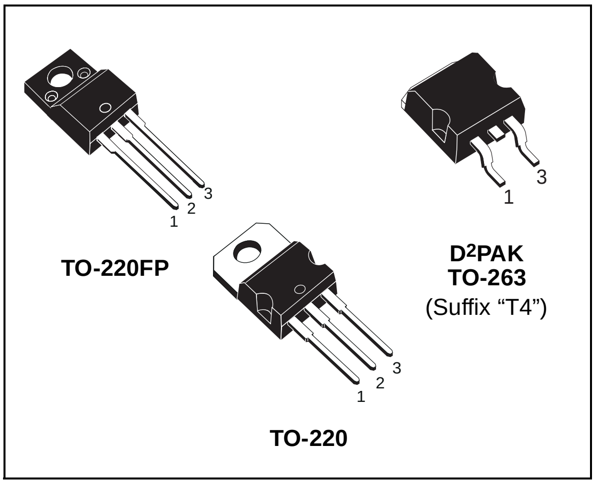
STB75NF75
STP75NF75 STP75NF75FP

N-CHANNEL 75V - 0.0095 Ω - 80A TO-220/TO-220FP/D²PAK STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STB75NF75 STP75NF75 STP75NF75FP	75 V 75 V 75 V	<0.011 Ω <0.011 Ω <0.011 Ω	80 A 80 A 80 A(*)

- TYPICAL R_{DS}(on) = 0.0095 Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- SURFACE-MOUNTING D²PAK (TO-263) POWER PACKAGE IN TAPE & REEL (SUFFIX “T4”)



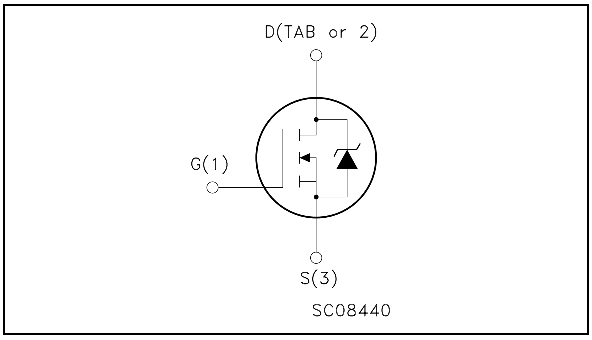
DESCRIPTION

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

- SOLENOID AND RELAY DRIVERS
- DC MOTOR CONTROL
- DC-DC CONVERTERS
- AUTOMOTIVE ENVIRONMENT

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STB75NF75 STP75NF75	STP75NF75FP	
V_{DS}	Drain-source Voltage (V_{GS} = 0)	75		V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	75		V
V_{GS}	Gate- source Voltage	± 20		V
I_D	Drain Current (continuous) at T_C = 25°C	80	80(*)	A
I_D	Drain Current (continuous) at T_C = 100°C	70	70(*)	A
I_{DM}(•)	Drain Current (pulsed)	320	320(*)	A
P_{tot}	Total Dissipation at T_C = 25°C	300	45	W
	Derating Factor	2.0	0.3	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	12		V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	700		mJ
V_{ISO}	Insulation Withstand Voltage (DC)	------	2000	V
T_{stg}	Storage Temperature	-55 to 175		°C
T_j	Operating Junction Temperature			

(•) Pulse width limited by safe operating area.
(*) Refer to SOA for the max allowable current values on FP-type due to Rth value

(1) $I_{SD} \le 80A$, di/dt ≤300A/µs, $V_{DD} \le V_{(BR)DSS}$, $T_j \le T_{JMAX}$
(2) Starting T_j = 25 °C, I_D = 40A, V_{DD}= 37.5V

THERMAL DATA

			D^2PAK TO-220	TO-220FP	
Rthj-case	Thermal Resistance Junction-case	Max	0.5	3.33	°C/W
Rthj-amb T_l	Thermal Resistance Junction-ambient Maximum Lead Temperature For Soldering Purpose (1.6 mm from case, for 10 sec.)	Max	62.5 300		°C/W °C

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	75			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} = ± 20 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	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V I_D = 40 A		0.0095	0.011	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (*)	Forward Transconductance	V_{DS} = 15 V I_D = 40 A		20		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		3700 730 240		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} = 37.5 V I_D = 45 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 3)		25 25		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD}= 60 V I_D= 80 A V_{GS}= 10V		117 27 47	160	nC nC nC

