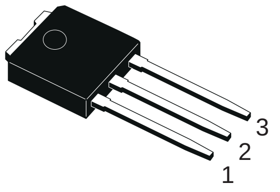
STD17NF03L

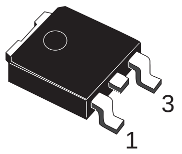
N-CHANNEL 30V - 0.038Ω - 17A - DPAK/IPAK
STripFET™ POWER MOSFET

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

- TYPICAL R_{DS}(on) = 0.038Ω
- EXCEPTIONAL dv/dt CAPABILITY
- APPLICATION ORIENTED CHARACTERIZATION
- ADD SUFFIX “T4” FOR ORDERING IN TAPE & REEL
- ADD SUFFIX “-1” FOR ORDERING IN IPAK VERSION



IPAK

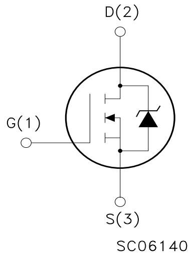


DPAK

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

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

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	±20	V
I_D	Drain Current (continuos) at T_C = 25°C	17	A
I_D	Drain Current (continuos) at T_C = 100°C	12	A
I_{DM} (●)	Drain Current (pulsed)	68	A
P_{TOT}	Total Dissipation at T_C = 25°C	20	W
	Derating Factor	0.13	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	6	V/ns
E_{AS} (2)	Single Pulse Avalanche Energy	200	mJ
T_{stg}	Storage Temperature	–65 to 175	°C
T_j	Max. Operating Junction Temperature	175	°C

(●) Pulse width limited by safe operating area

(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=11A, V_{DD}=15V

THERMAL DATA

Rthj-case	Thermal Resistance Junction-case Max	7.5	°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	30			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 (1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA	1			V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS} = 10V, I_D = 8.5 A V_{GS} = 5 V, I_D = 8.5 A		0.038 0.045	0.05 0.06	Ω
$I_{D(on)}$	On State Drain Current	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$, V_{GS} = 10V	17			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward Transconductance	V_{DS} > $I_{D(on)}$ x $R_{DS(on)max}$, I_D =11A		7		S
C_{iss} C_{oss} C_{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{DS} = 25V, f = 1 MHz, V_{GS} = 0		330 90 40		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} = 15V, I_D = 8.5A R_G = 4.7Ω V_{GS} = 4.5V (see test circuit, Figure 3)		11		ns
t_r	Rise Time			100		ns
Q_g	Total Gate Charge	V_{DD} = 24V, I_D = 17A, V_{GS} = 10V		6.5	9	nC
Q_{gs}	Gate-Source Charge			3.6		nC
Q_{gd}	Gate-Drain Charge			2		nC

SWITCHING OFF

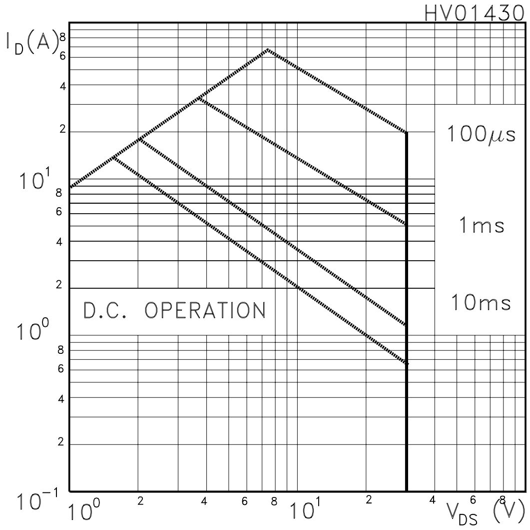
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$	Turn-off-Delay Time	V_{DD} = 15V, I_D = 8.5A, R_G = 4.7Ω, V_{GS} = 4.5V (see test circuit, Figure 3)		25		ns
t_f	Fall Time			22		ns
$t_{r(off)}$	Off-voltage Rise Time	Vclamp =24V, I_D =17A R_G = 4.7Ω, V_{GS} = 4.5V		22		ns
t_f	Fall Time	(see test circuit, Figure 5)		55		ns
t_c	Cross-over Time			75		ns

