

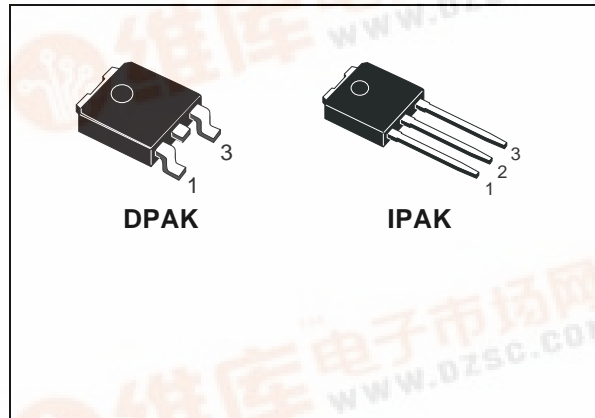


STD3PS25 - STD3PS25-1

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

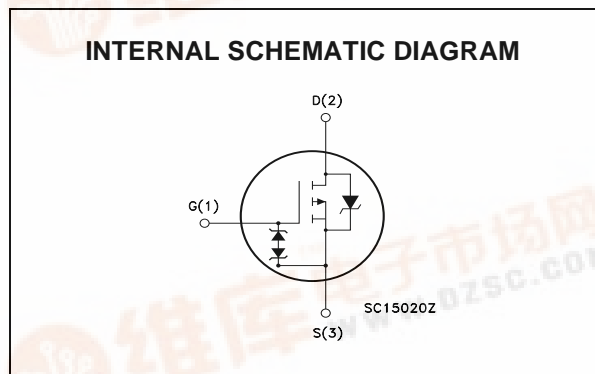


DESCRIPTION

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 converters for lighting applications.

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

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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 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			±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	$V_{DD} = 125V$, $I_D = 1.5A$ $R_G = 4.7\Omega$, $V_{GS} = 10V$ (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	$V_{DD} = 200V$, $I_D = 1.5A$, $R_G = 4.7\Omega$, $V_{GS} = 10V$ (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	$I_{SD} = 0.60A$, $di/dt = 100A/\mu s$, $V_{DD} = 40V$, $T_j = 150^\circ C$ (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	$I_{gs} = \pm 500 \mu A$ (Open Drain)	± 25			V

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

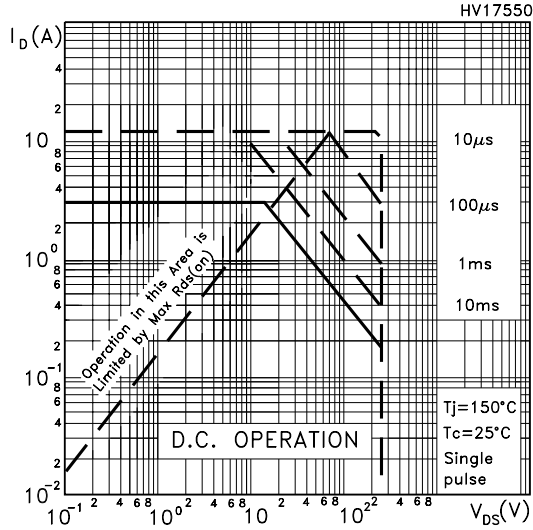
(5) Pulse width limited by safe operating area

PROTECTION FEATURES OF GATE-TO-SOURCE ZENER DIODES

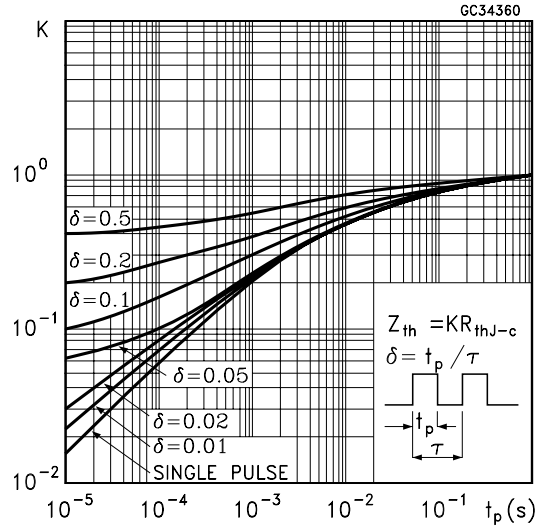
The built-in back-to-back Zener diodes have specifically been designed to enhance not only the device's ESD capability, but also to make them safely absorb possible voltage transients that may occasionally be applied from gate to source. In this respect the Zener voltage is appropriate to achieve an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

