STD17NF03L
STD17NF03L-1

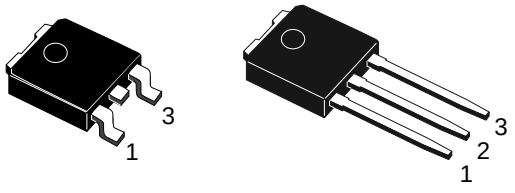
N-CHANNEL 30V - 0.038Ω - 17A - DPAK/IPAK
STripFET™II MOSFET

Table 1: General Features

TYPE	V_{DSS}	$R_{DS(on)}$	I_D
STD17NF03L	30 V	< 0.05 Ω	17 A
STD17NF03L-1	30 V	< 0.05 Ω	17 A

- TYPICAL $R_{DS}(on)$ = 0.038Ω
- EXCEPTIONAL dv/dt CAPABILITY
- LOW GATE CHARGE AT 100°C
- APPLICATION ORIENTED CHARACTERIZATION
- 100% AVALANCHE TESTED

Figure 1: Package

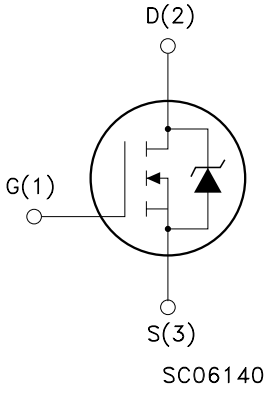


DPAK **IPAK**

DESCRIPTION

This 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.

Figure 2: Internal Schematic Diagram



APPLICATIONS

- DC-DC & DC-AC CONVERTERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- AUTOMOTIVE ENVIRONMENT

Table 2: Order Codes

SALES TYPE	MARKING	PACKAGE	PACKAGING
STD17NF03LT4	D17NF03L@	DPAK	TAPE & REEL
STD17NF03L-1	D17NF03L@	IPAK	TUBE

Rev. 3

NEW DATASHEET ACCORDING TO PCN DSG-TRA/04/532

Table 3: Absolute Maximum ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source Voltage (V_{GS} = 0)	30	V
V_{DGR}	Drain-gate Voltage (R_{GS} = 20 kΩ)	30	V
V_{GS}	Gate- source Voltage	±16	V
I_D	Drain Current (continuous) at T_C = 25°C	17	A
I_D	Drain Current (continuous) at T_C = 100°C	12	A
I_{DM} (●)	Drain Current (pulsed)	68	A
P_{TOT}	Total Dissipation at T_C = 25°C	30	W
	Derating Factor	0.2	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	7	V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	200	mJ
T_{stg}	Storage Temperature	–55 to 175	°C
T_j	Operating Junction Temperature	175	°C

(1) $I_{SD} \leq 17A$, $di/dt \leq 300A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_j \leq T_{JMAX.}$.
(2) Starting T_j=25°C, I_D=8.5A, V_{DD}=15V
(●) Pulse width limited by safe operating area

Table 4: Thermal Data

Rthj-case	Thermal Resistance Junction-case Max	5.0	°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)

Table 5: Off

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	I_D = 250 µA, V_{GS} = 0	30			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} = ±16V			±100	nA

Table 6: On

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA	1	1.5	2.2	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V, I_D = 8.5 A		0.038	0.05	Ω
		V_{GS} = 5 V, I_D = 8.5 A		0.045	0.06	Ω

ELECTRICAL CHARACTERISTICS (CONTINUED)

Table 7: Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$, I_D =8.5A		12		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		320 155 28		pF pF pF

Table 8: Switching On

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	V_{DD} = 15V, I_D = 8.5A R_G = 4.7Ω V_{GS} = 5V (see Figure 16)		11 100		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	V_{DD} = 24V, I_D = 17A, V_{GS} = 5V		4.8 2.25 1.7	6.5	nC nC nC

Table 9: Switching Off

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off-Delay Time Fall Time	V_{DD} = 15V, I_D = 8.5A, R_G=4.7Ω, V_{GS} = 5V (see Figure 16)		25 22		ns ns
$t_{r(off)}$ t_f t_c	Off-voltage Rise Time Fall Time Cross-over Time	Vclamp =24V, I_D =17A R_G=4.7Ω, V_{GS} = 5V (see Figure 17)		22 55 75		ns ns ns