SOURCE DRAIN DIODE

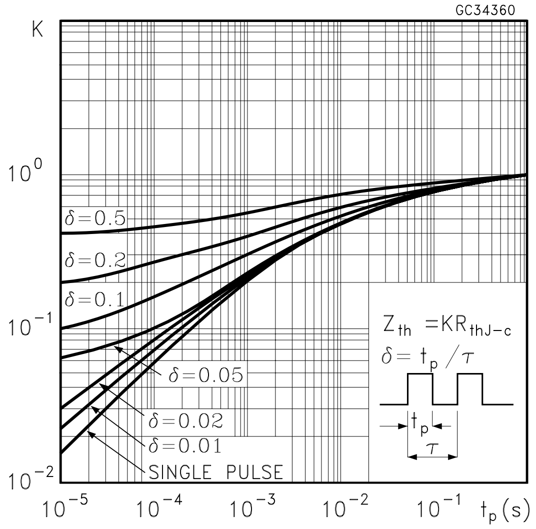
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				17	A
I_{SDM} (1)	Source-drain Current (pulsed)				68	A
V_{SD} (2)	Forward On Voltage	I_{SD} = 17A, V_{GS} = 0			1.5	V
t_{rr}	Reverse Recovery Time	I_{SD} = 17A, di/dt = 100A/µs, V_{DD} = 15V, T_j = 150°C (see test circuit, Figure 5)		30		ns
Q_{rr}	Reverse Recovery Charge			18		nC
I_{RRM}	Reverse Recovery Current			1.2		A

