



STD3NB30

N-CHANNEL 300V - 1.8Ω - 3.2A DPAK

PowerMesh™ MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STD3NB30	300 V	< 2Ω	3.2 A

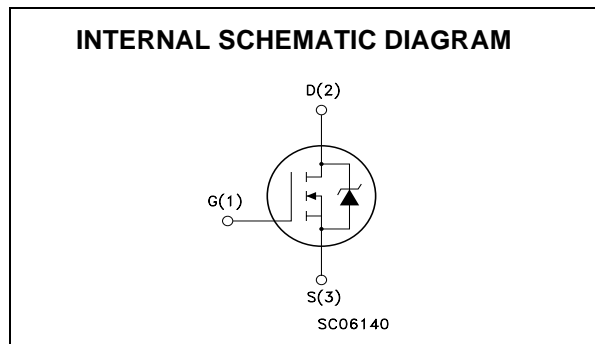
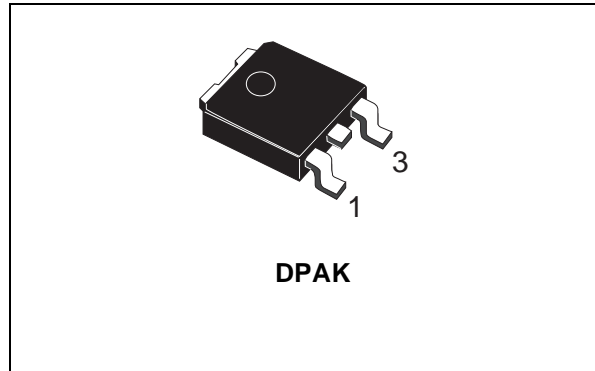
- TYPICAL R_{DS(on)} = 1.8Ω
- EXTREMELY HIGH dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- VERY LOW INTRINSIC CAPACITANCES
- GATE CHARGE MINIMIZED
- ADD SUFFIX "T4" FOR ORDERING IN TAPE & REEL

DESCRIPTION

Using the latest high voltage MESH OVERLAY™ process, STMicroelectronics has designed an advanced family of power MOSFETs with outstanding performances. The new patent pending strip layout coupled with the Company's proprietary edge termination structure, gives the lowest R_{DS(on)} per area, exceptional avalanche and dv/dt capabilities and unrivalled gate charge and switching characteristics.

APPLICATIONS

- SWITCH MODE POWER SUPPLIES (SMPS)
- DC-AC CONVERTERS FOR WELDING EQUIPMENT AND UNINTERRUPTIBLE POWER SUPPLIES AND MOTOR DRIVERS



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	300	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	300	V
V _{GS}	Gate- source Voltage	±30	V
I _D	Drain Current (continuous) at T _C = 25°C	3.2	A
I _D	Drain Current (continuous) at T _C = 100°C	2	A
I _{DM} (●)	Drain Current (pulsed)	12.8	A
P _{TOT}	Total Dissipation at T _C = 25°C	45	W
	Derating Factor	0.36	W/°C
dv/dt(1)	Peak Diode Recovery voltage slope	4	V/ns
T _{stg}	Storage Temperature	-65 to 150	°C
T _j	Max. Operating Junction Temperature	150	°C

(●)Pulse width limited by safe operating area

(1)I_{SD} ≤ 3.2A, di/dt ≤ 100A/μs, V_{DD} ≤ V_{(BR)DSS}, T_j ≤ T_{JMAX}.

STD3NB30

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	2.77	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	100	°C/W
T _I	Maximum Lead Temperature For Soldering Purpose	275	°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I _{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max)	3.2	A
E _{AS}	Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 50 V)	190	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	300			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating, T _C = 125 °C			1 50	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ±30V			±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	2	3	4	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10V, I _D = 2.5 A		1.8	2	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (1)	Forward Transconductance	V _{DS} > I _{D(on)} × R _{DS(on)max} , I _D = 2.5 A		2.1		S
C _{iss}	Input Capacitance	V _{DS} = 25V, f = 1 MHz, V _{GS} = 0		260		pF
C _{OSS}	Output Capacitance			56		pF
C _{rss}	Reverse Transfer Capacitance			7		pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 150V, I_D = 2.5 A$ $R_G = 4.7\Omega, V_{GS} = 10V$		9		ns
t_r	Rise Time	(see test circuit, Figure 3)		9		ns
Q_g	Total Gate Charge	$V_{DD} = 240V, I_D = 5 A,$ $V_{GS} = 10V$		12	16	nC
Q_{gs}	Gate-Source Charge			7.5		nC
Q_{gd}	Gate-Drain Charge			3		nC

