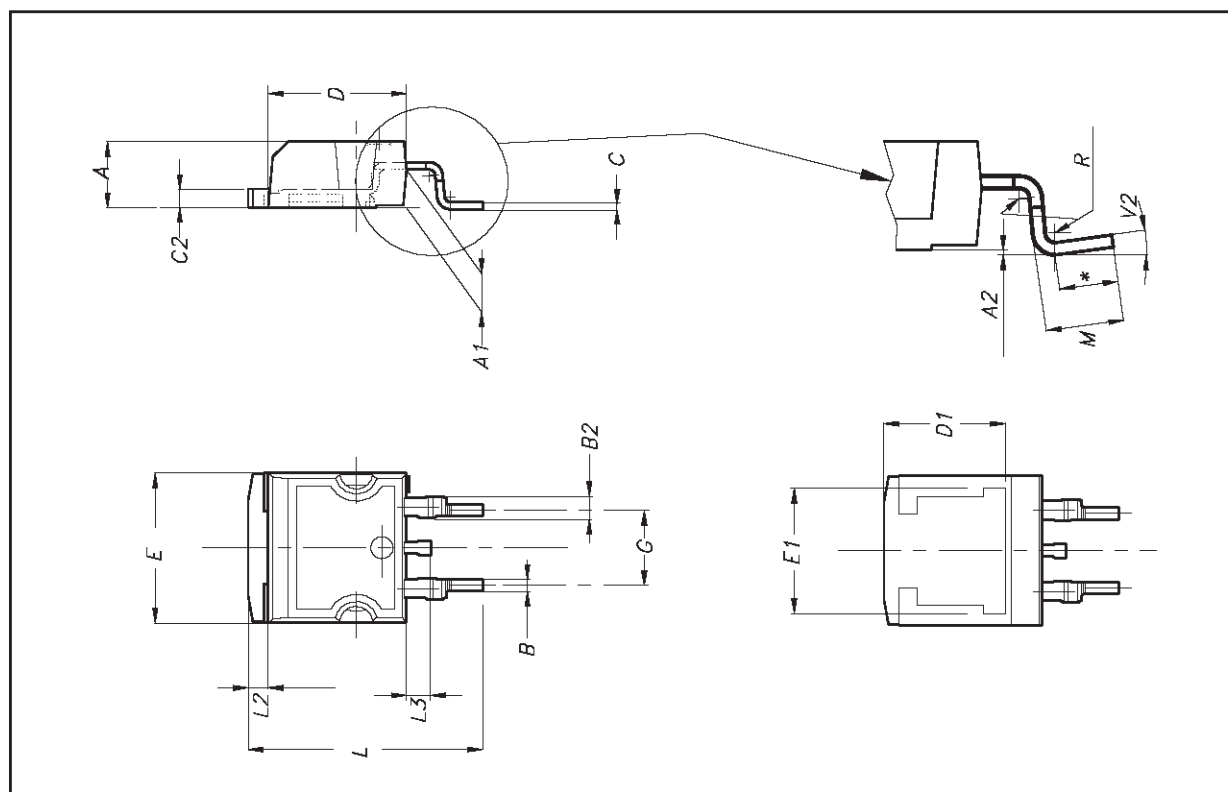


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times

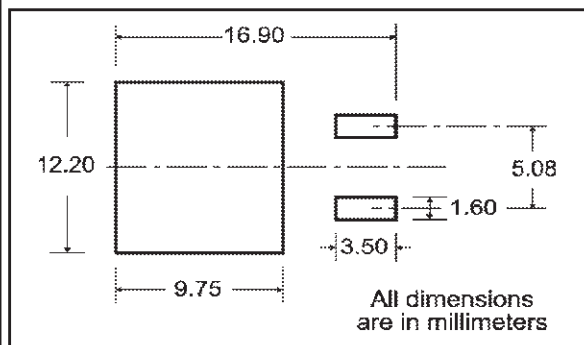


D-PAK MECHANICAL DATA

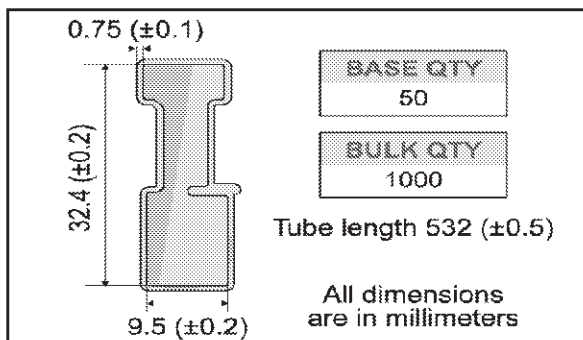
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	0.45		0.6	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.393		
E1		8.5			0.334	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.590		0.625
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.068
M	2.4		3.2	0.094		0.126
R		0.4			0.015	
V2	0°		8°			



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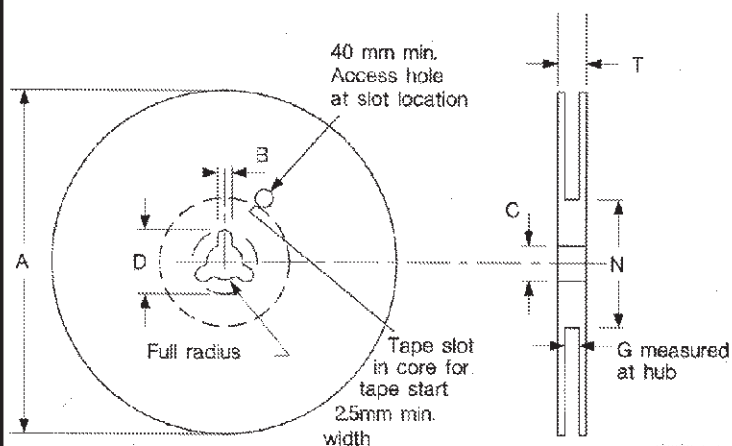


78 % (6 + , 30 (17 QR VXII



7\$ 3(\$1' 5((/ 6+,30 (17 VXIII .7 .