Table 10: Source Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				22	A
I_{SDM} (2)	Source-drain Current (pulsed)				88	A
V_{SD} (1)	Forward On Voltage	I_{SD} = 17A, V_{GS} = 0			1.5	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	I_{SD} = 17A, di/dt = 100A/µs, V_{DD} = 15V, T_j = 150°C (see test circuit, Figure 5)		28 18 1.3		ns nC A

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

Figure 3: Safe Operating Area

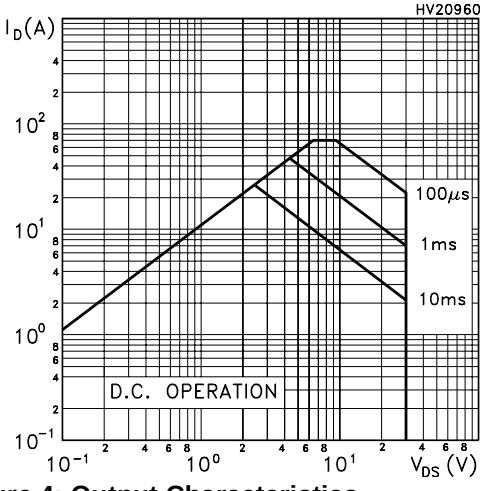


Figure 4: Output Characteristics

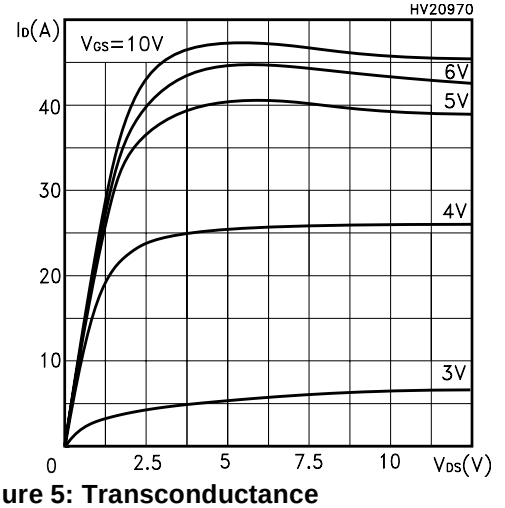


Figure 5: Transconductance

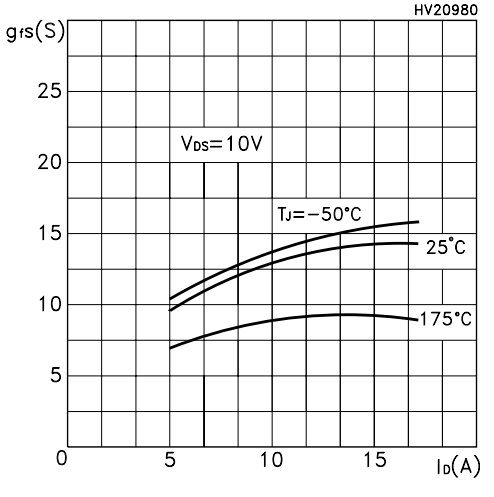


Figure 6: Thermal Impedance

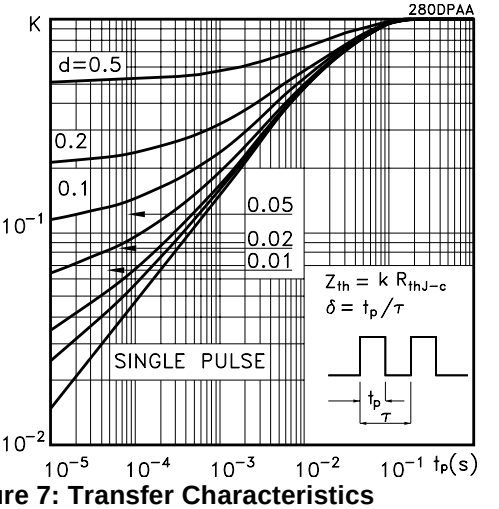


Figure 7: Transfer Characteristics

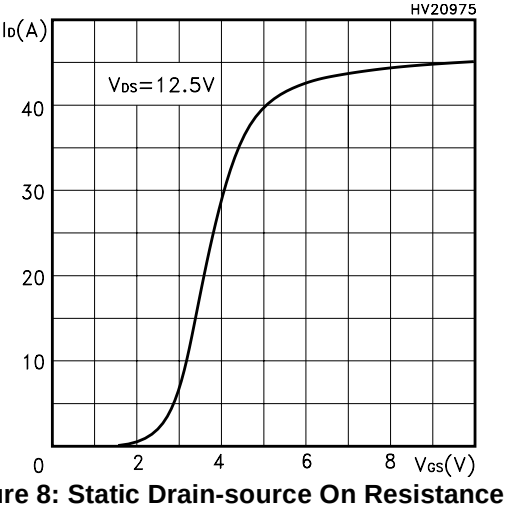


Figure 8: Static Drain-source On Resistance

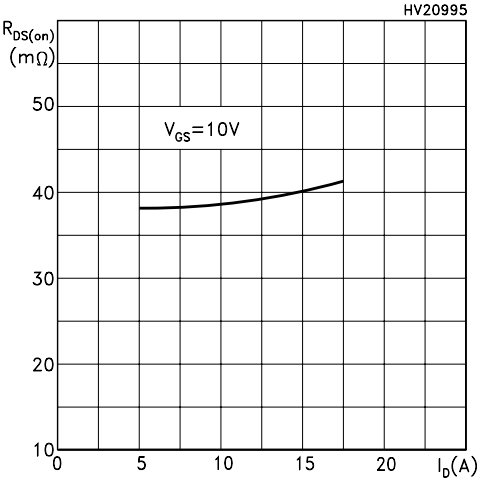


Figure 9: Gate Charge vs Gate-source Voltage

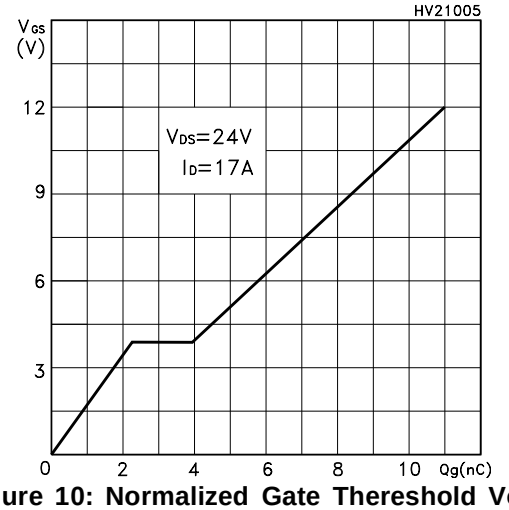