SWITCHING OFF

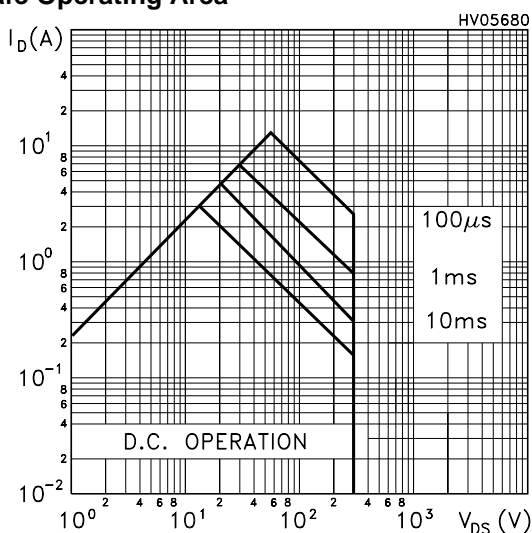
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{r(Voff)}$	Off-voltage Rise Time	$V_{DD} = 240V, I_D = 5 A,$ $R_G = 4.7\Omega, V_{GS} = 10V$		10		ns
t_f	Fall Time	(see test circuit, Figure 5)		7		ns
t_c	Cross-over Time			15		ns

SOURCE DRAIN DIODE

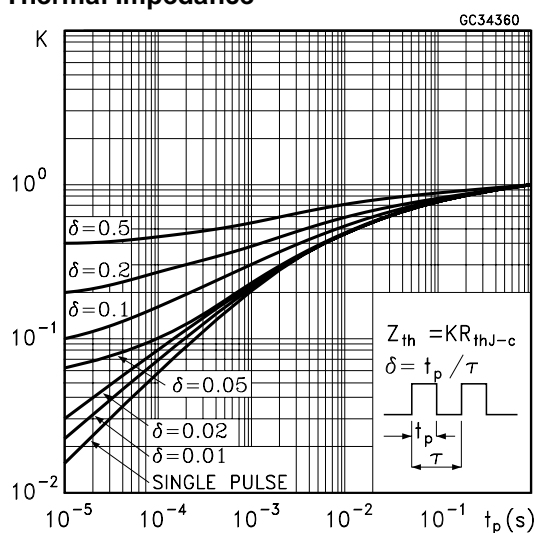
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				3.2	A
$I_{SDM} (2)$	Source-drain Current (pulsed)				12.8	A
$V_{SD} (1)$	Forward On Voltage	$I_{SD} = 3.2 A, V_{GS} = 0$			1.5	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 5 A, di/dt = 100A/\mu s,$ $V_{DD} = 100V, T_j = 150^\circ C$		180		ns
Q_{rr}	Reverse Recovery Charge	(see test circuit, Figure 5)		800		nC
I_{RRM}	Reverse Recovery Current			9		A

