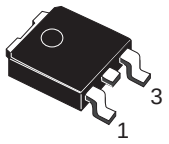
STD3PS25 - STD3PS25-1

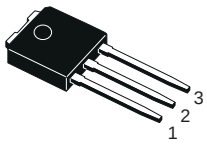
P-CHANNEL 250V - 2.1Ω - 3A DPAK/IPAK
MESH OVERLAY™ MOSFET

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STD3PS25	250 V	< 2.8 Ω	3 A
STD3PS25-1	250 V	< 2.8 Ω	3 A

- TYPICAL R_{DS}(on) = 2.1Ω
- 100% AVALANCHE TESTED
- APPLICATION ORIENTED CHARACTERIZATION
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- GATE-SOURCE ZENER DIODE



DPAK

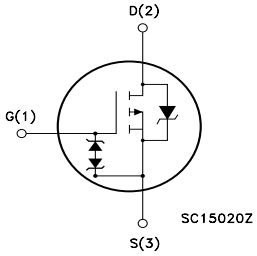


IPAK

DESCRIPTION

Using the latest high voltage MESH OVERLAY™ process, STMicroelectronics has designed an advanced family of power MOSFETs with outstanding performance. The new patented STrip layout coupled with the Company's proprietary edge termination structure, makes it suitable in coverters for lighting applications.

INTERNAL SCHEMATIC DIAGRAM



APPLICATIONS

- CONSUMER
- LIGHTING

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	250	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	250	V
V_{GS}	Gate- source Voltage	±25	V
I_D	Drain Current (continuous) at T_C = 25°C	3	A
I_D	Drain Current (continuous) at T_C = 100°C	1.9	A
I_{DM} (1)	Drain Current (pulsed)	12	A
P_{TOT}	Total Dissipation at T_C = 25°C	45	W
	Derating Factor	0.36	W/°C
T_{stg}	Storage Temperature	– 50 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	2.77	°C/W
Rthj-amb	Thermal Resistance Junction-ambient Max	100	°C/W
T_l	Maximum Lead Temperature For Soldering Purpose	275	°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	250			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0)	V_{DS} = Max Rating			1	µA
		V_{DS} = Max Rating, T_C = 125 °C			10	µA
I_{GSS}	Gate-body Leakage Current (V_{DS} = 0)	V_{GS} = ± 20 V			±10	µA

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 = 0.3 A		2.1	2.8	Ω

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0		260		pF
C_{oss}	Output Capacitance			52		pF
C_{rss}	Reverse Transfer Capacitance			25		pF
R_G	Gate-Input Resistance	f = 1 MHz,Gate DC Bias=0 Test Signal Level=20 mV Open Drain		6		Ω

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} = 125V, I_D = 1.5A R_G = 4.7Ω V_{GS} = 10V (Resistive, see Figure 3)		12 22		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 200V, I_D= 1.5A, V_{GS} = 10V		16 1.4 7.6	21	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} = 200V, I_D = 1.5A, R_G = 4.7Ω, V_{GS} = 10V (see test circuit, Figure 5)		29.5 7		ns ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} I_{SDM} (4)	Source-drain Current Source-drain Current (pulsed)				3 12	A A
V_{SD} (5)	Forward On Voltage	I_{SD} = 3A, V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Curren	I_{SD} = 0.60A, di/dt = 100A/µs, V_{DD} = 40V, T_j = 150°C (see test circuit, Figure 5)		143 806 11		ns nC A

GATE-SOURCE ZENER DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{GSO}	Gate-Source Breakdown Voltage	Igs=± 500 µA (Open Drain)	± 25			V