Figure 10: Normalized Gate Thereshold Voltage vs Temperature

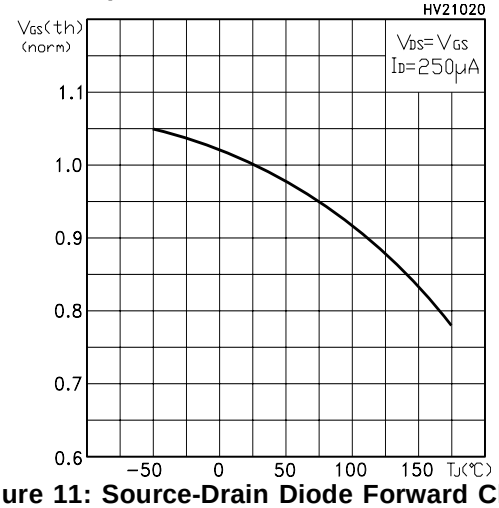


Figure 11: Source-Drain Diode Forward Characteristics

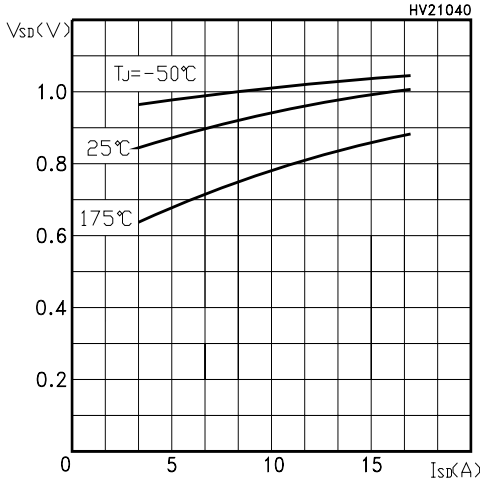


Figure 12: Capacitance Variations

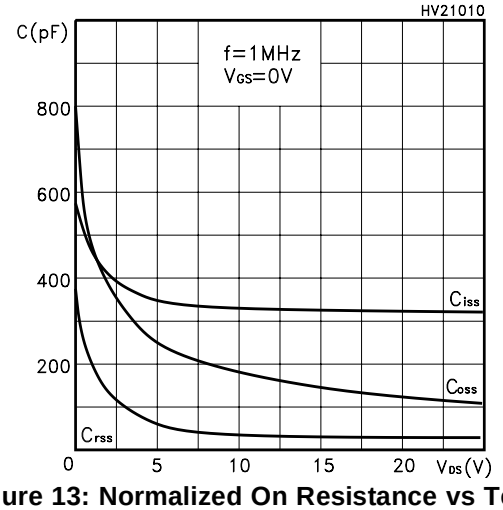


Figure 13: Normalized On Resistance vs Temperature

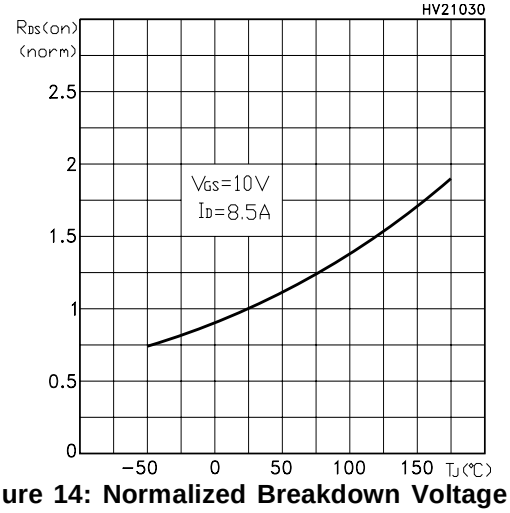


Figure 14: Normalized Breakdown Voltage vs Temperature

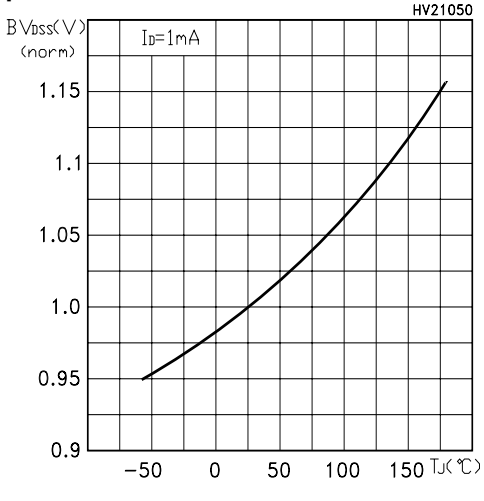