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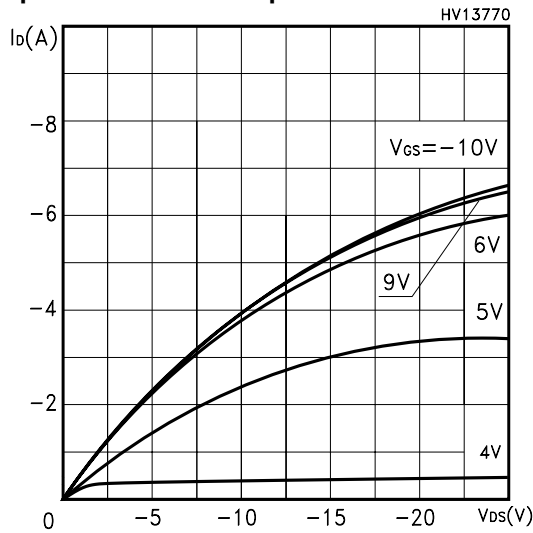
Safe Operating Area p-ch



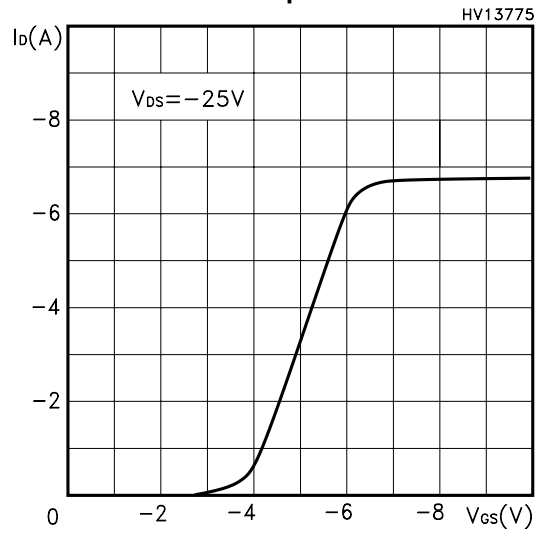
Thermal Impedance for Complementary pair