SWITCHING OFF

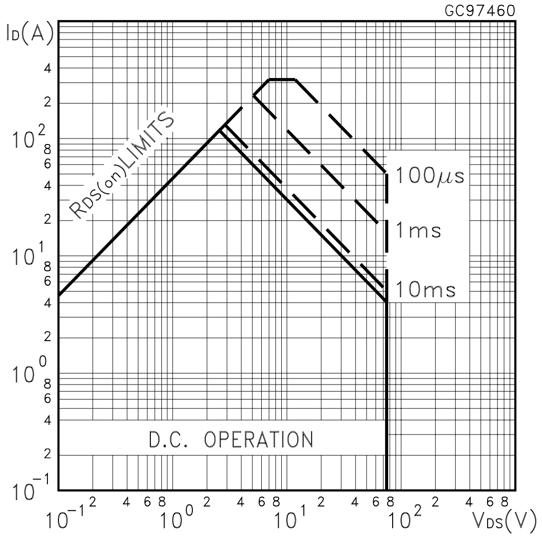
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	V_{DD} = 37.5 V I_D = 45 A R_G = 4.7 Ω V_{GS} = 10 V (Resistive Load, Figure 3)		66 30		ns ns

SOURCE DRAIN DIODE

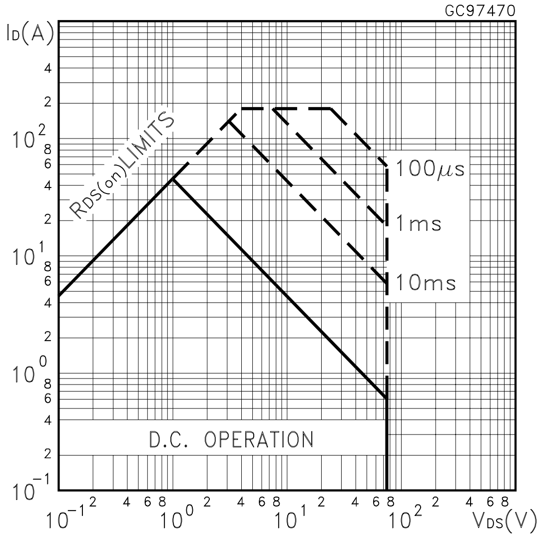
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (•)	Source-drain Current Source-drain Current (pulsed)				80 320	A A
V_{SD} (*)	Forward On Voltage	I_{SD} = 80 A V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 80 A di/dt = 100A/µs V_{DD} = 25 V T_j = 150°C (see test circuit, Figure 5)		132 660 10		ns nC A