Figure 15: Unclamped Inductive Load Test Circuit

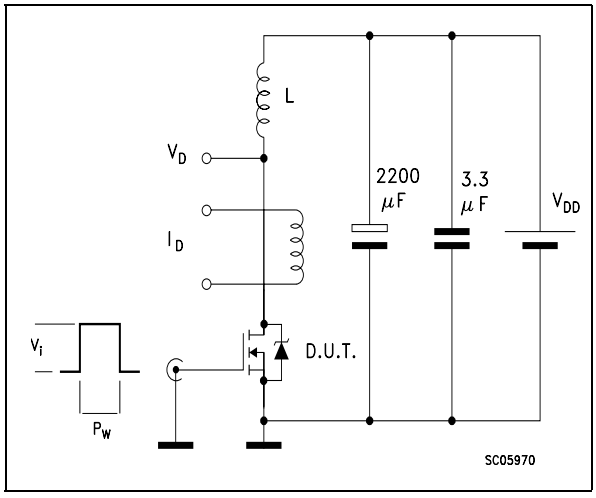


Figure 16: Switching Times Test Circuit For Resistive Load

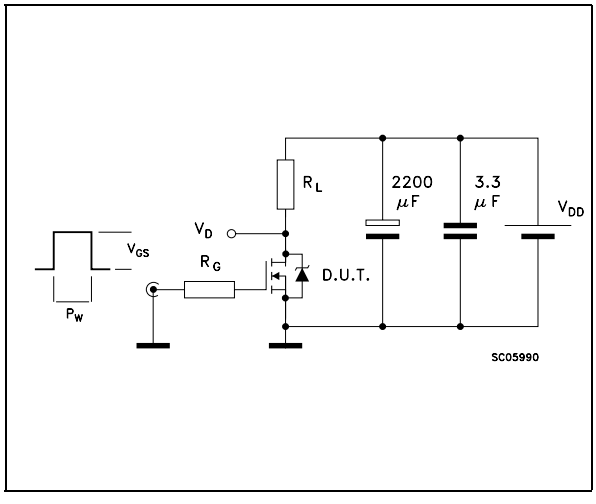


Figure 17: Test Circuit For Inductive Load Switching and Diode Recovery Times

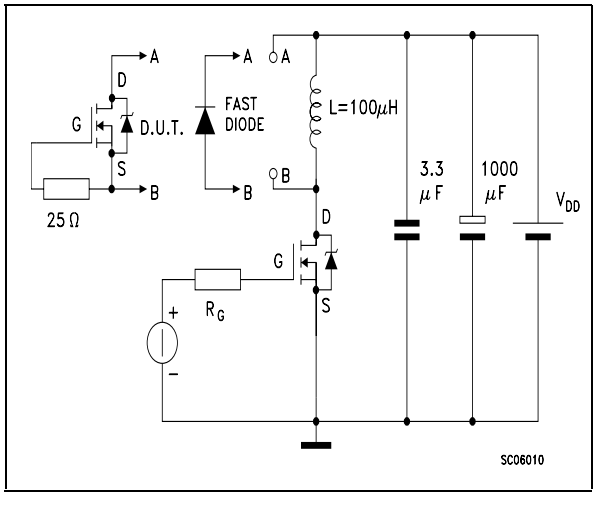


Figure 18: Unclamped Inductive Wafeform

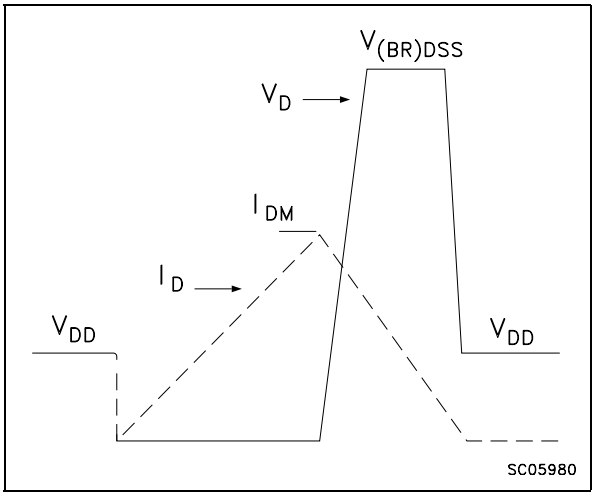
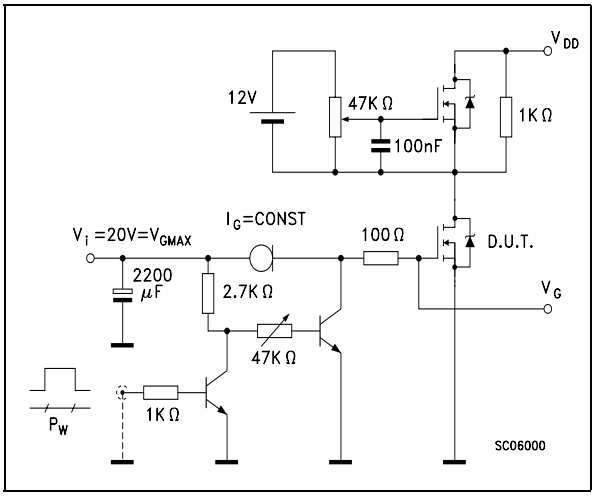
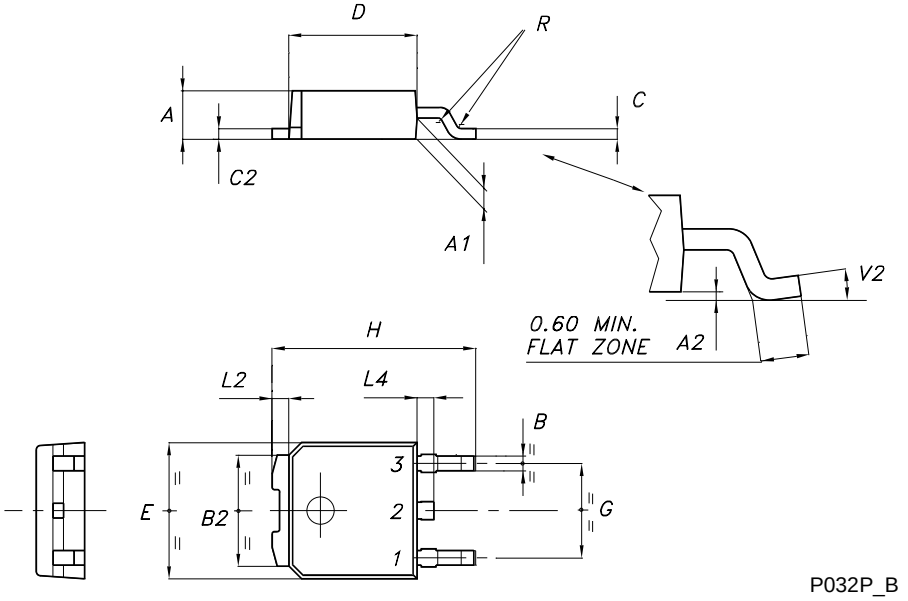


