



STB85NF55 STP85NF55

N-CHANNEL 55V - 0.0062 Ω - 80A D²PAK/TO-220
STripFET™ II POWER MOSFET

TYPE	V _{DSS}	R _{DS(on)}	I _D
STB85NF55	55 V	<0.008 Ω	80 A
STP85NF55	55 V	<0.008 Ω	80 A

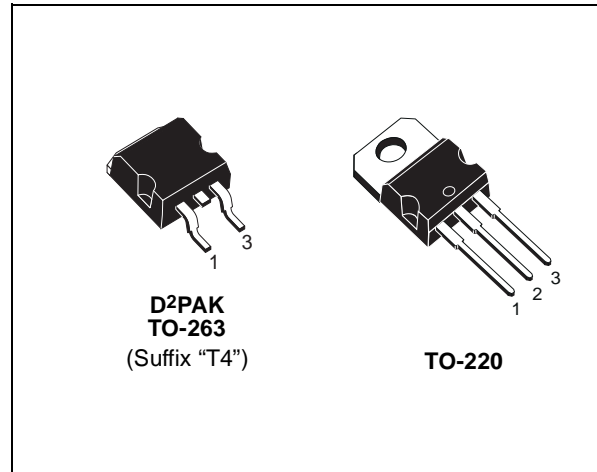
- TYPICAL R_{DS(on)} = 0.0062 Ω
- FOR THROUGH-HOLE VERSION CONTACT SALES OFFICE

DESCRIPTION

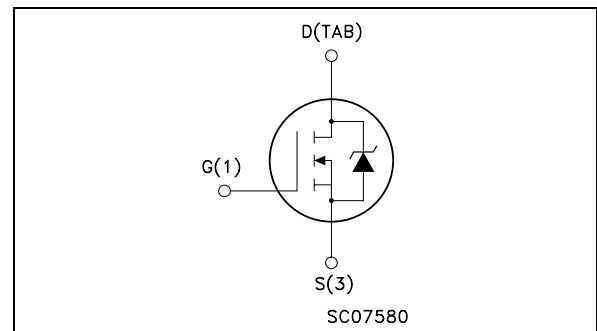
This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

APPLICATIONS

- SOLENOID AND RELAY DRIVERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- DC-DC CONVERTERS
- AUTOMOTIVE ENVIRONMENT



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	55	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	55	V
V _{GS}	Gate- source Voltage	± 20	V
I _D (●)	Drain Current (continuous) at T _C = 25°C	80	A
I _D	Drain Current (continuous) at T _C = 100°C	80	A
I _{DM} (●●)	Drain Current (pulsed)	320	A
P _{tot}	Total Dissipation at T _C = 25°C	300	W
	Derating Factor	2.0	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	10	V/ns
E _{AS} (2)	Single Pulse Avalanche Energy	980	mJ
T _{stg}	Storage Temperature	-55 to 175	°C
T _j	Max. Operating Junction Temperature		

(●) Current Limited by Package

(●●) Pulse width limited by safe operating area

(1) I_{SD} ≤ 80A, di/dt ≤ 300A/μs, V_{DD} ≤ V(BR)DSS, T_j ≤ T_{JMAX}.

(2) Starting T_j = 25 °C I_D = 40A V_{DD} = 25V

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THERMAL DATA

Rthj-case	Thermal Resistance Junction-case	Max	0.5	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max	62.5	°C/W
T _l	Maximum Lead Temperature For Soldering Purpose		300	°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	55			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	2	3	4	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10 V I _D = 40 A		0.0062	0.008	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} = 15V I _D = 40 A		120		S
C _{iss}	Input Capacitance	V _{DS} = 25V f = 1 MHz V _{GS} = 0		3700		pF
C _{oss}	Output Capacitance			900		pF
C _{rss}	Reverse Transfer Capacitance			310		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	$V_{DD} = 30\text{ V}$ $I_D = 40\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		25 100		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD}=30\text{V}$ $I_D=80\text{A}$ $V_{GS}=10\text{V}$ (see test circuit, Figure 4)		120 30 45	150	nC nC nC