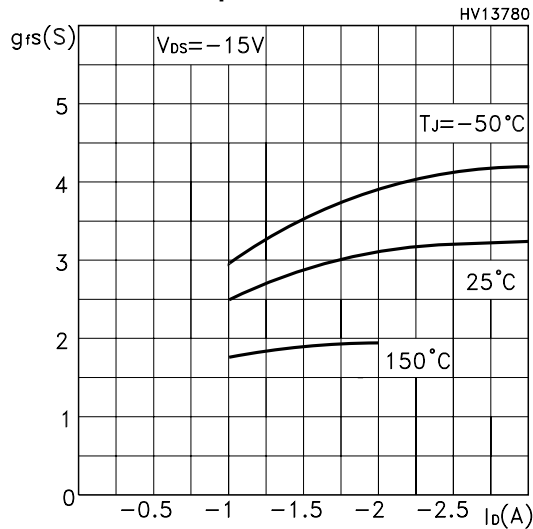
Output Characteristics p-ch



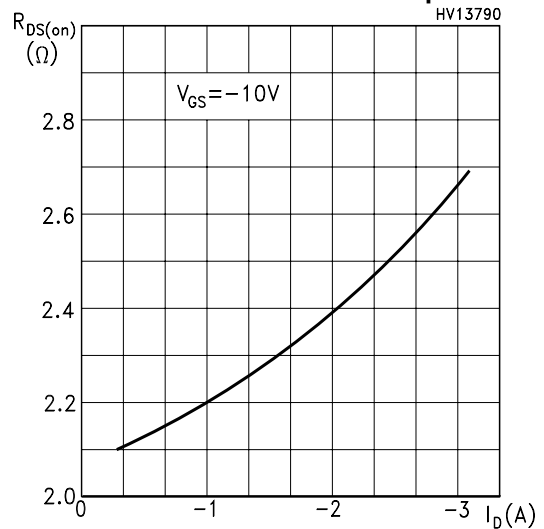
Transfer Characteristics p-ch



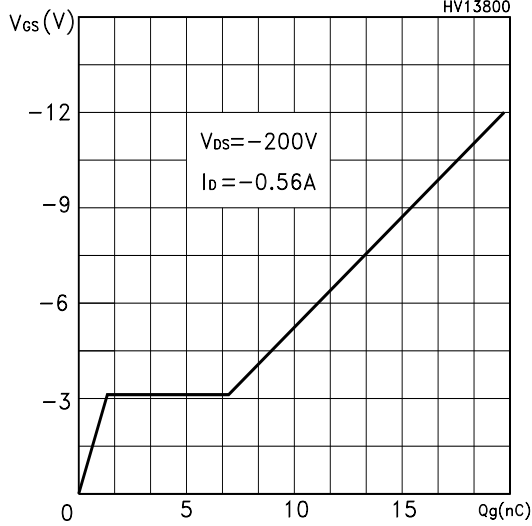
Transconductance p-ch



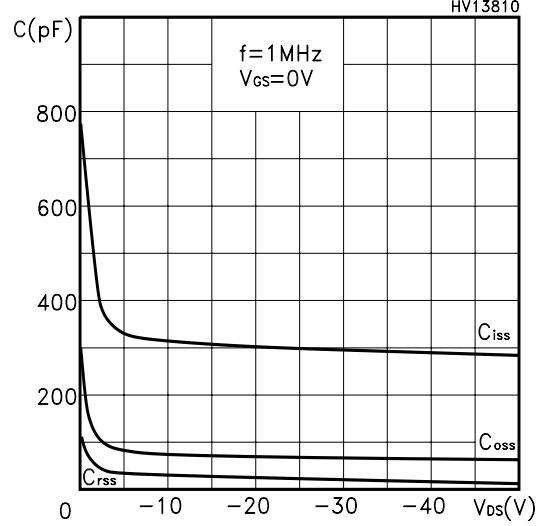
Static Drain-source On Resistance p-ch



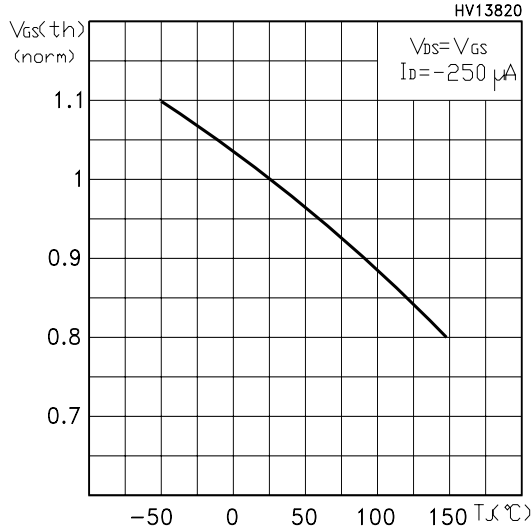
Gate Charge vs Gate-source Voltage p-ch



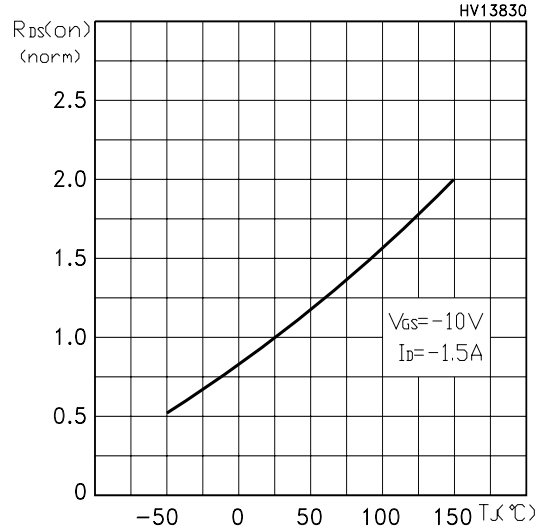