REEL MECHANICAL DATA

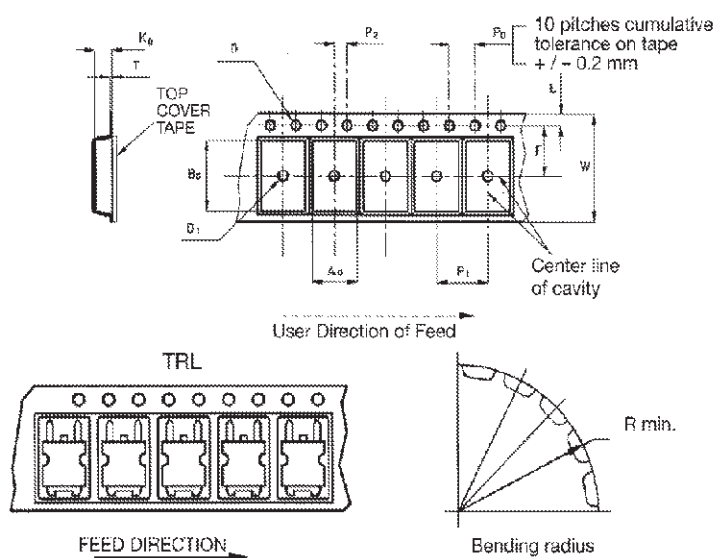


№, 0	P P		IQFK	
	0,1	0 \$;	0,1	0 \$;
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0.795	
G	24.4	26.4	0.960	1.039
N	100		3.937	
T		30.4		1.197

%\$6(4 7<	%8/ . 4 7<
1000	1000

TAPE MECHANICAL DATA

',0	P P		IQFK	
	0,1	0 \$;	0,1	0 \$;
A0	10.5	10.7	0.413	0.421
B0	15.7	15.9	0.618	0.626
D	1.5	1.6	0.059	0.063
D1	1.59	1.61	0.062	0.063
E	1.65	1.85	0.065	0.073
F	11.4	11.6	0.449	0.456
K0	4.8	5.0	0.189	0.197
P0	3.9	4.1	0.153	0.161
P1	11.9	12.1	0.468	0.476
P2	1.9	2.1	0.075	0.082
R	50		1.574	
T	0.25	0.35	0.0098	0.0137
W	23.7	24.3	0.933	0.956



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