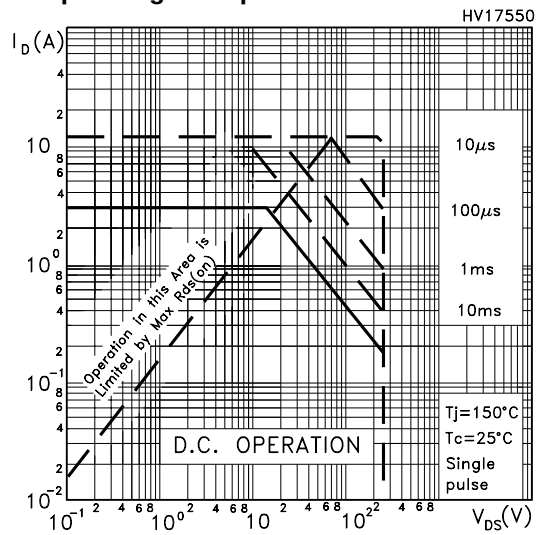
(4) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.

(5) Pulse width limited by safe operating area

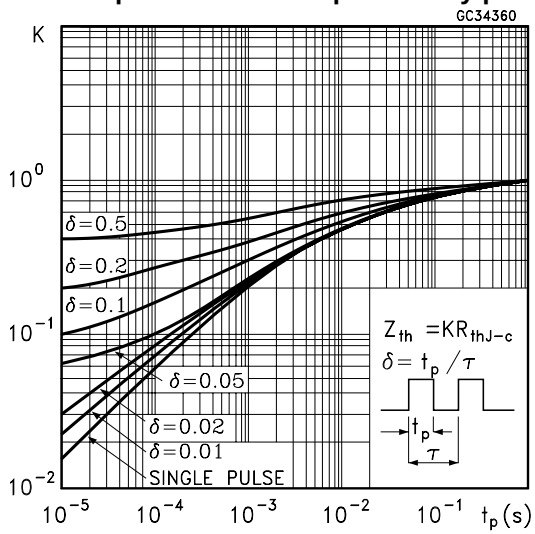
PROTECTION FEATURES OF GATE-TO-SOURCE ZENER DIODES

The built-in back-to-back Zener diodes have specifically been designed to enhance not only the device's ESD capability, but also to make them safely absorb possible voltage transients that may occasionally be applied from gate to source. In this respect the Zener voltage is appropriate to achieve an efficient and cost-effective intervention to protect the device's integrity. These integrated Zener diodes thus avoid the usage of external components.

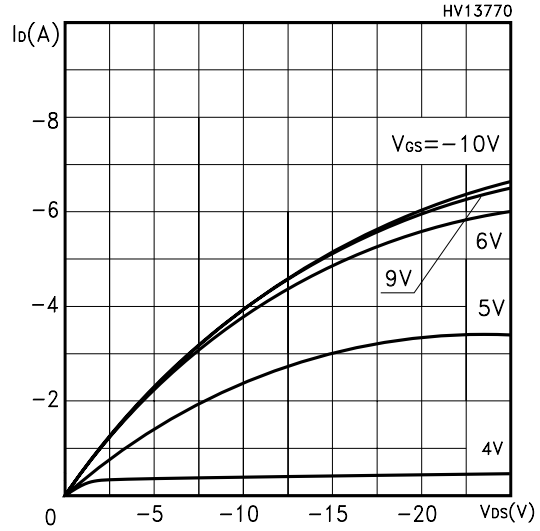
Safe Operating Area p-ch



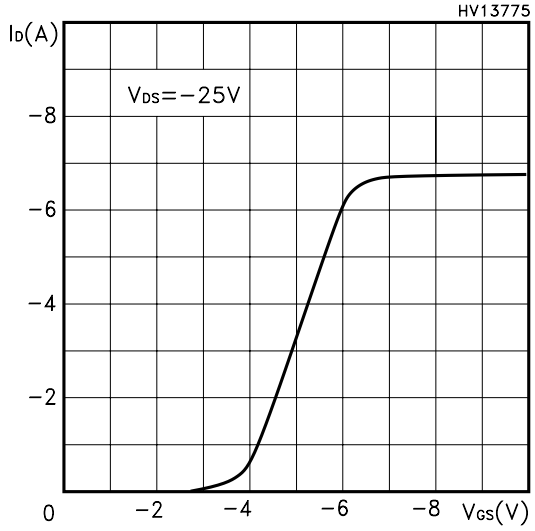
Thermal Impedance for Complementary pair