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

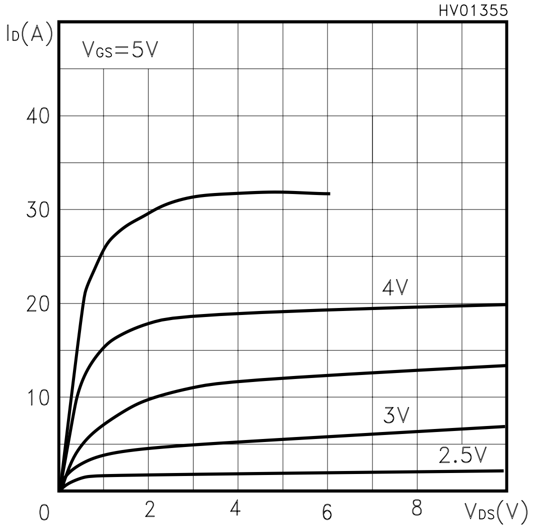
Safe Operating Area



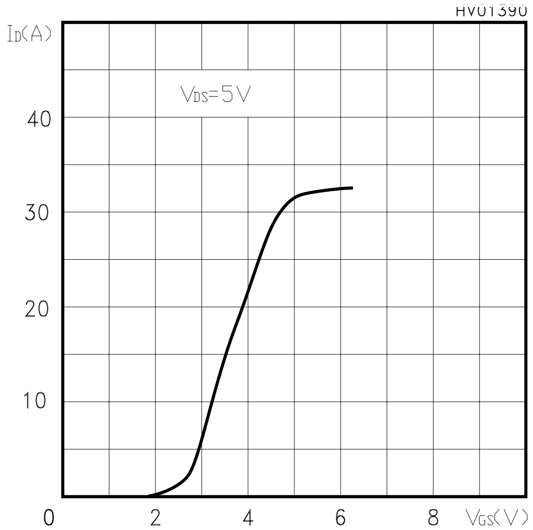
Thermal Impedence



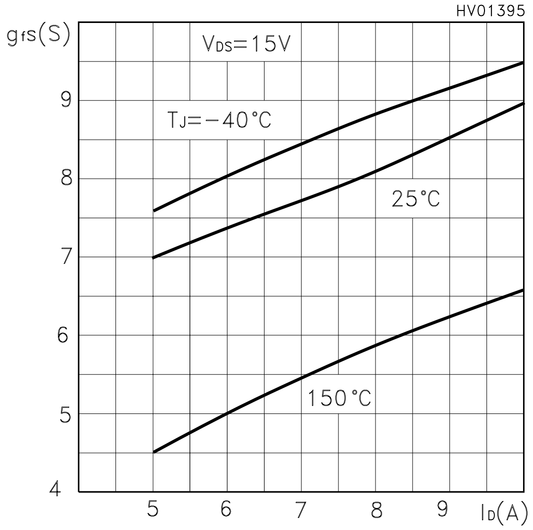
Output Characteristics



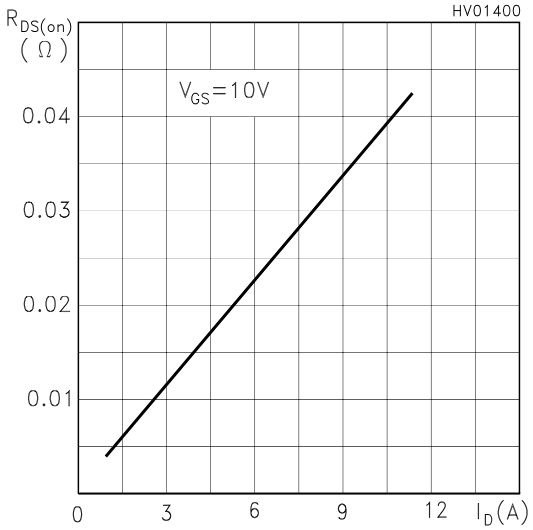
Transfer Characteristics