SWITCHING OFF

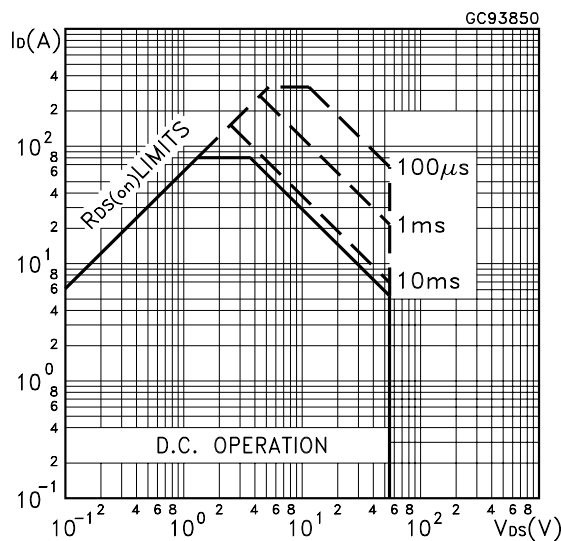
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	$V_{DD} = 30\text{ V}$ $I_D = 40\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3)		70 35		ns ns

SOURCE DRAIN DIODE

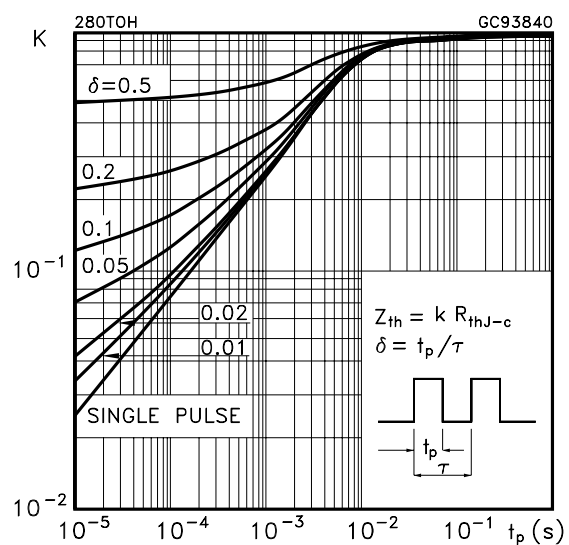
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (●)	Source-drain Current Source-drain Current (pulsed)				80 320	A A
V_{SD} (*)	Forward On Voltage	$I_{SD} = 80\text{ A}$ $V_{GS} = 0$			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 80\text{ A}$ $di/dt = 100\text{A}/\mu\text{s}$ $V_{DD} = 25\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 5)		75 210 5.5		ns nC A