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

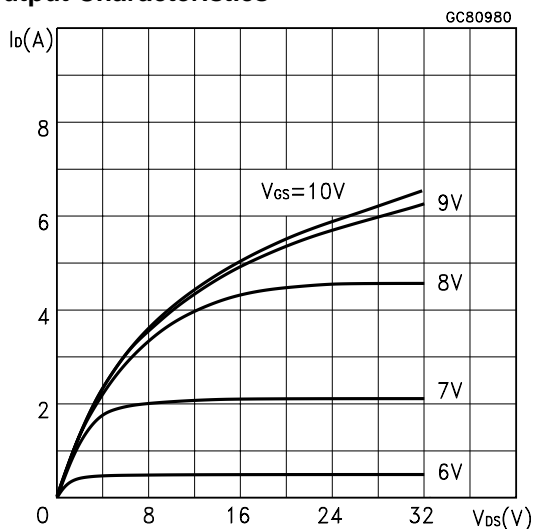
Safe Operating Area



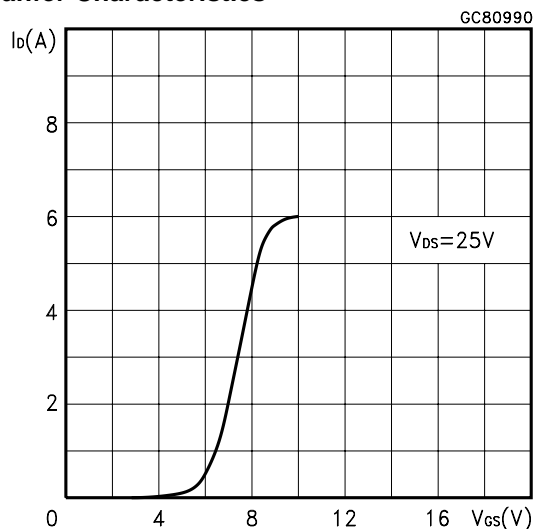
Thermal Impedance



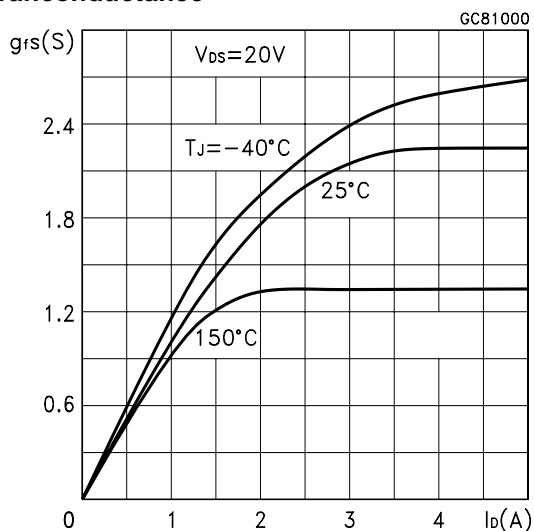
Output Characteristics



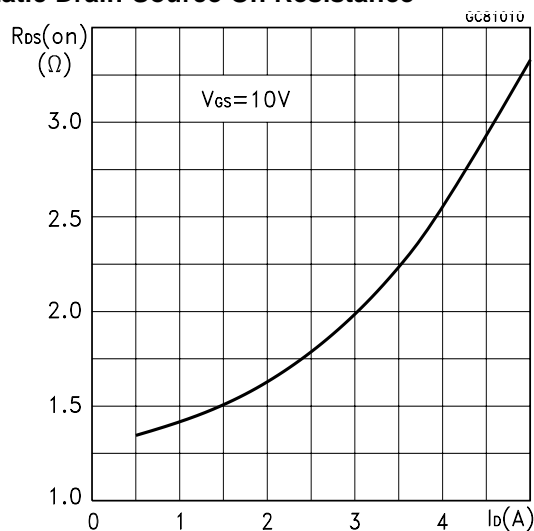
Transfer Characteristics



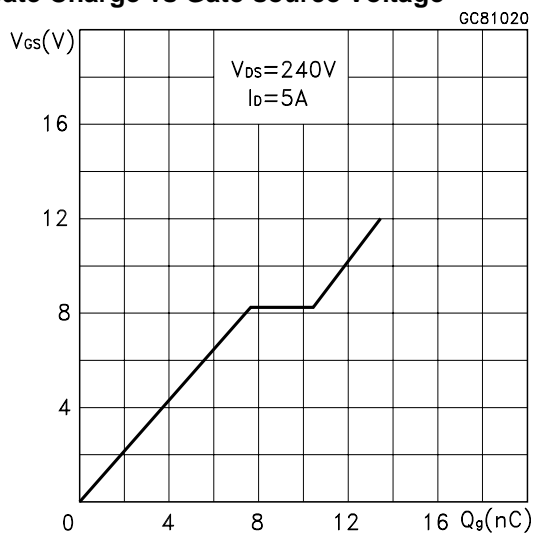
Transconductance