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

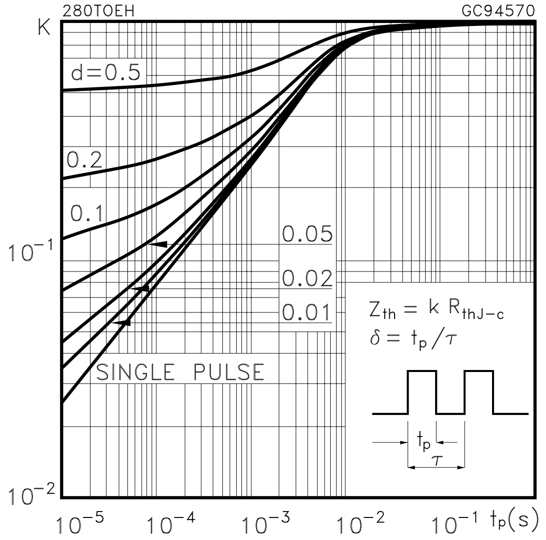
Safe Operating Area



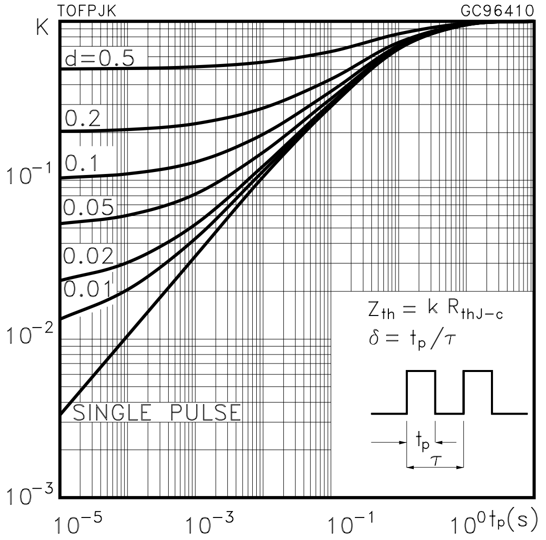
Safe Operating Area for TO-220FP



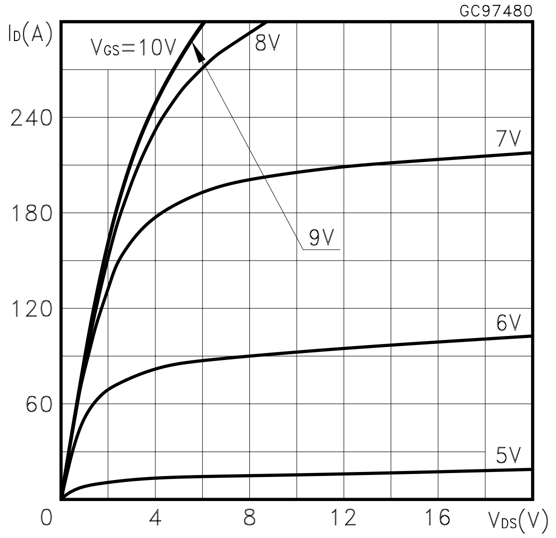
Thermal Impedance



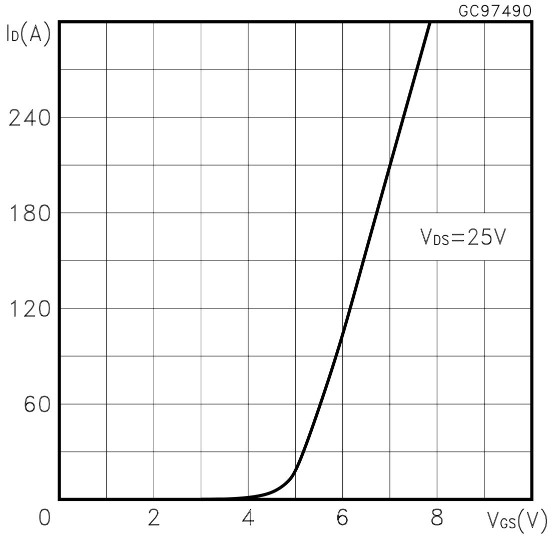
Thermal Impedance for TO-220FP



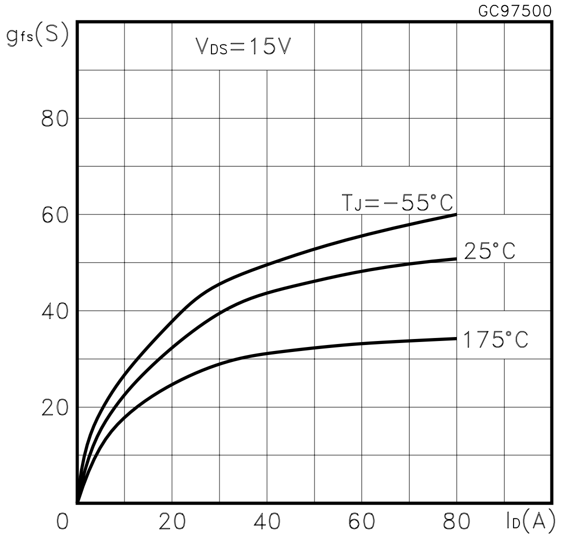
Output Characteristics



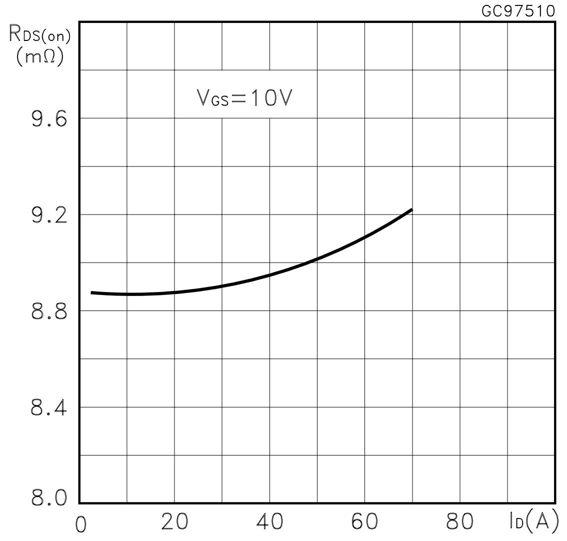
