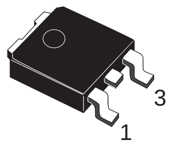
STD60NF55L

N-CHANNEL 55V - 0.012Ω - 60A DPAK
STripFET™ II POWER MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STD60NF55L	55V	< 0.015Ω	60A

- TYPICAL $R_{DS(on)}$ = 0.012Ω
- LOW THRESHOLD DRIVE
- ADD SUFFIX “T4” FOR ORDERING IN TAPE & REEL

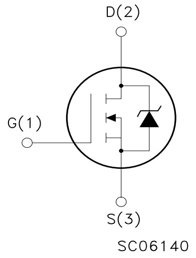


DPAK
TO-252

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 avalance characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility..

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

- AUTOMOTIVE
- MOTOR CONTROL

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	± 15	V
I_D	Drain Current (continuous) at T_C = 25°C	60	A
I_D	Drain Current (continuous) at T_C = 100°C	42	A
I_{DM} (•)	Drain Current (pulsed)	240	A
P_{TOT}	Total Dissipation at T_C = 25°C	110	W
	Derating Factor	0.73	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	16	V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	400	mJ
T_{stg}	Storage Temperature	– 55 to 175	°C
T_j	Operating Junction Temperature		

(•) Pulse width limited by safe operating area

(1)$I_{SD} \leq 40A$, di/dt ≤350A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_j \leq T_{JMAX}$.

(2) Starting T_j=25°C, I_D=30A, V_{DD}=20V

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	1.36	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	62.5	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose	275	°C

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	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} = ± 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 = 250µA	1		2	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10 V, I_D = 30 A V_{GS} = 5 V, I_D = 30 A		0.012 0.014	0.015 0.017	Ω Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} = 10 V, I_D = 30 A		35		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		1950 390 130		pF pF pF

ELECTRICAL CHARACTERISTICS (CONTINUED)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{DD} = 25 V, I_D = 30 A R_G = 4.7Ω V_{GS} = 4.5V (see test circuit, Figure 3)		30		ns
t_r	Rise Time			180		ns
Q_g	Total Gate Charge	V_{DD} = 40 V, I_D = 60 A, V_{GS} = 5 V		40		nC
Q_{gs}	Gate-Source Charge			10		nC
Q_{gd}	Gate-Drain Charge			20		nC

SWITCHING OFF

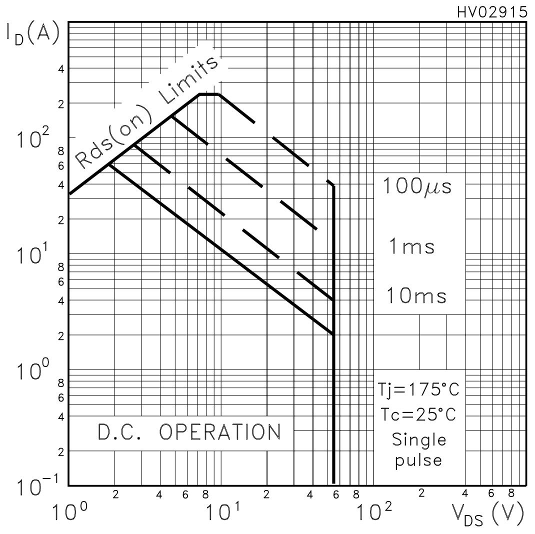
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	V_{DD} = 25 V, I_D = 30 A, R_G = 4.7Ω, V_{GS} = 4.5V (see test circuit, Figure 3)		80		ns
t_f	Fall Time			35		ns