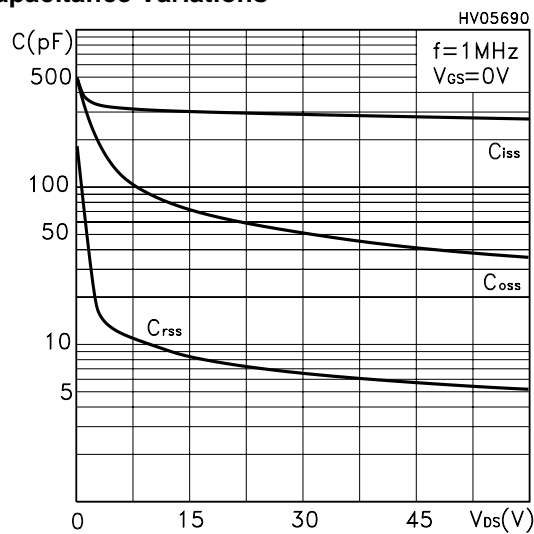
Static Drain-Source On Resistance



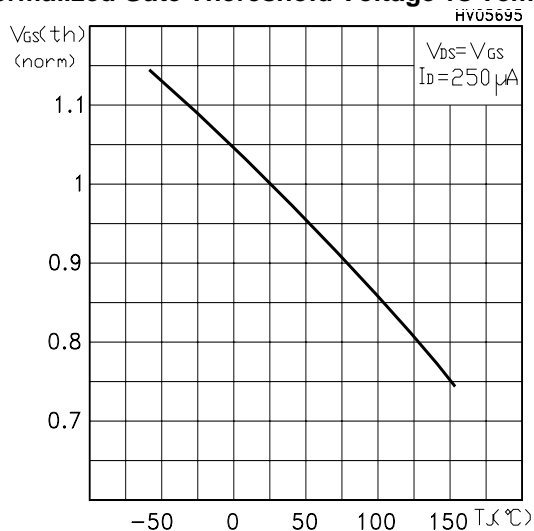
Gate Charge vs Gate-source Voltage



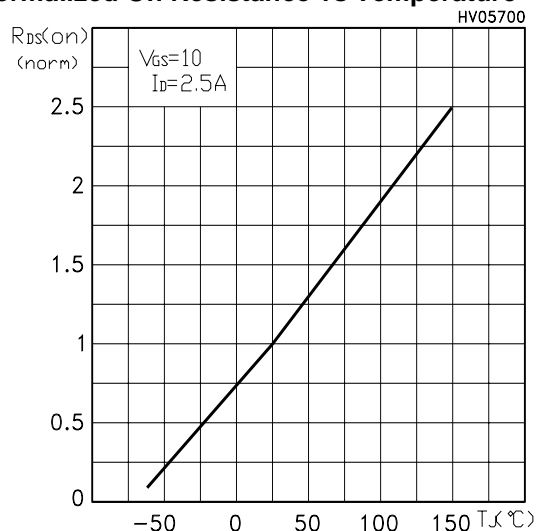
Capacitance Variations



Normalized Gate Threshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

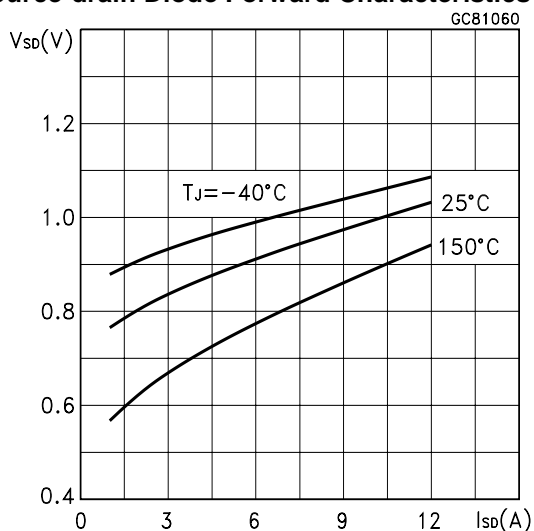


Fig. 1: Unclamped Inductive Load Test Circuit