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

Safe Operating Area

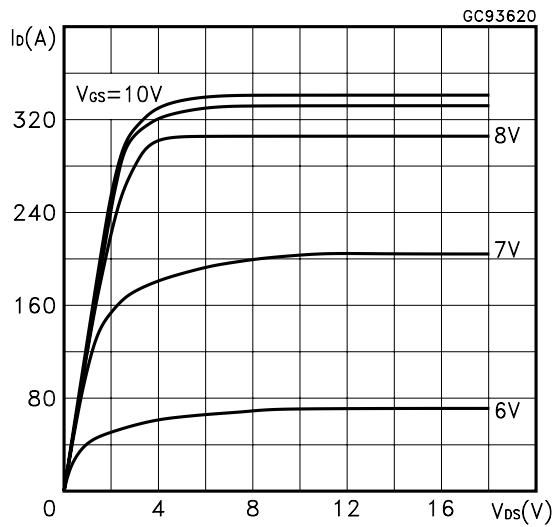


Thermal Impedance

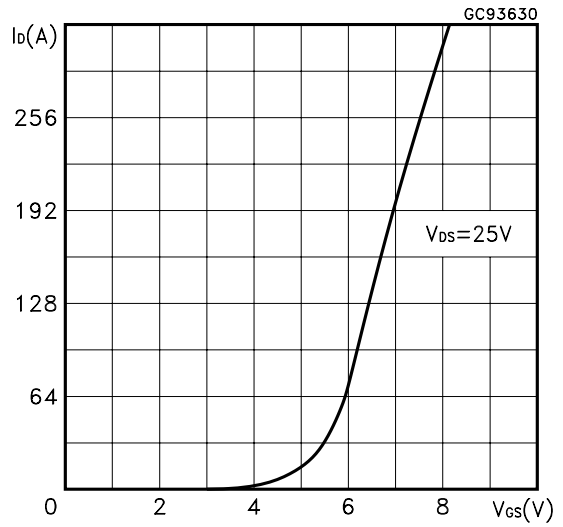


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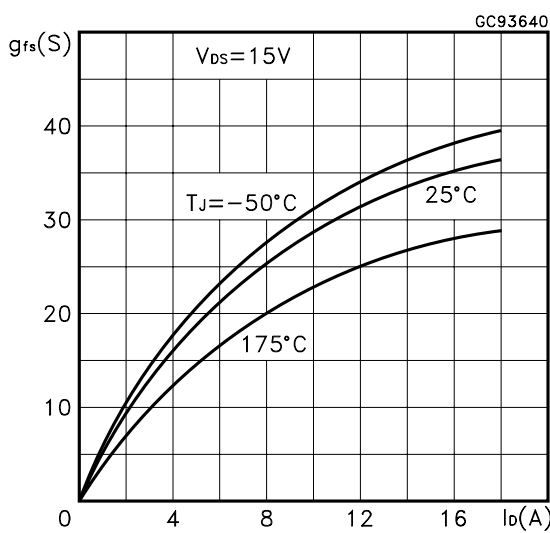
Output Characteristics