Capacitance Variations p-ch



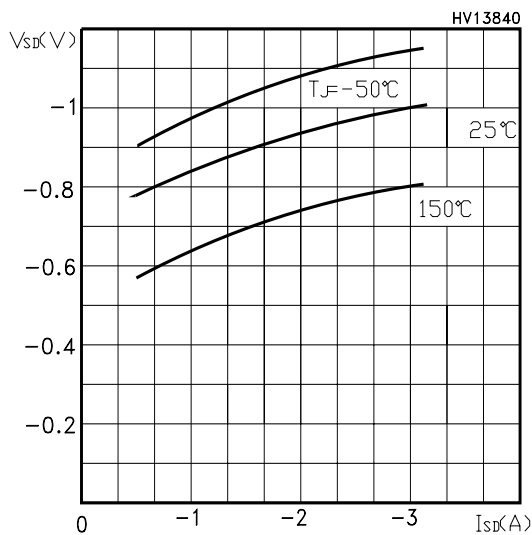
Norm. Gate Threshold Voltage vs Temp p-ch



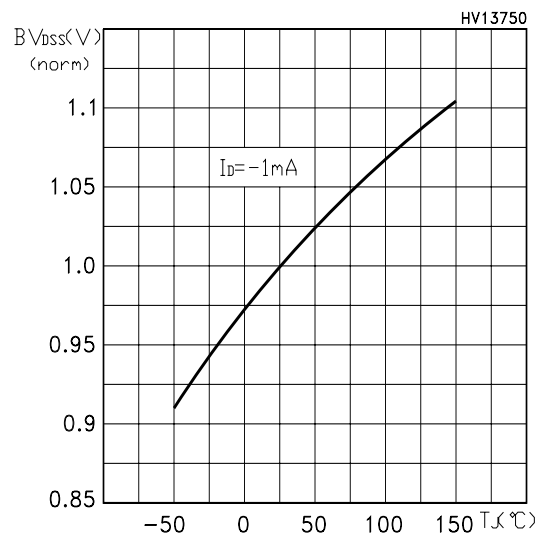
Normalized On Resistance vs Temperature p-ch



Source-drain Diode Forward Characteristics p-ch



Normalized BVDSS vs Temperature p-ch



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Fig. 1: Switching Times Test Circuit For Resistive Load