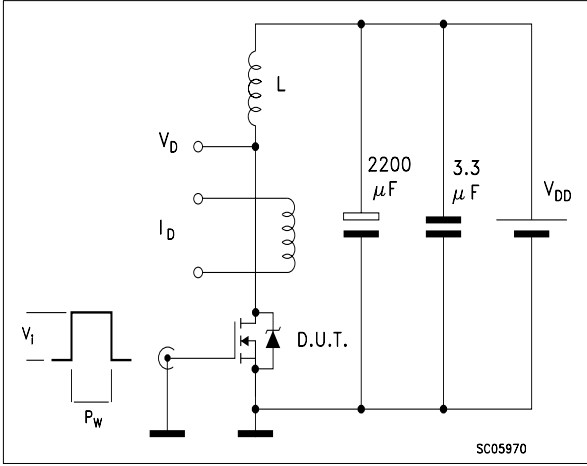


Fig. 2: Unclamped Inductive Waveform

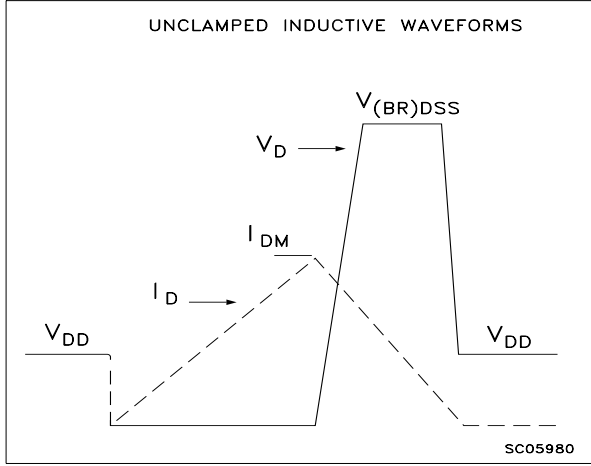


Fig. 3: Switching Times Test Circuits For Resistive Load

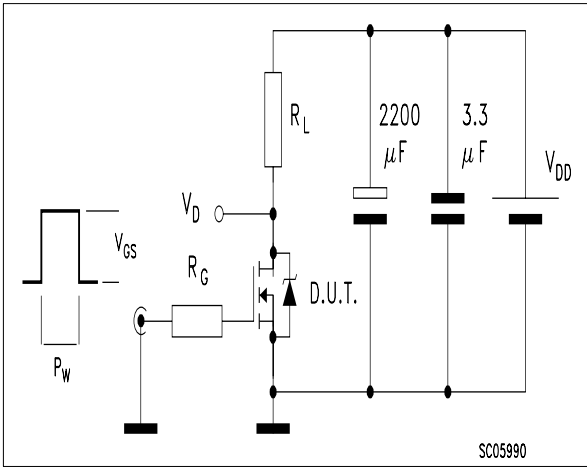


Fig. 4: Gate Charge test Circuit

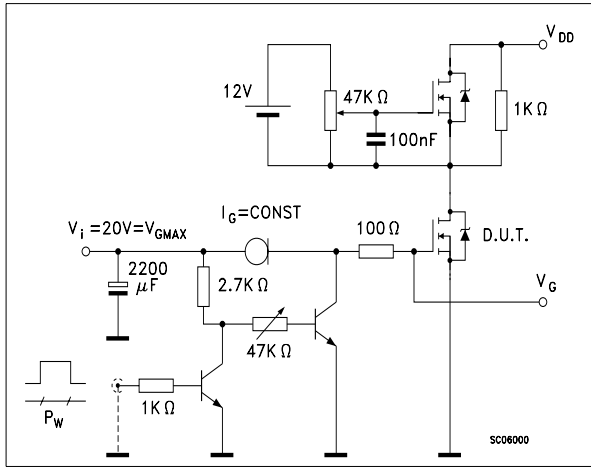
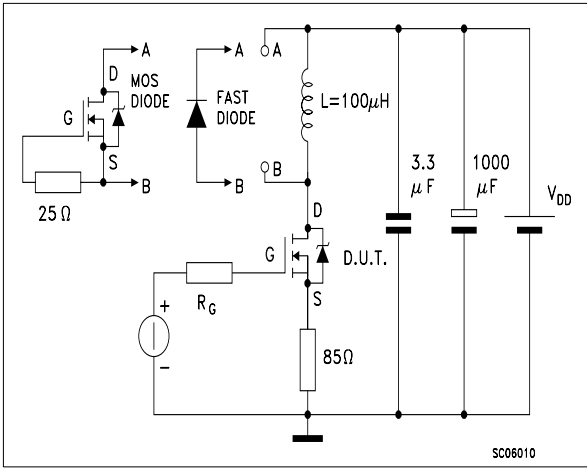
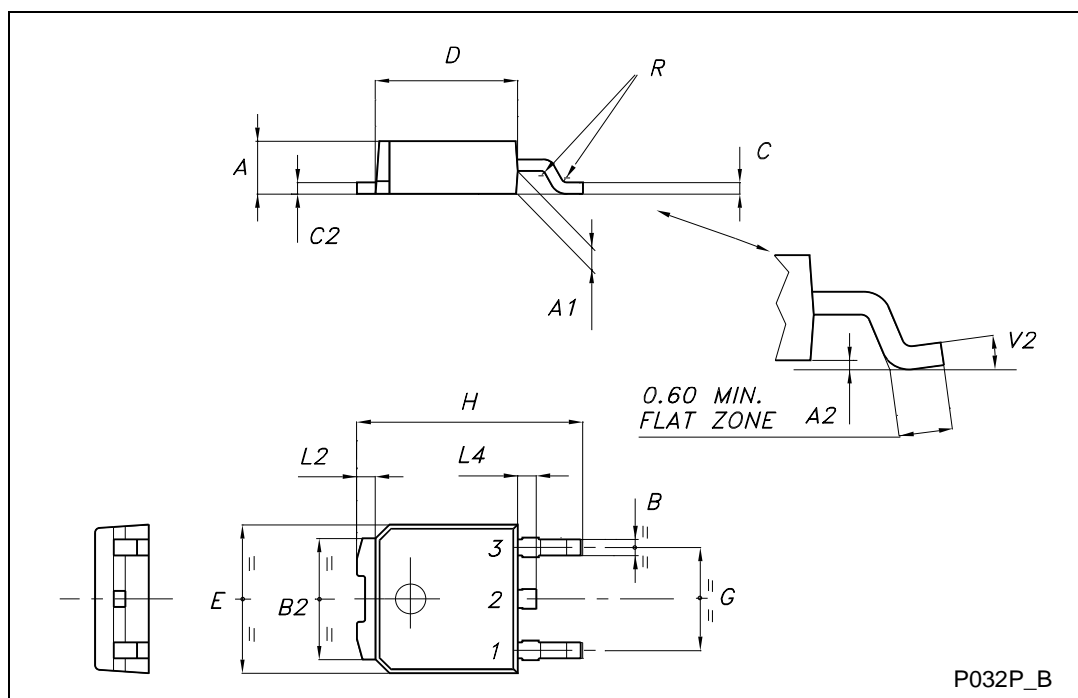