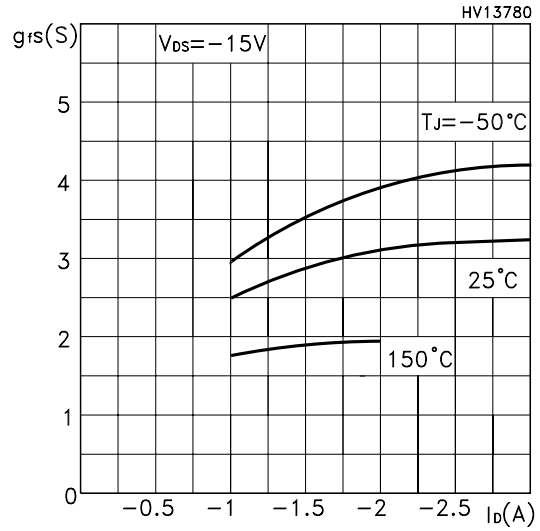
Output Characteristics p-ch



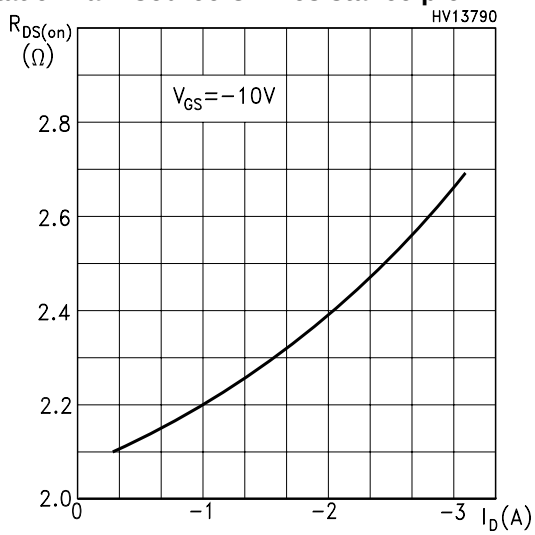
Transfer Characteristics p-ch



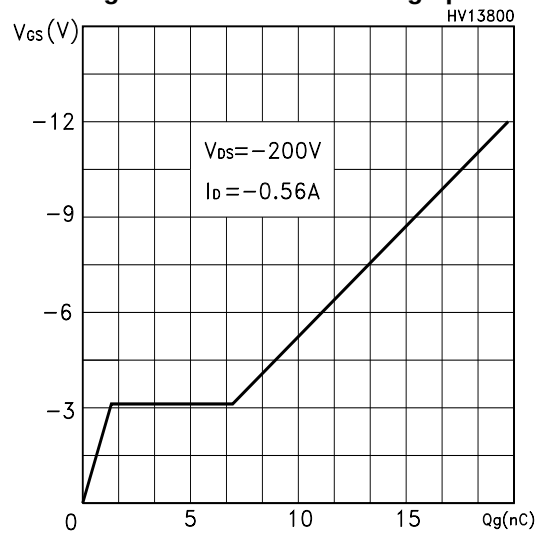
Transconductance p-ch



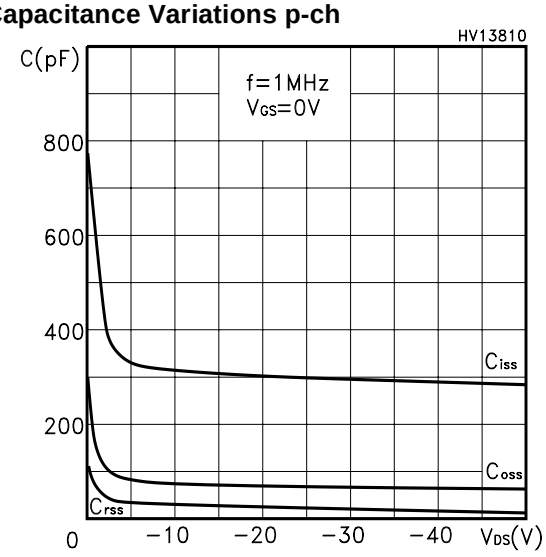