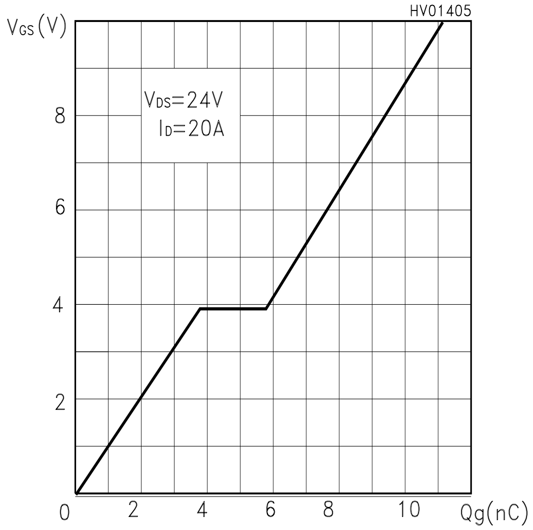
Transconductance



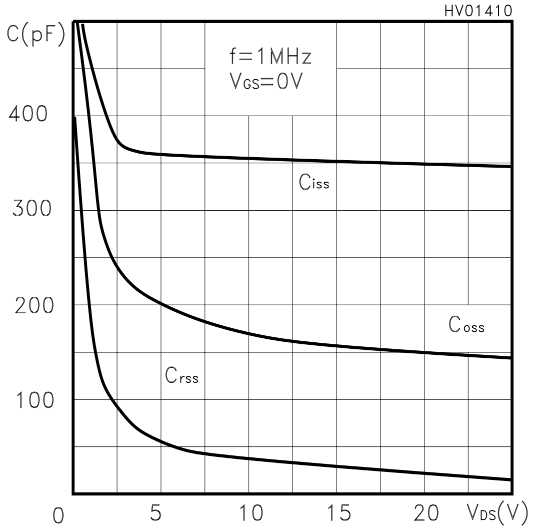
Static Drain-source On Resistance



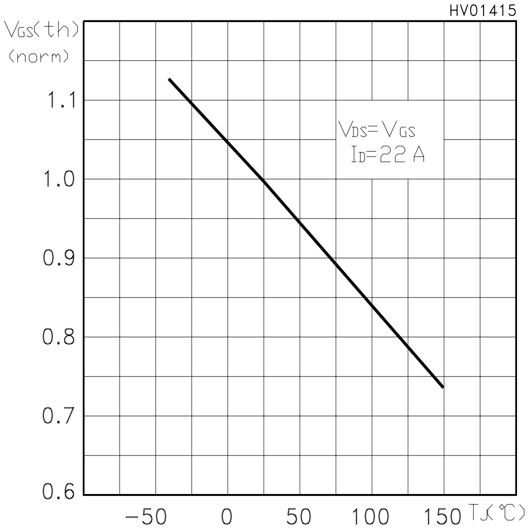
Gate Charge vs Gate-source Voltage



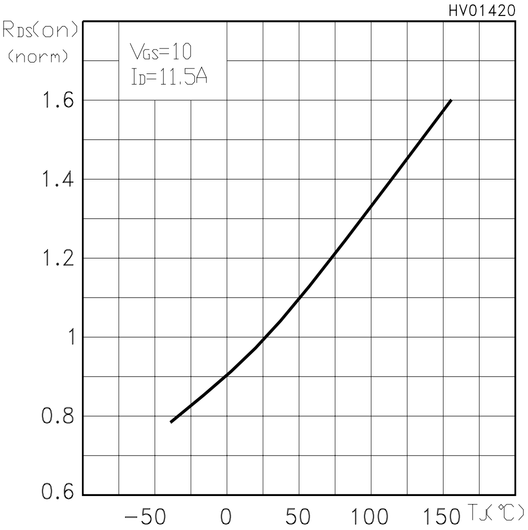
Capacitance Variations



Normalized Gate Thereshold Voltage vs Temp.