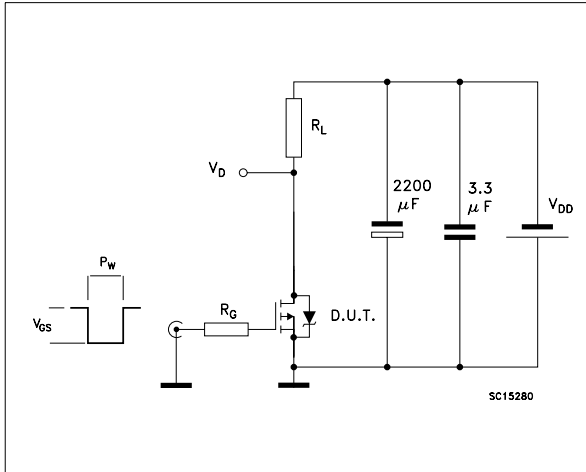


Fig. 2: Gate Charge test Circuit

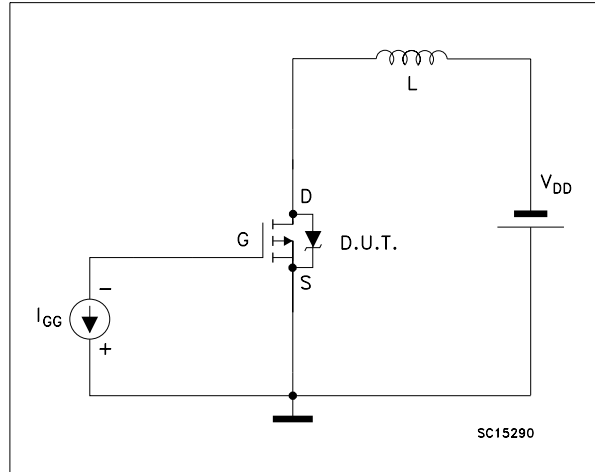
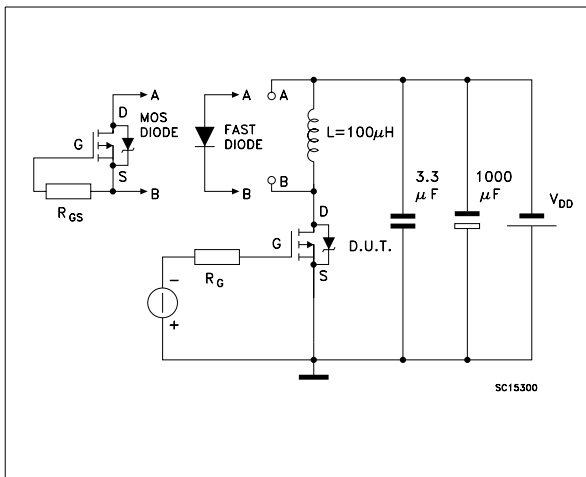
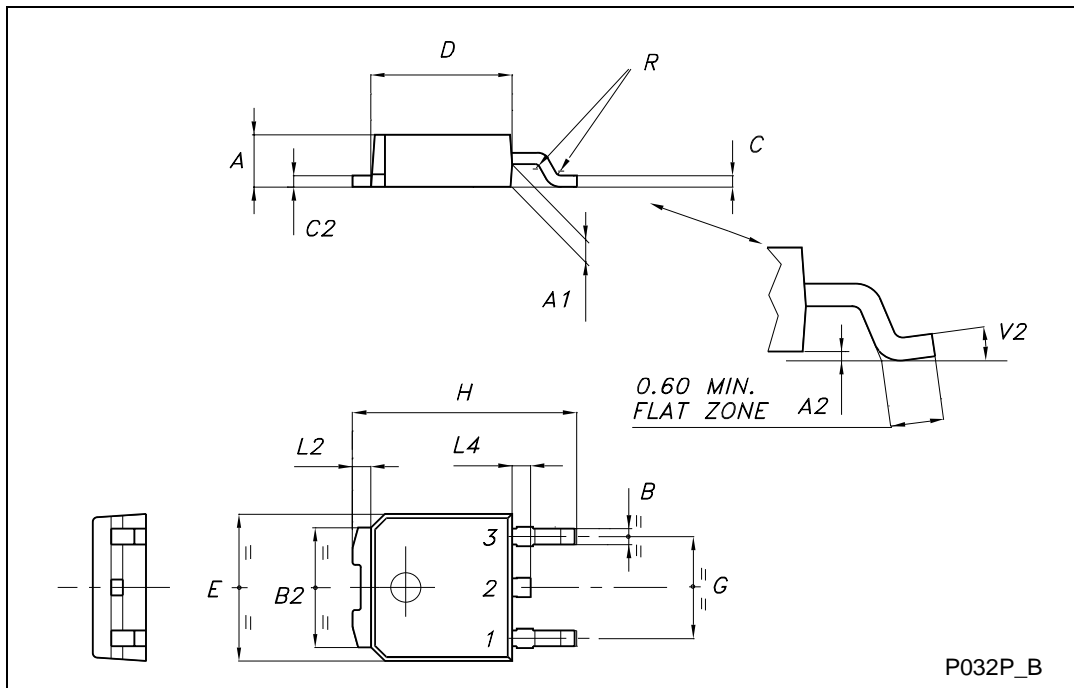