Static Drain-source On Resistance p-ch



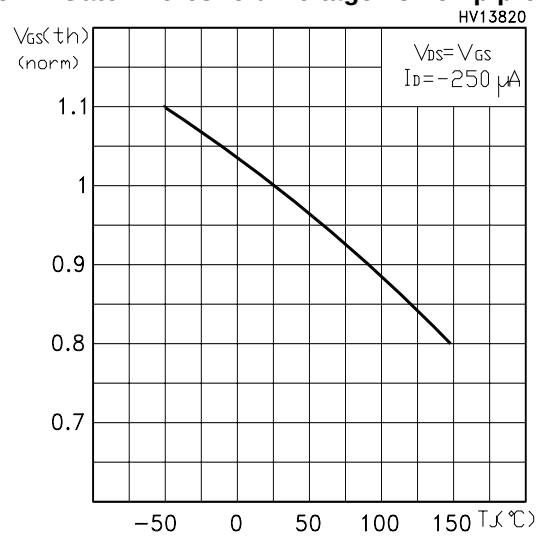
Gate Charge vs Gate-source Voltage p-ch



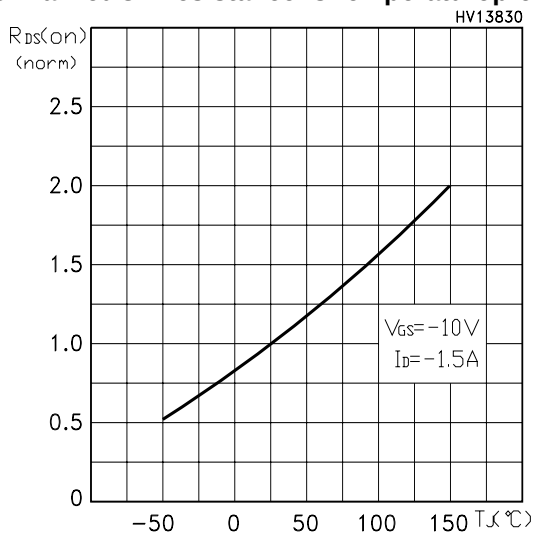
Capacitance Variations p-ch



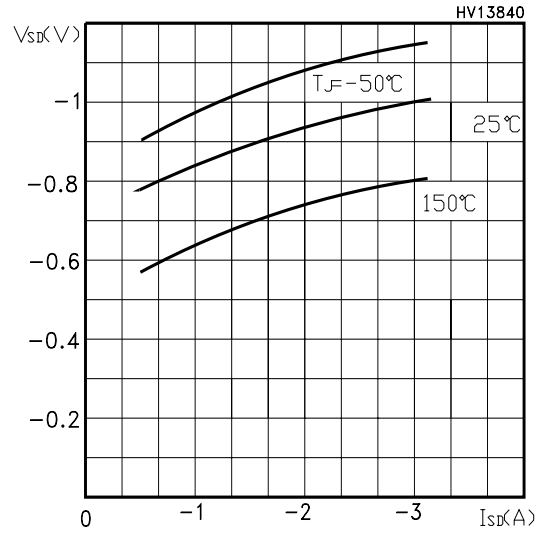
Norm. Gate Thereshold Voltage vs Temp p-ch