Transfer Characteristics



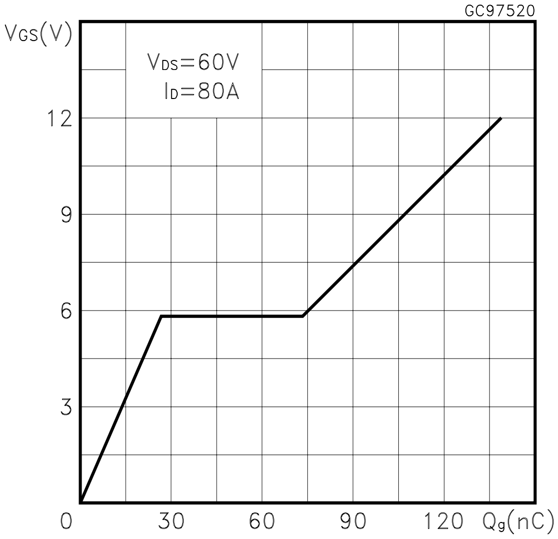
Transconductance



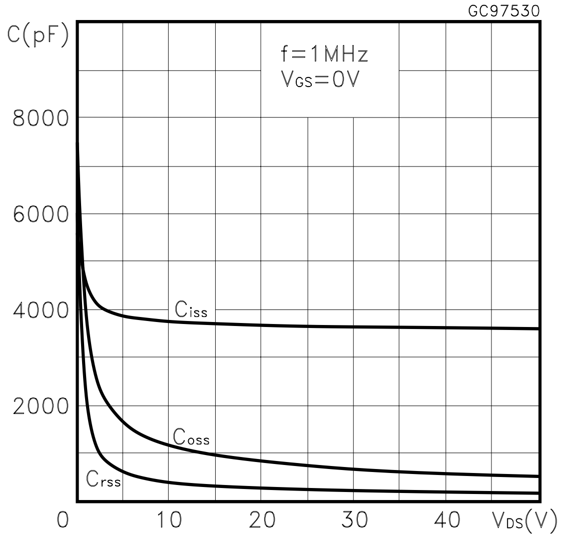
Static Drain-source On Resistance



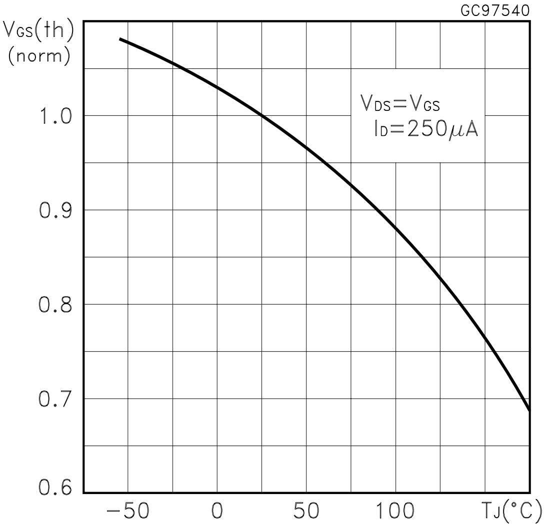
Gate Charge vs Gate-source Voltage



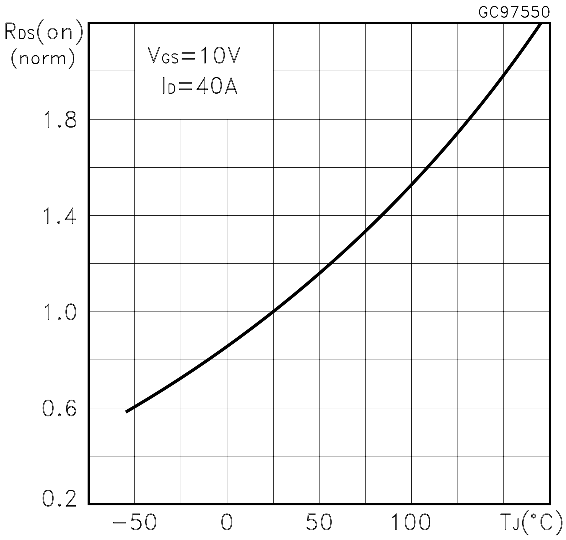
Capacitance Variations



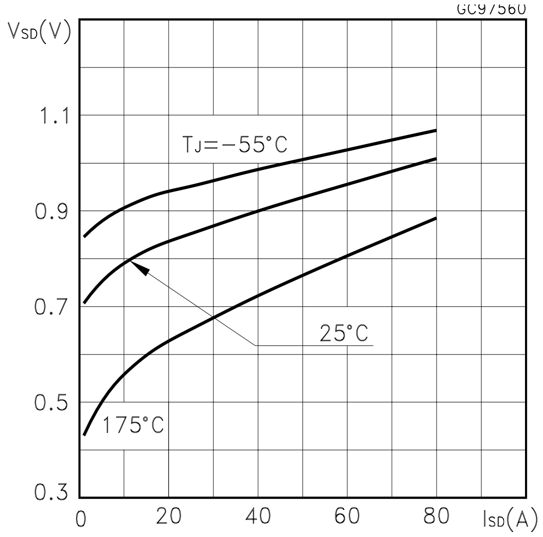
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage Temperature