Figure 19: Gate Charge Test Circuit



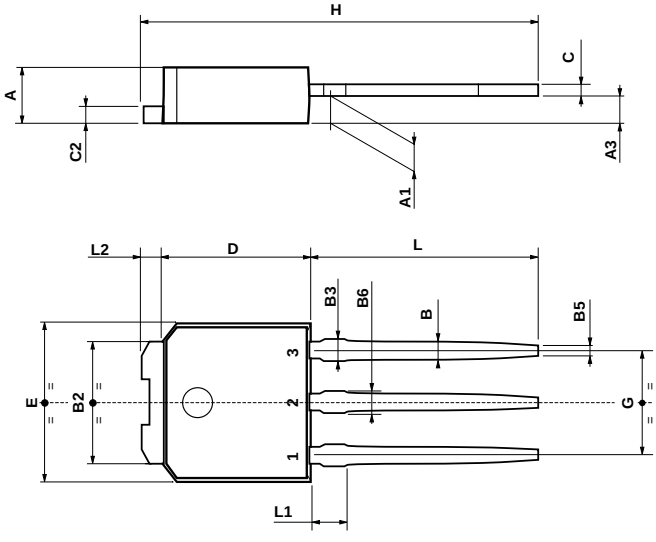
TO-252 (DPAK) MECHANICAL DATA

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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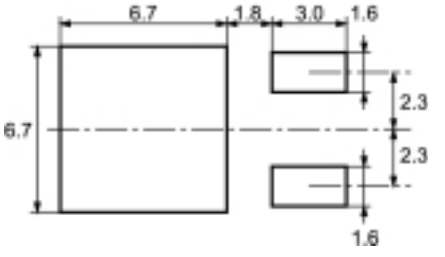
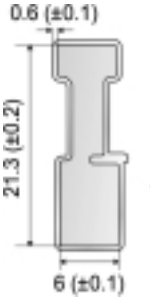
DPAK FOOTPRINT



All dimensions are in millimeters

TUBE SHIPMENT (no suffix)*



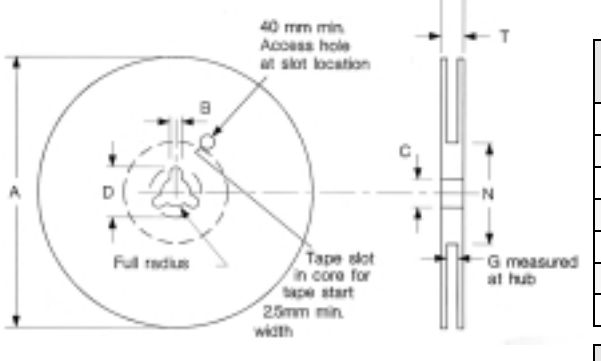
BASE QTY 75

BULK QTY 3000

Tube length 532 (±0.5)

All dimensions are in millimeters

TAPE AND REEL SHIPMENT (suffix "T4")*



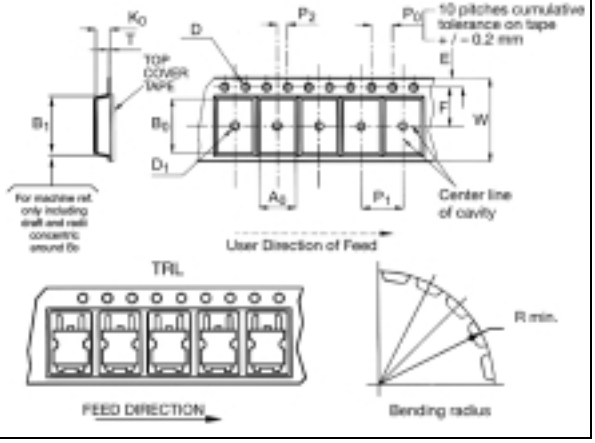
REEL MECHANICAL DATA

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

Table 11: Revision History

Date	Revision	Description of Changes
08-June-2004	2	New Stylesheet. Datasheet according to PCN DSG-TRA/04/532
19-Oct-2004	3	Modified value in title