NormalizedOnResistancevsTemperaturep-ch



Source-drainDiodeForwardCharacteristicsp-ch



Normalized BVDSS vs Temperature p-ch

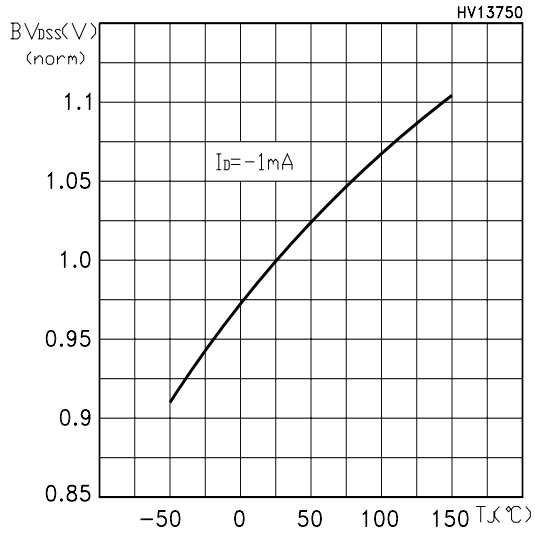


Fig. 1: Switching Times Test Circuit For Resistive Load

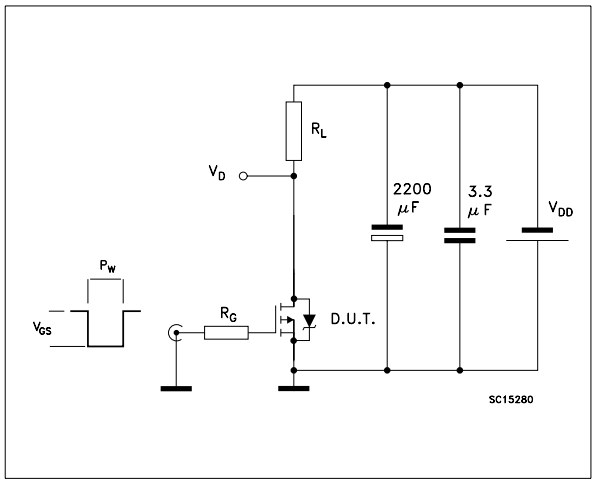


Fig. 2: Gate Charge test Circuit

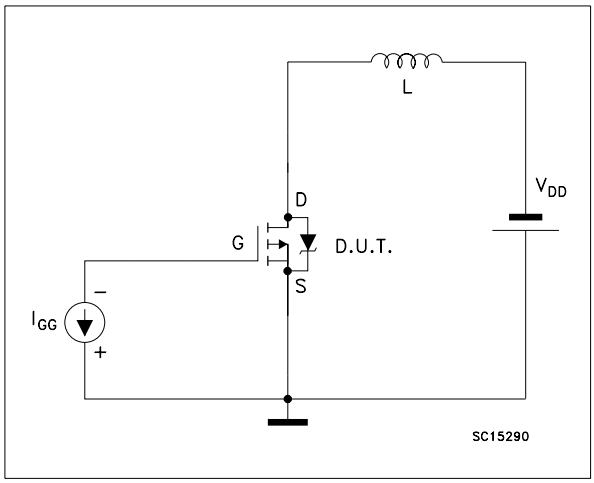
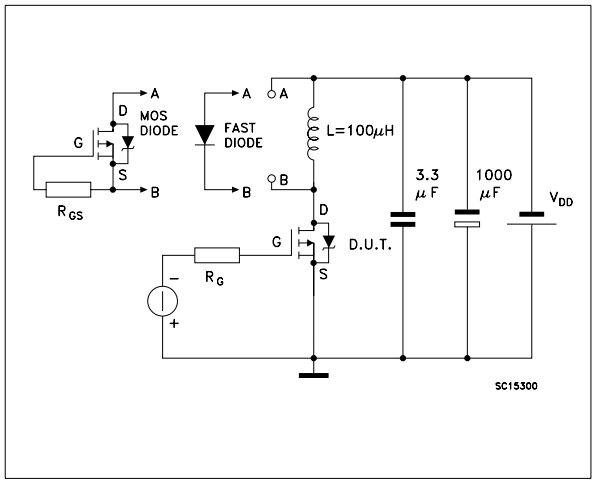
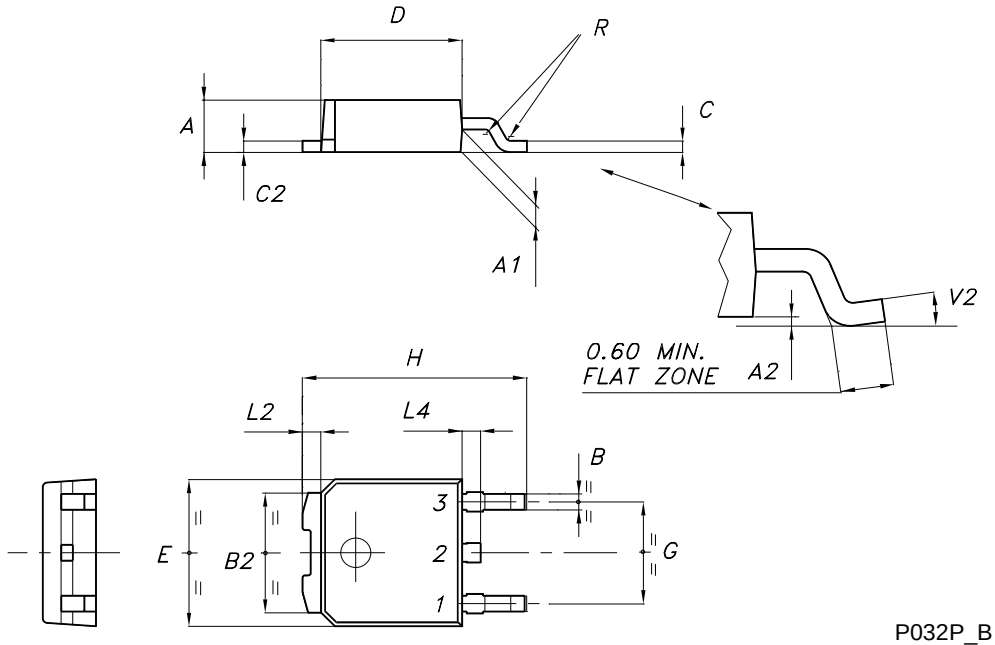


Fig. 3: Test Circuit For Diode Recovery Behaviour