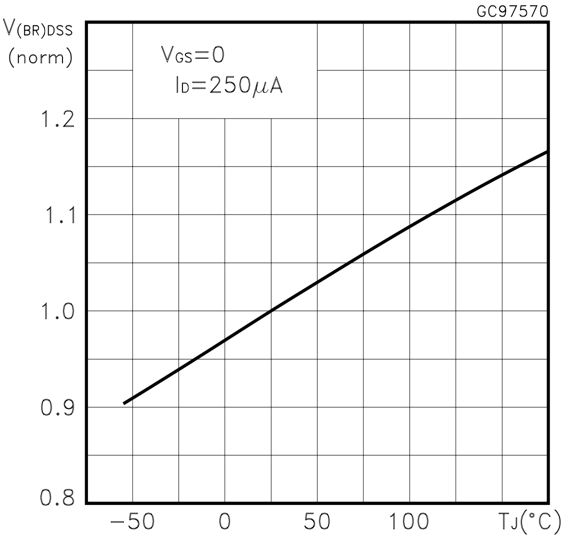


Fig. 1: Unclamped Inductive Load Test Circuit

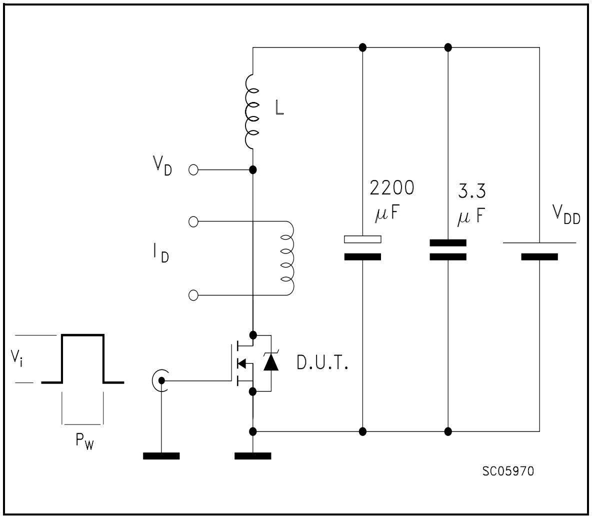


Fig. 2: Unclamped Inductive Waveform

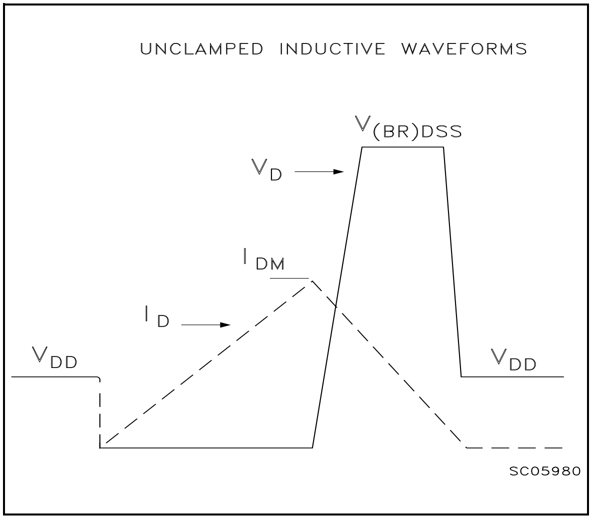