SOURCE DRAIN DIODE

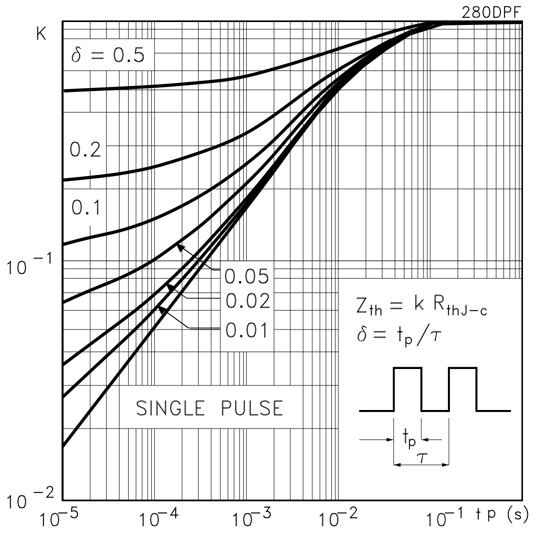
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				60	A
I_{SDM} (2)	Source-drain Current (pulsed)				240	A
V_{SD} (1)	Forward On Voltage	I_{SD} = 60A, V_{GS} = 0			1.3	V
t_{rr}	Reverse Recovery Time	I_{SD} = 40 A, di/dt = 100 A/µs, V_{DD} = 25 V, T_j = 150 °C (see test circuit, Figure 5)		65		ns
Q_{rr}	Reverse Recovery Charge			130		nC
I_{RRM}	Reverse Recovery Current			4		A