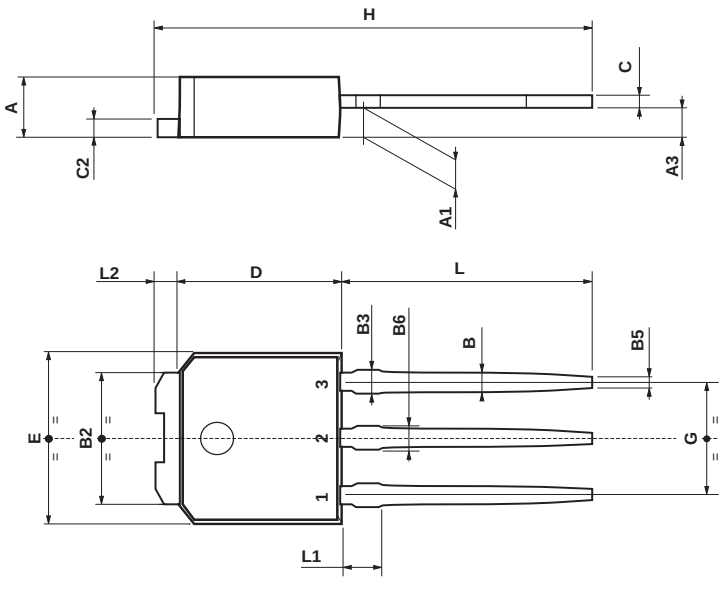
TO-252 (DPAK) MECHANICAL DATA

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



TO-251 (IPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A3	0.7		1.3	0.027		0.051
B	0.64		0.9	0.025		0.031
B2	5.2		5.4	0.204		0.212
B3			0.85			0.033
B5		0.3			0.012	
B6			0.95			0.037
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	15.9		16.3	0.626		0.641
L	9		9.4	0.354		0.370
L1	0.8		1.2	0.031		0.047
L2		0.8	1		0.031	0.039