Fig. 3: Switching Times Test Circuits For Resistive Load

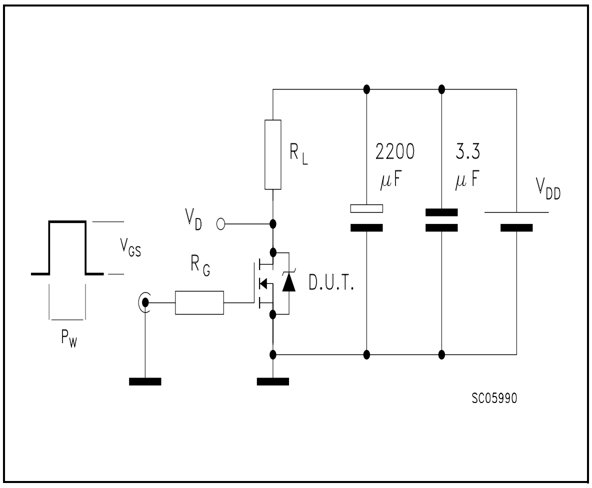


Fig. 4: Gate Charge test Circuit

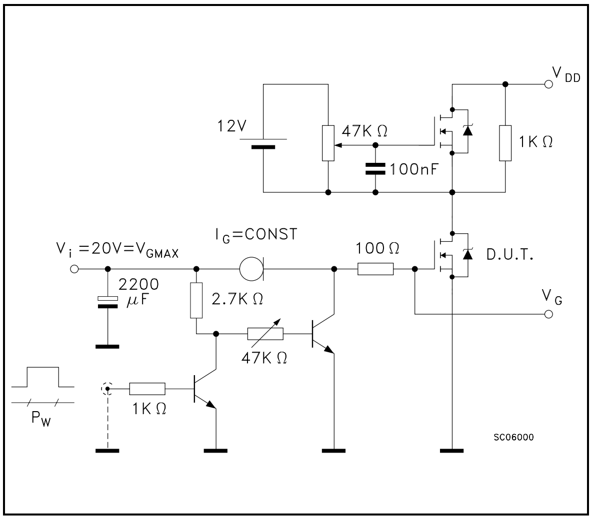
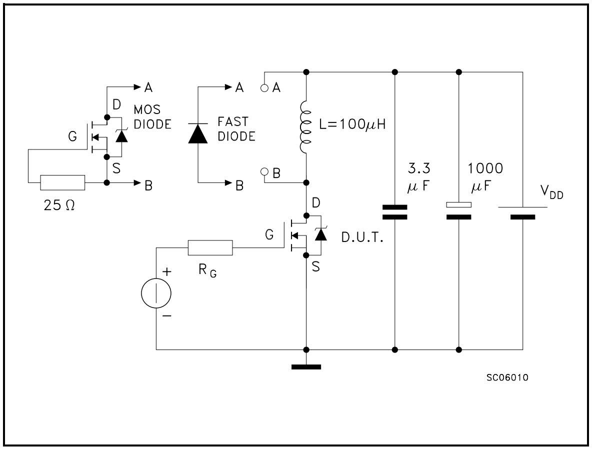
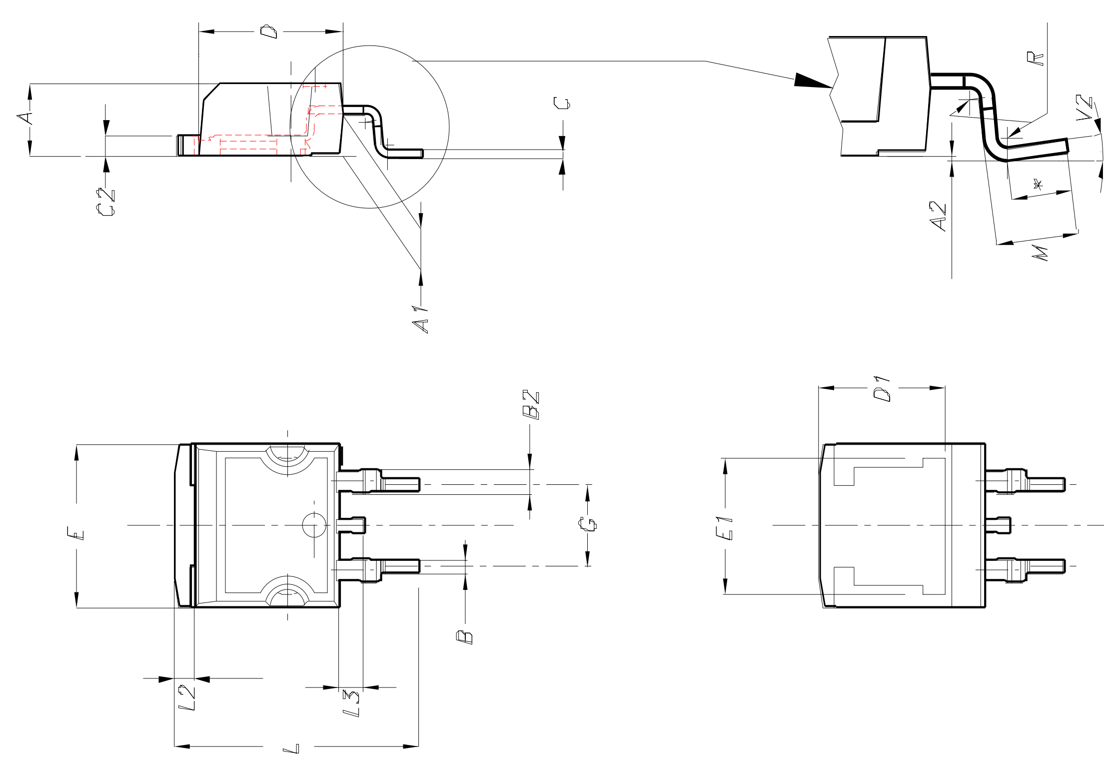