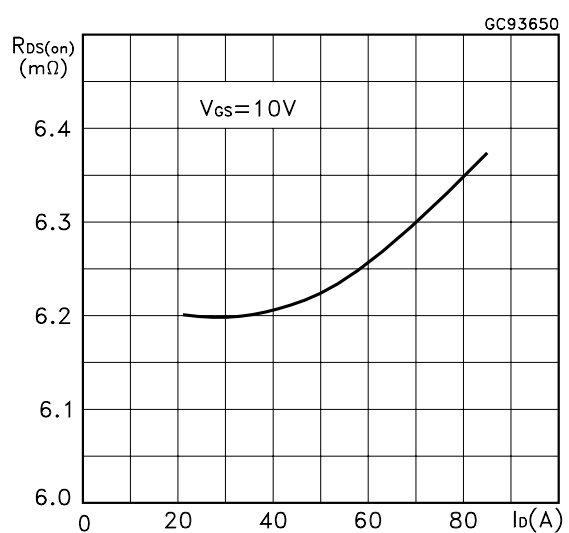
Transfer Characteristics



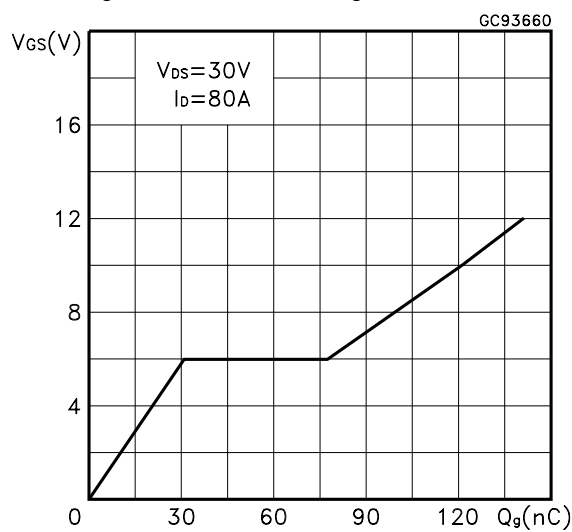
Transconductance



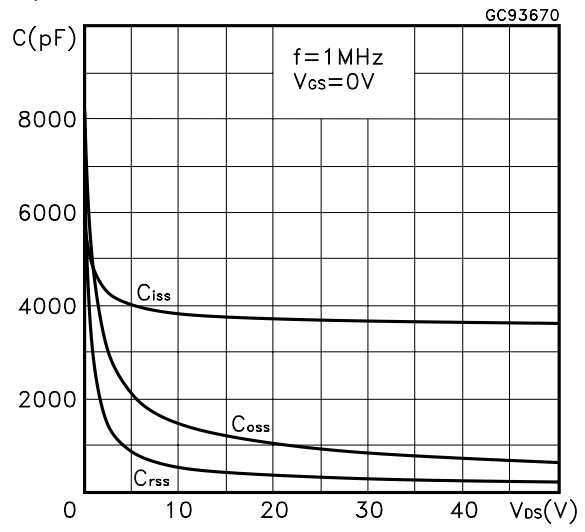
Static Drain-source On Resistance



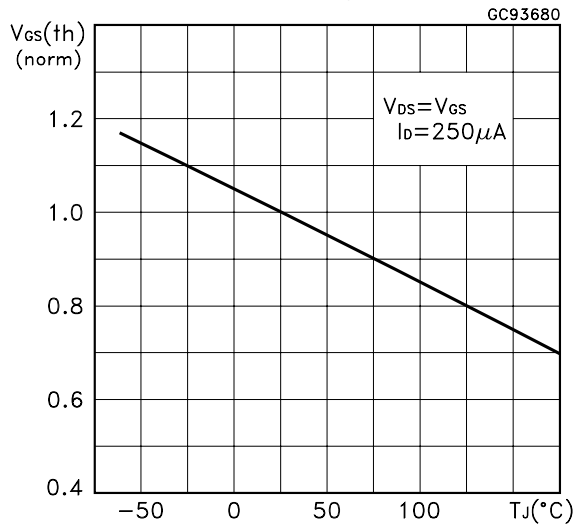
Gate Charge vs Gate-source Voltage



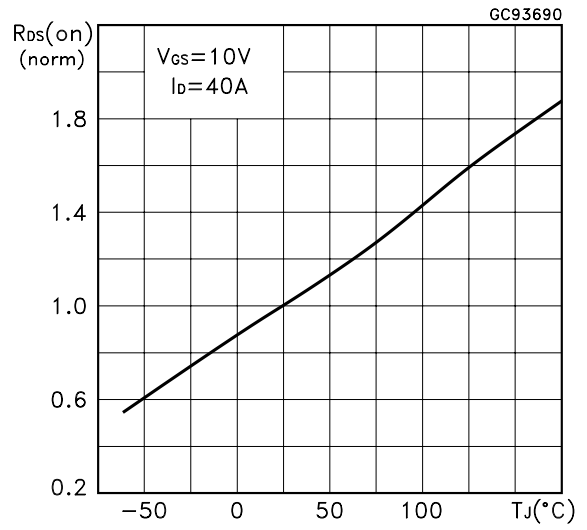
Capacitance Variations



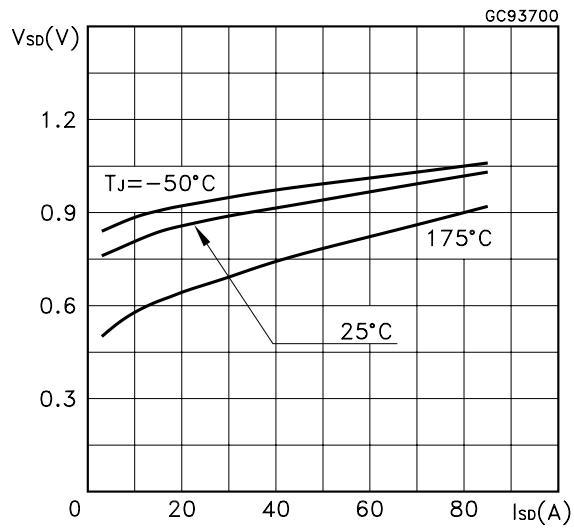
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage vs Temperature.