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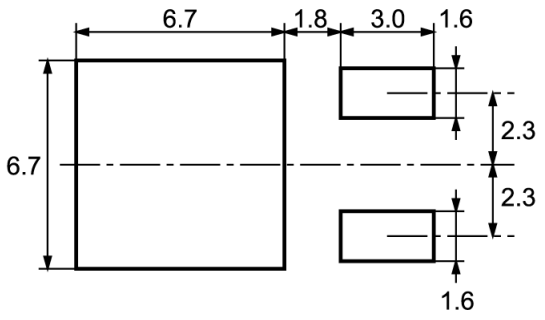
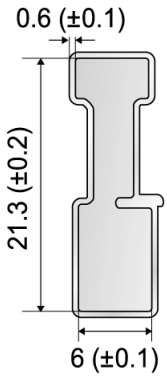
DPAK FOOTPRINT



All dimensions are in millimeters

TUBE SHIPMENT (no suffix)*



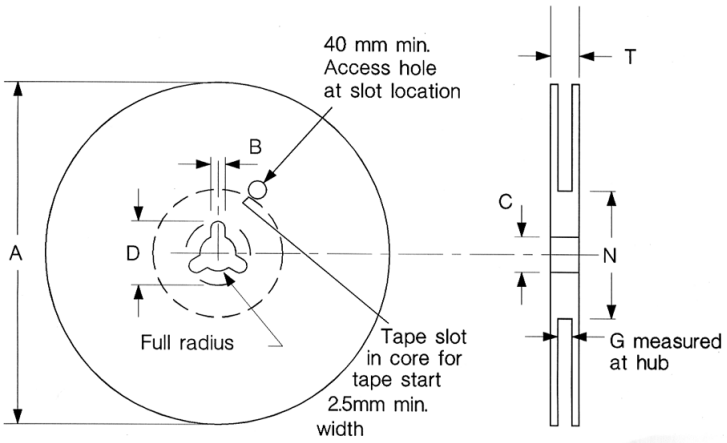
BASE QTY
75

BULK QTY
3000

Tube length 532 (±0.5)

All dimensions are in millimeters

TAPE AND REEL SHIPMENT (suffix "T4")*



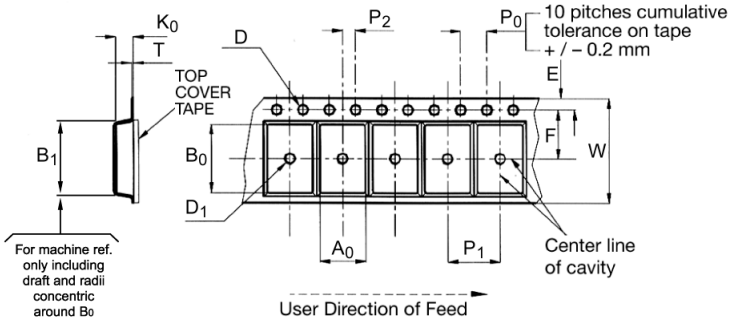
REEL MECHANICAL DATA

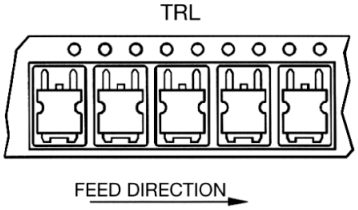
DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0.795	
G	16.4	18.4	0.645	0.724
N	50		1.968	
T		22.4		0.881

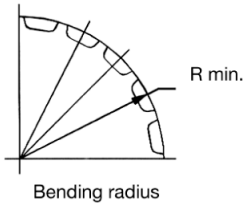
BASE QTY	BULK QTY
2500	2500

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







* on sales type