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



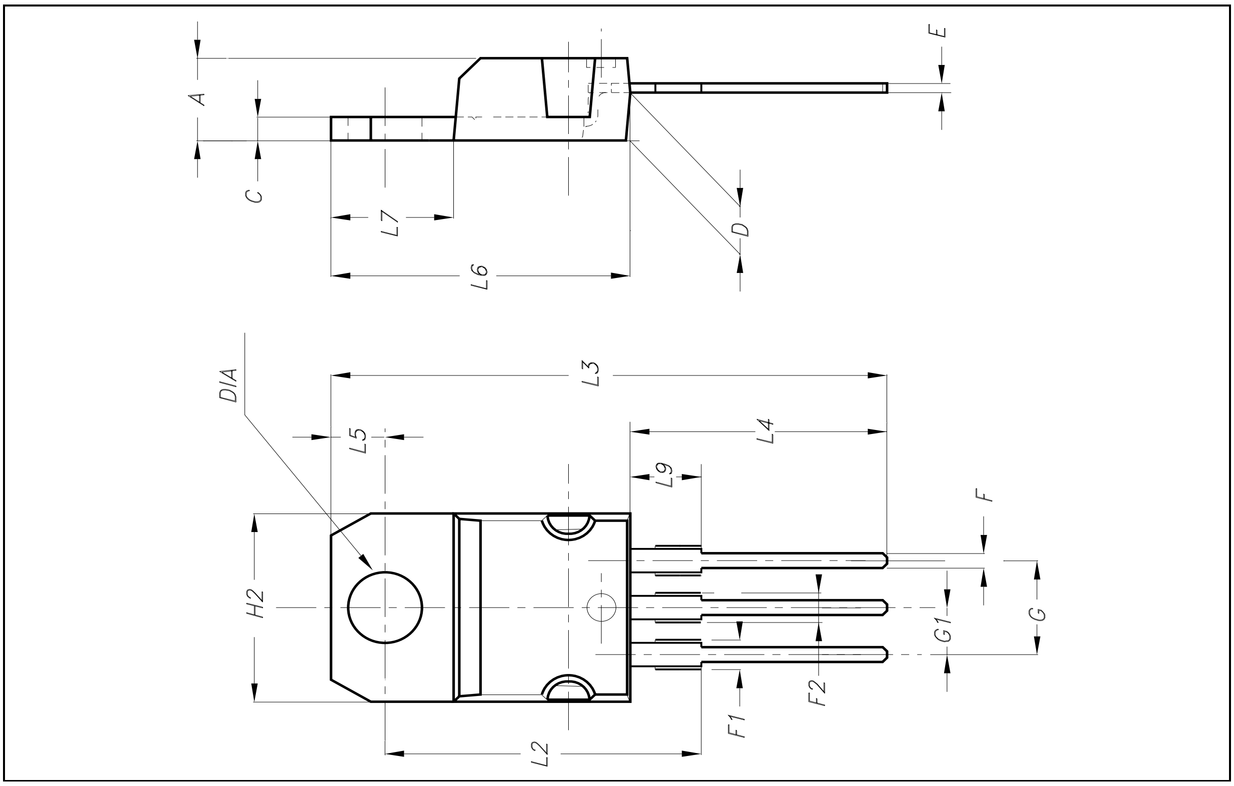
D^{2}PAK MECHANICAL DATA

DIM.	mm.			inch.		
	MIN.	TYP.	MAX.	MIN.	TYP.	TYP.
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	0.028		0.037
B2	1.14		1.7	0.045		0.067
C	0.45		0.6	0.018		0.024
C2	1.21		1.36	0.048		0.054
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.394		0.409
E1	8.5				0.334	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.591		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.069
M	2.4		3.2	0.094		0.126
R		0.4			0.016	
V2	0°		8°	0°		8°