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

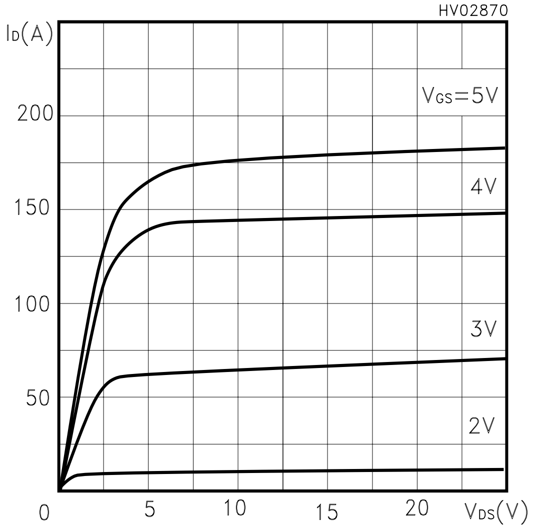
Safe Operating Area



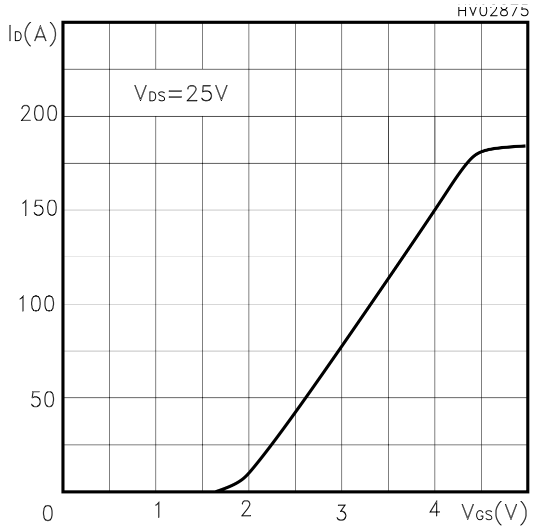
Thermal Impedance



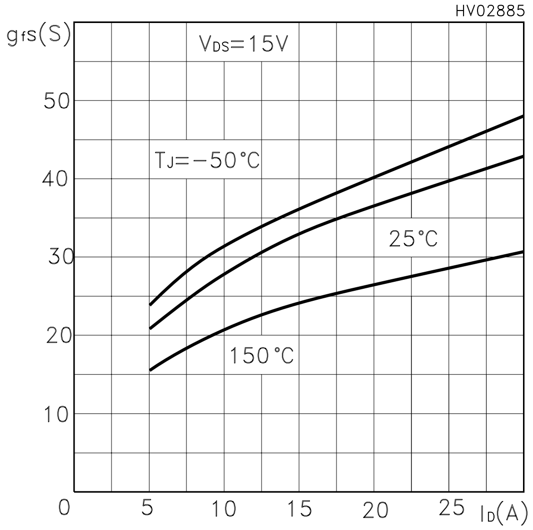
Output Characteristics



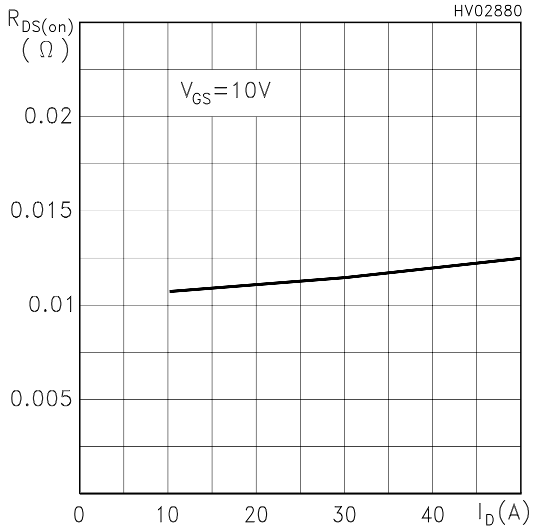
Transfer Characteristics



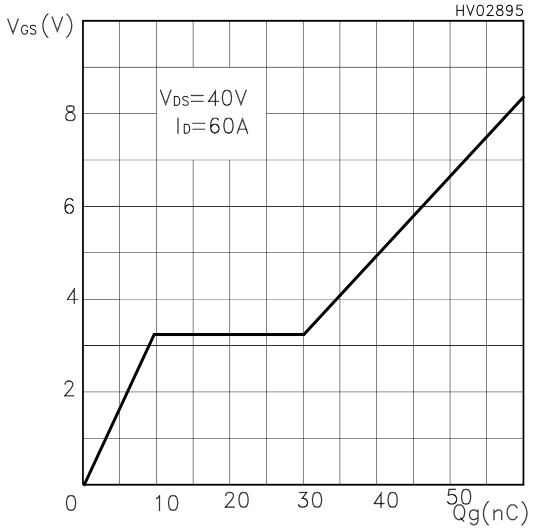
Transconductance