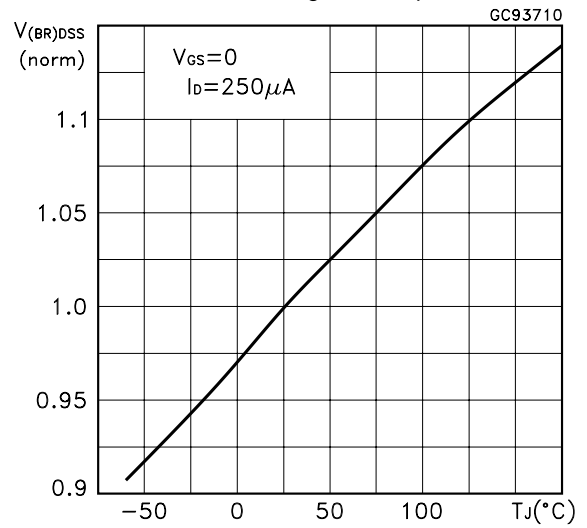


Fig. 1: Unclamped Inductive Load Test Circuit



Fig. 2: Unclamped Inductive Waveform



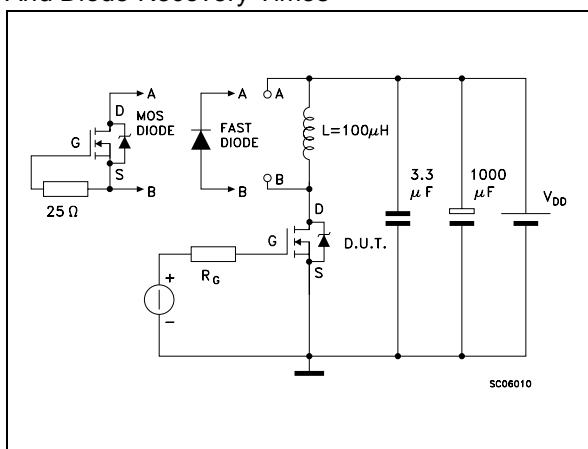
Fig. 3: Switching Times Test Circuits For Resistive Load