Fig. 3: Test Circuit For Diode Recovery Behaviour



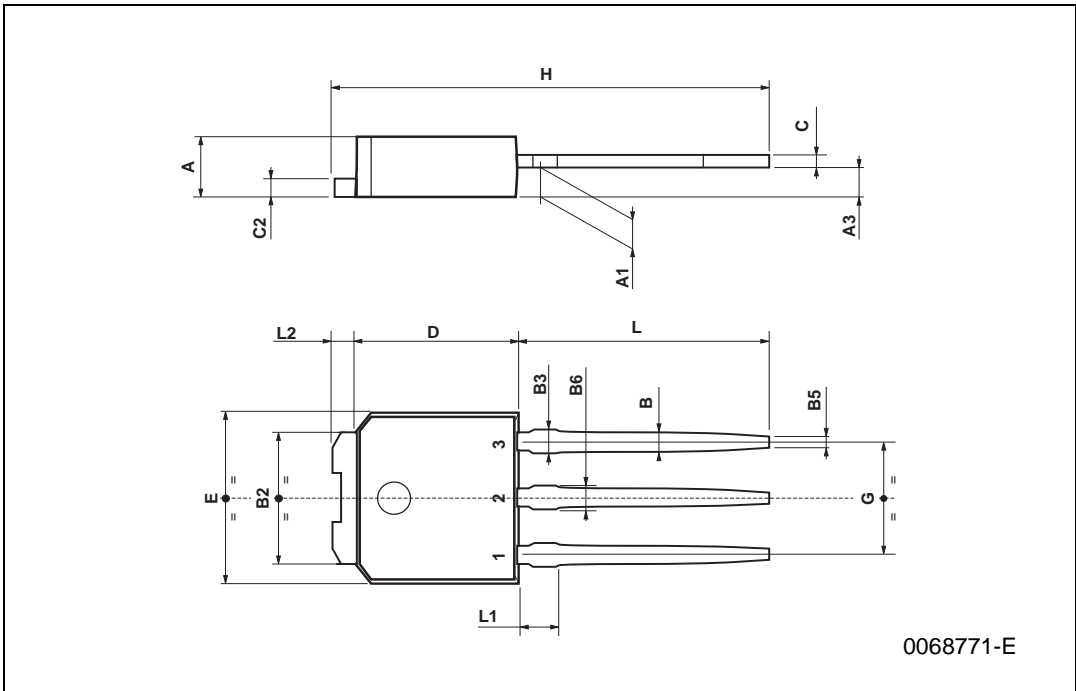
TO-252 (DPAK) MECHANICAL DATA

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°		8°	0°		0°

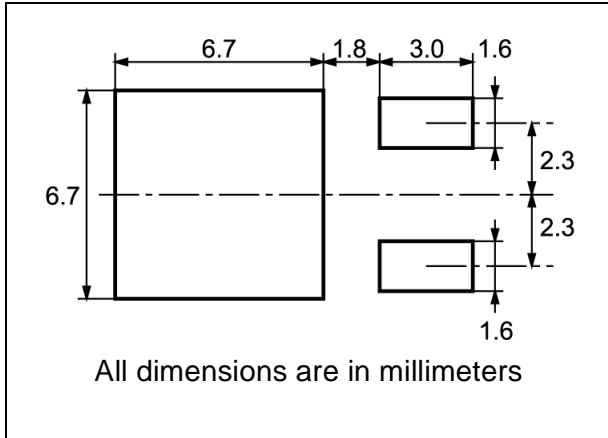


TO-251 (IPAK) MECHANICAL DATA

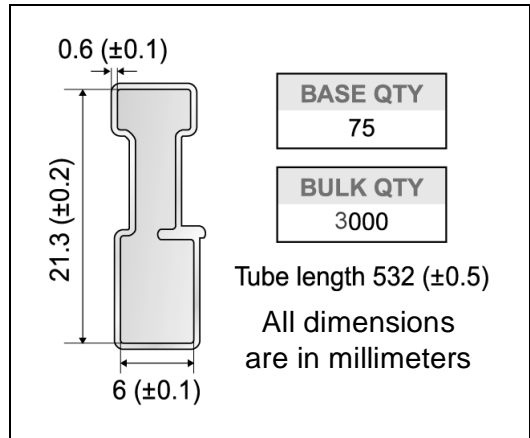
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A3	0.7		1.3	0.027		0.051
B	0.64		0.9	0.025		0.031
B2	5.2		5.4	0.204		0.212
B3			0.85			0.033
B5		0.3			0.012	
B6			0.95			0.037
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		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



DPAK FOOTPRINT



TUBE SHIPMENT (no suffix)*



TAPE AND REEL SHIPMENT (suffix "T4")*

40 mm min. Access hole at slot location

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

Full radius

G measured at hub

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

TOP COVER TAPE

10 pitches cumulative tolerance on tape +/- 0.2 mm

Center line of cavity

User Direction of Feed

FEED DIRECTION

Bending radius R min.

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

* on sales type

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