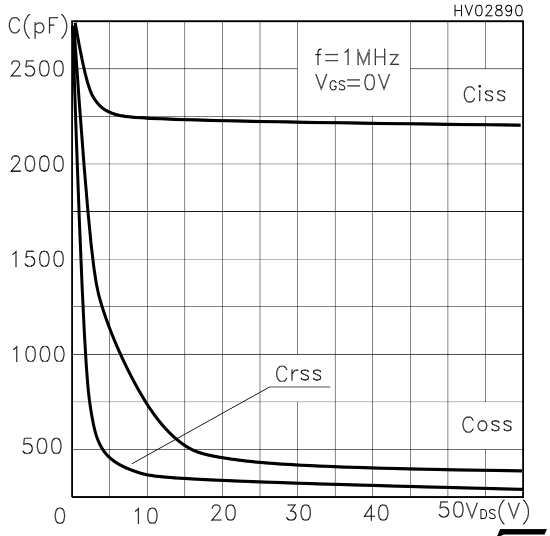
Static Drain-source On Resistance



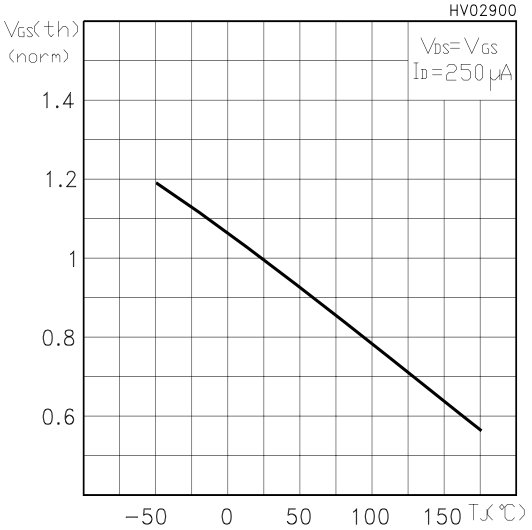
Gate Charge vs Gate-source Voltage



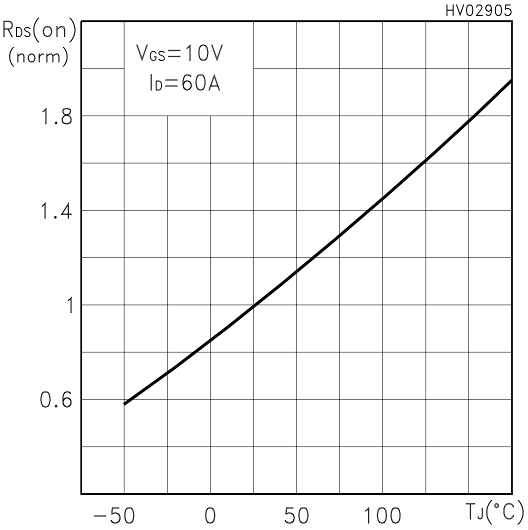
Capacitance Variations



Normalized Gate Thereshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

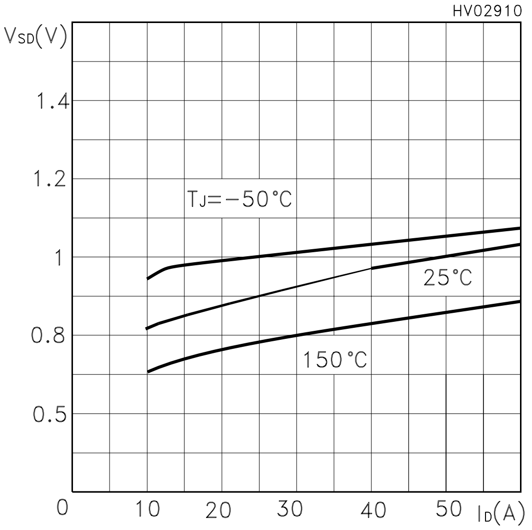


Fig. 1: Unclamped Inductive Load Test Circuit