Fig. 4: Gate Charge test Circuit

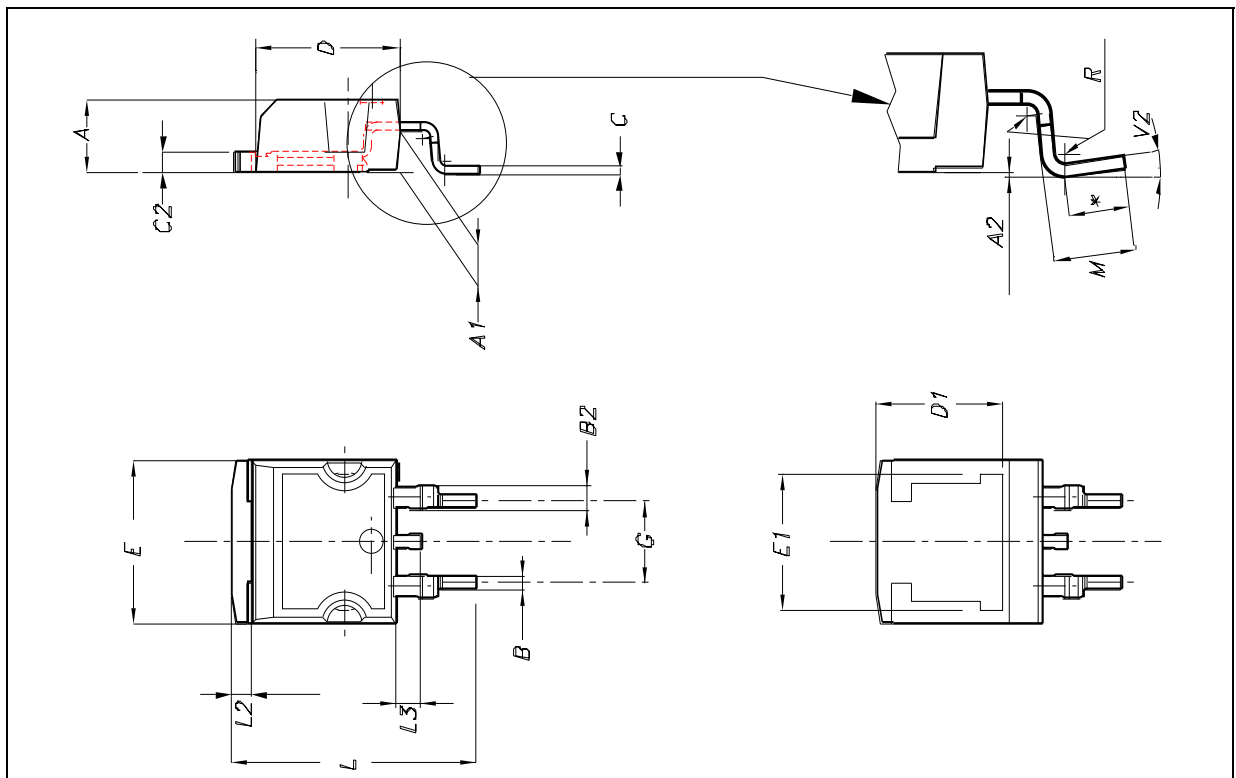


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



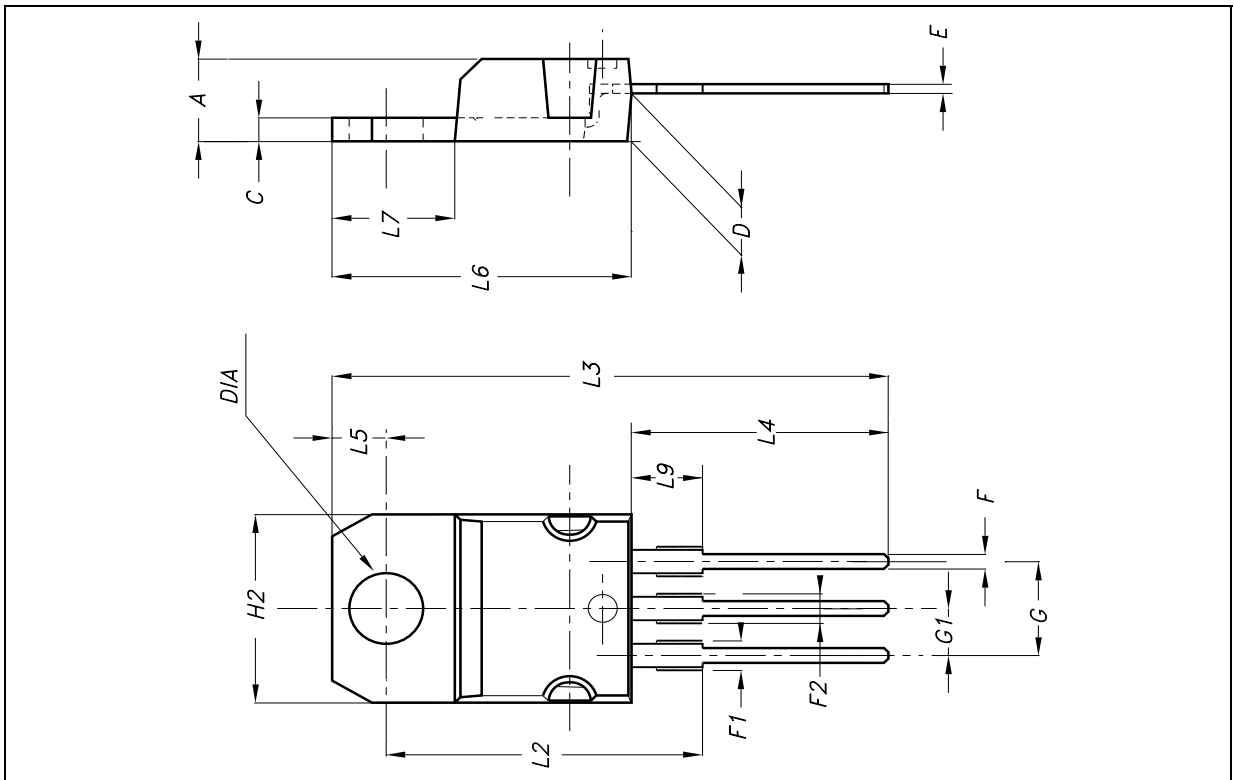
D²PAK MECHANICAL DATA

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			0.015	
V2	0°		8°	0°		8°

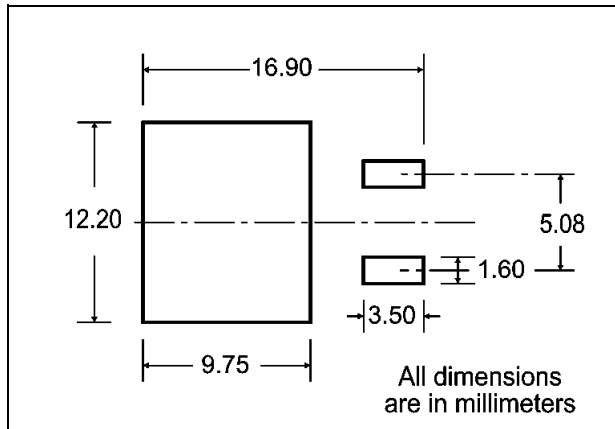


TO-220 MECHANICAL DATA

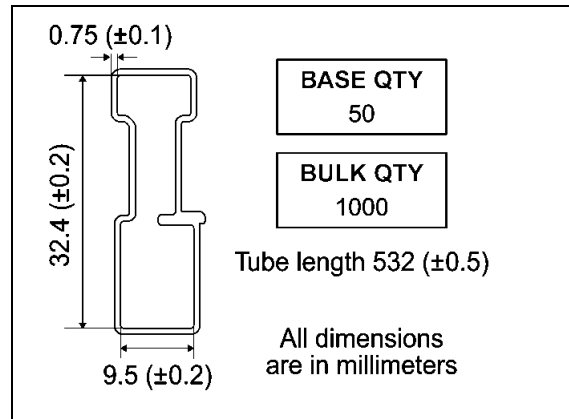
DIM.	mm.			inch.		
	MIN.	TYP.	MAX.	MIN.	TYP.	TYP.
A	4.4		4.6	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.40		2.70	0.094		0.106
H2	10		10.40	0.393		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



D2PAK FOOTPRINT



TUBE SHIPMENT (no suffix)*



TAPE AND REEL SHIPMENT (suffix "T4")*

Diagram showing the tape and reel shipment details. The top view shows a circular reel with a diameter of A. The tape slot in the core has a width of 2.5 mm min. and a full radius. The distance from the center to the edge of the tape slot is B. The distance from the center to the edge of the reel is D. The distance from the center to the edge of the tape is N. The distance from the center to the edge of the reel is G, measured at the hub. The distance from the center to the edge of the reel is T. The distance from the center to the edge of the reel is C. The distance from the center to the edge of the reel is 40 mm min. Access hole at slot location.

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	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

Diagram showing the tape mechanical data. The top view shows the tape with dimensions K0, D, P2, P0, E, F, W, B0, D1, A0, P1, and Center line of cavity. The distance from the center to the edge of the tape is 10 pitches cumulative tolerance on tape +/- 0.2 mm. The distance from the center to the edge of the tape is T. The distance from the center to the edge of the tape is D. The distance from the center to the edge of the tape is P2. The distance from the center to the edge of the tape is P0. The distance from the center to the edge of the tape is E. The distance from the center to the edge of the tape is F. The distance from the center to the edge of the tape is W. The distance from the center to the edge of the tape is B0. The distance from the center to the edge of the tape is D1. The distance from the center to the edge of the tape is A0. The distance from the center to the edge of the tape is P1. The distance from the center to the edge of the tape is Center line of cavity. The distance from the center to the edge of the tape is TRL. The distance from the center to the edge of the tape is FEED DIRECTION. The distance from the center to the edge of the tape is Bending radius. The distance from the center to the edge of the tape is R min.

* on sales type



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