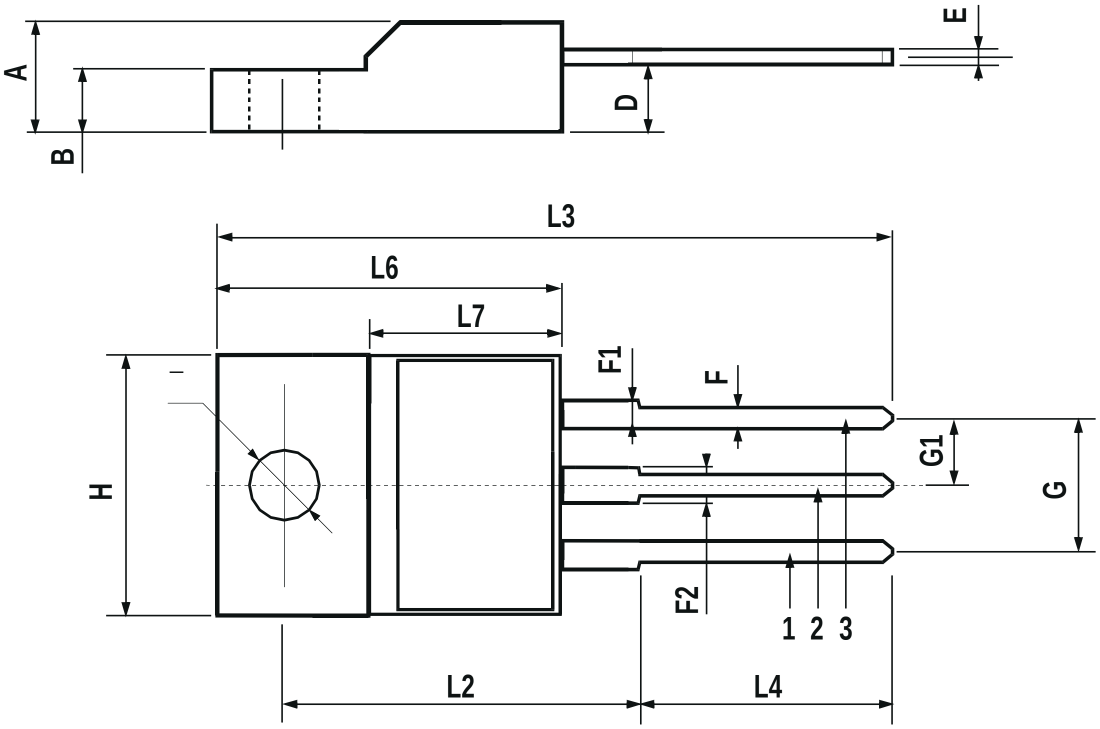
TO-220 MECHANICAL DATA

DIM.	mm.			inch.		
	MIN.	TYP.	MAX.	MIN.	TYP.	TYP.
A	4.4		4.6	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.40		2.70	0.094		0.106
H2	10		10.40	0.393		0.409
L2		16.40			0.645	
L3		28.90			1.137	
L4	13		14	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.20		6.60	0.244		0.260
L9	3.50		3.93	0.137		0.154
DIA	3.75		3.85	0.147		0.151

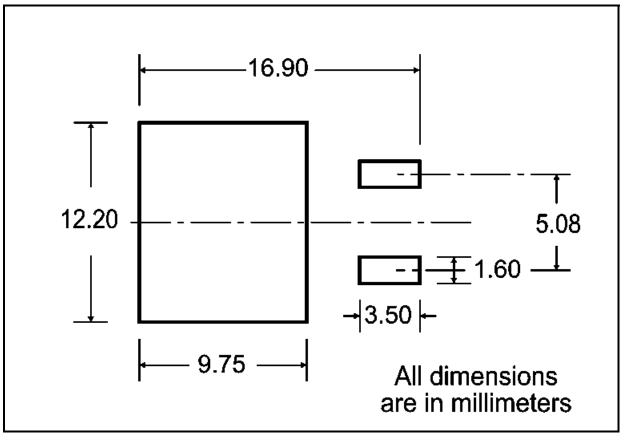


TO-220FP MECHANICAL DATA

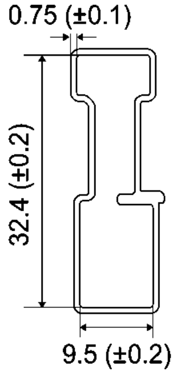
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.7	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
Ø	3		3.2	0.118		0.126



D²PAK FOOTPRINT



TUBE SHIPMENT (no suffix)*



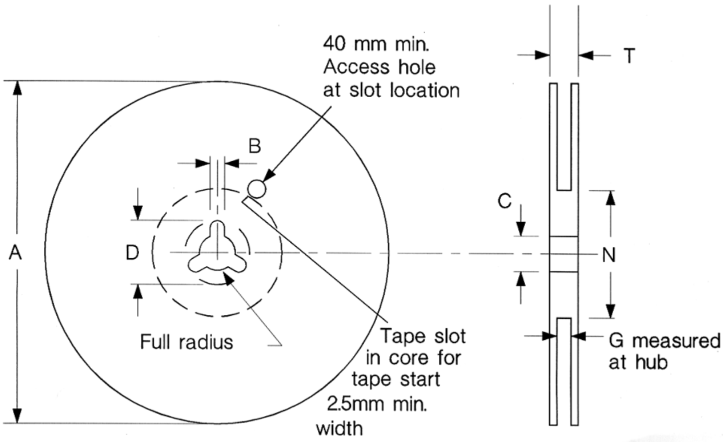
BASE QTY
50

BULK QTY
1000

Tube length 532 (±0.5)

All dimensions
are in millimeters

TAPE AND REEL SHIPMENT (suffix ”T4”)*



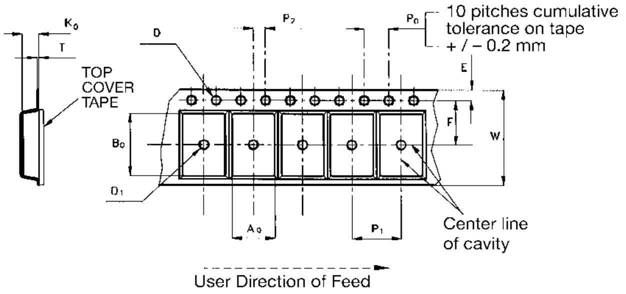
REEL MECHANICAL DATA

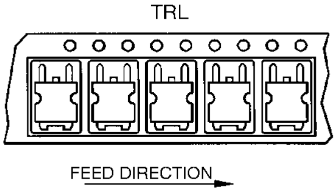
DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0.795	
G	24.4	26.4	0.960	1.039
N	100		3.937	
T		30.4		1.197

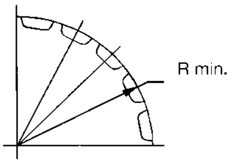
BASE QTY	BULK QTY
1000	1000

TAPE MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
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	0075	0.082
R	50		1.574	
T	0.25	0.35	.0.0098	0.0137
W	23.7	24.3	0.933	0.956







Bending radius

* on sales type

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