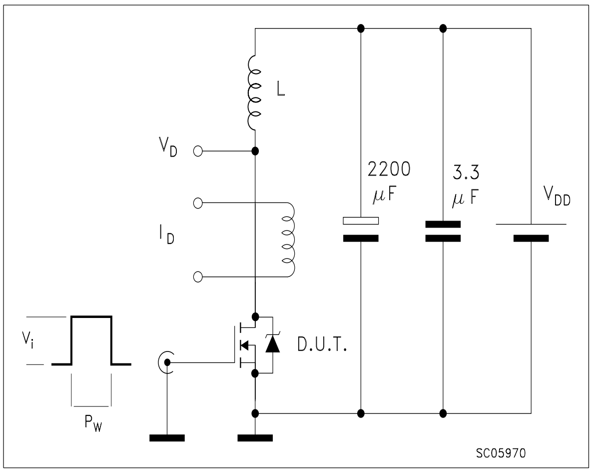


Fig. 2: Unclamped Inductive Waveform

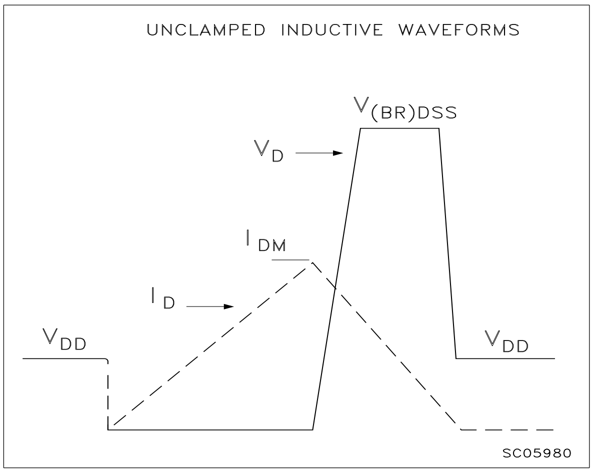


Fig. 3: Switching Times Test Circuit For Resistive Load

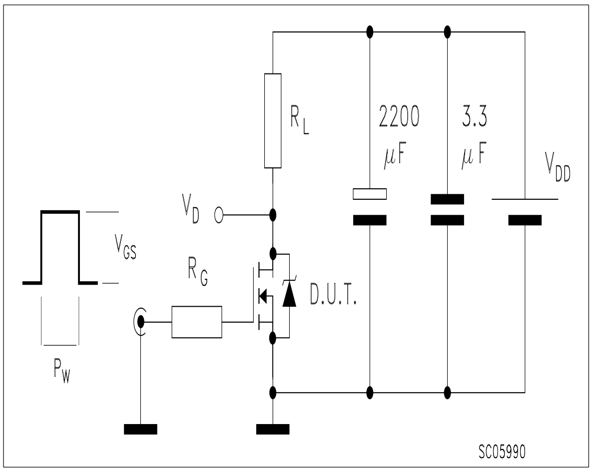


Fig. 4: Gate Charge test Circuit

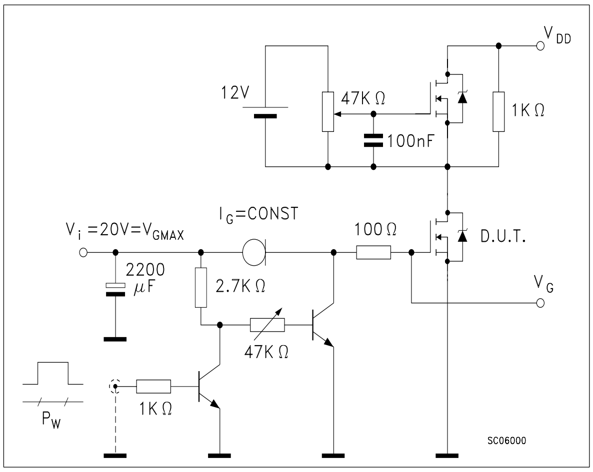
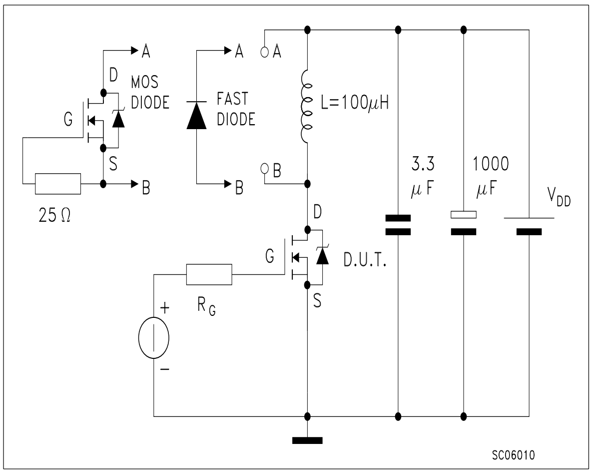
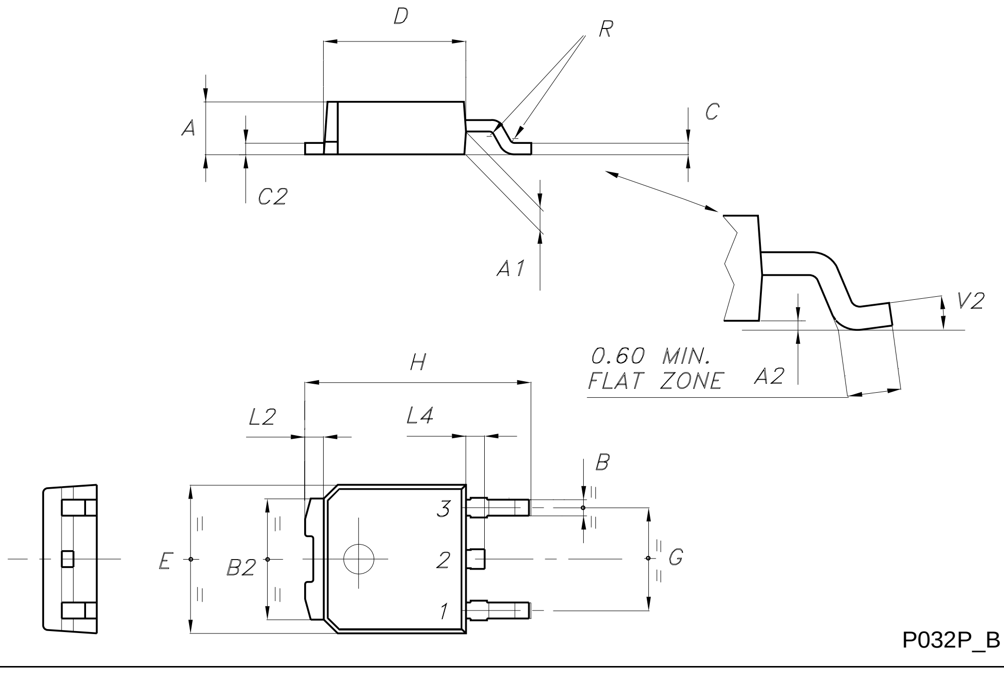