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times

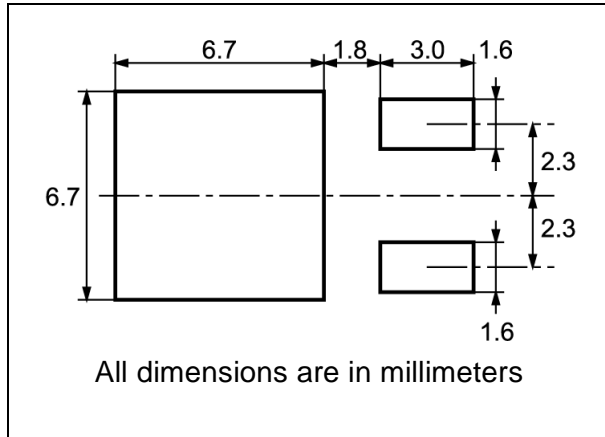


TO-252 (DPAK) MECHANICAL DATA

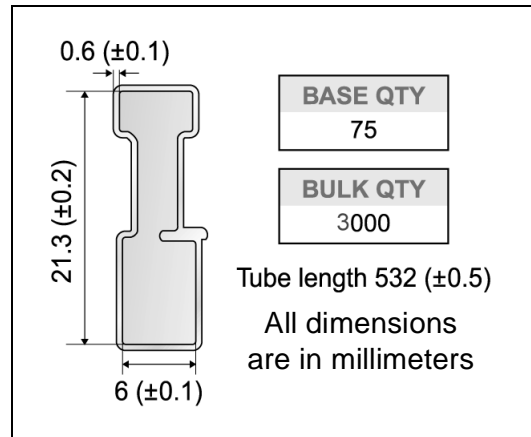
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		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°



DPAK FOOTPRINT



TUBE SHIPMENT (no suffix)*



TAPE AND REEL SHIPMENT (suffix "T4")*

40 mm min. Access hole at slot location

Full radius

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

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

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
2500	2500

TAPE MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A ₀	6.8	7	0.267	0.275
B ₀	10.4	10.6	0.409	0.417
B ₁		12.1		0.476
D	1.5	1.6	0.059	0.063
D ₁	1.5		0.059	
E	1.65	1.85	0.065	0.073
F	7.4	7.6	0.291	0.299
K ₀	2.55	2.75	0.100	0.108
P ₀	3.9	4.1	0.153	0.161
P ₁	7.9	8.1	0.311	0.319
P ₂	1.9	2.1	0.075	0.082
R	40		1.574	
W	15.7	16.3	0.618	0.641

TOP COVER TAPE

Center line of cavity

User Direction of Feed

FEED DIRECTION

Bending radius R min.

* on sales type

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