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



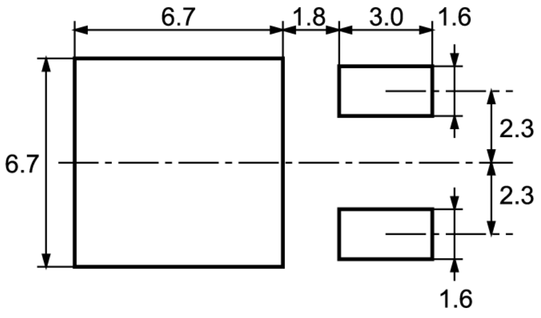
TO-252 (DPAK) MECHANICAL DATA

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^o		8^o	0^o		0^o



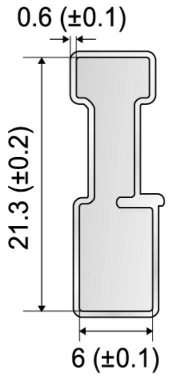
P032P_B

DPAK FOOTPRINT



All dimensions are in millimeters

TUBE SHIPMENT (no suffix)*



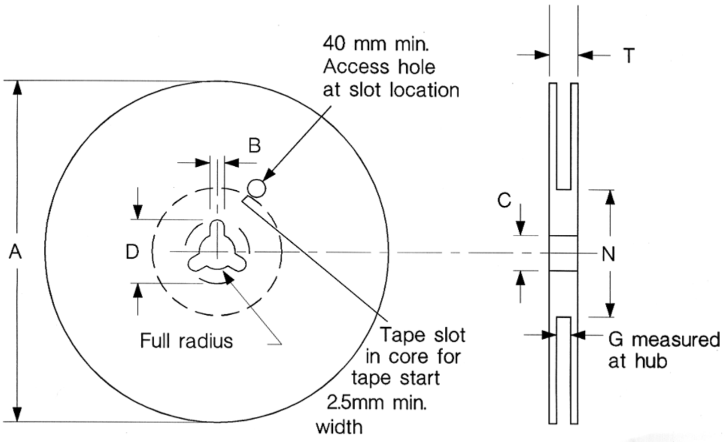
BASE QTY
75

BULK QTY
3000

Tube length 532 (±0.5)

All dimensions
are in millimeters

TAPE AND REEL SHIPMENT (suffix ”T4”)*



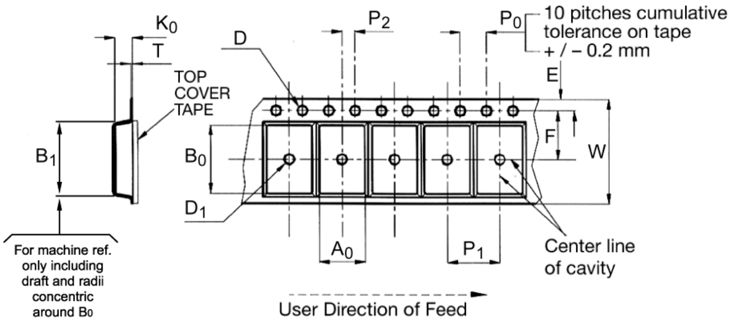
REEL MECHANICAL DATA

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

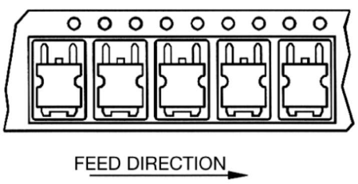
BASE QTY	BULK QTY
2500	2500

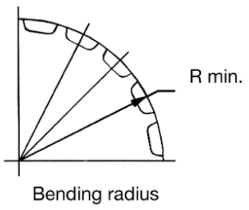
TAPE MECHANICAL DATA

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



TRL





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