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics

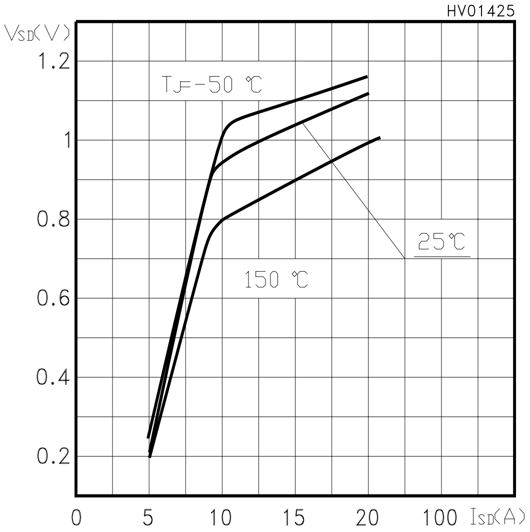


Fig. 1: Unclamped Inductive Load Test Circuit

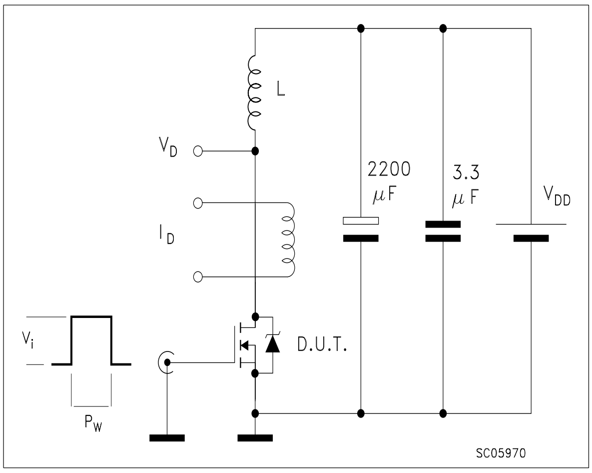


Fig. 2: Unclamped Inductive Waveform

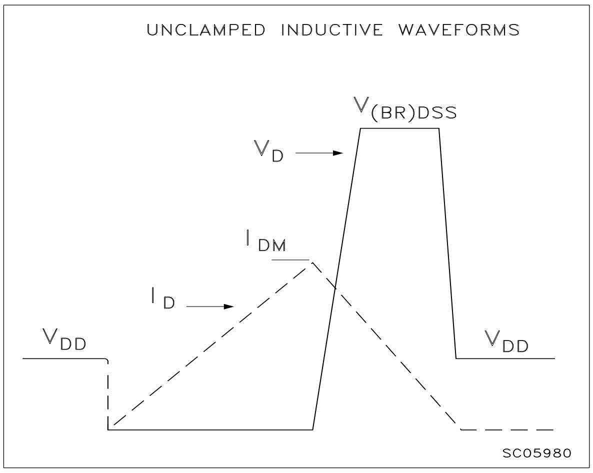


Fig. 3: Switching Times Test Circuit For Resistive Load

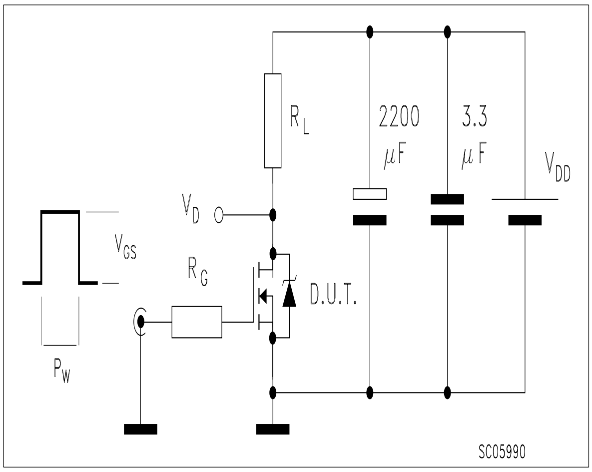


Fig. 4: Gate Charge test Circuit

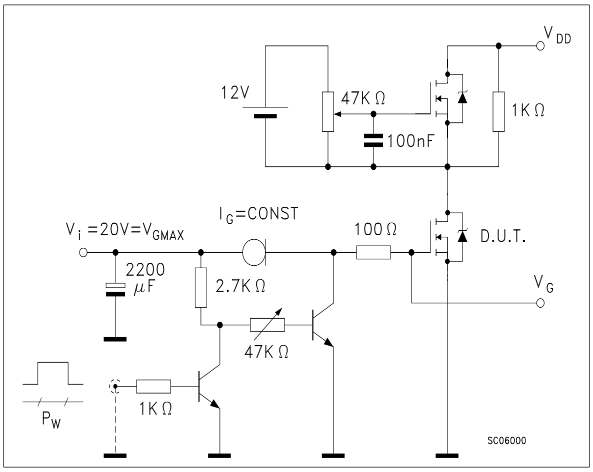
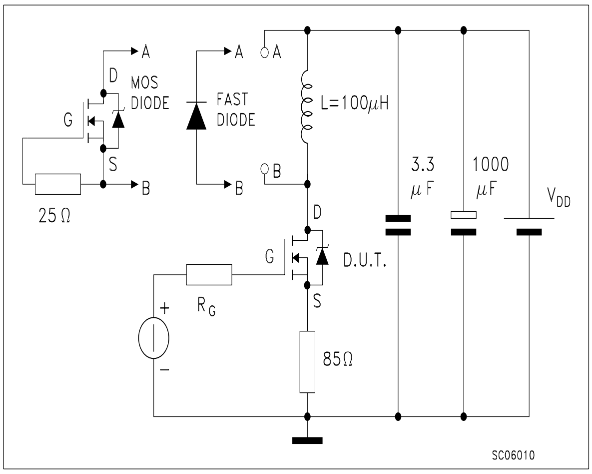
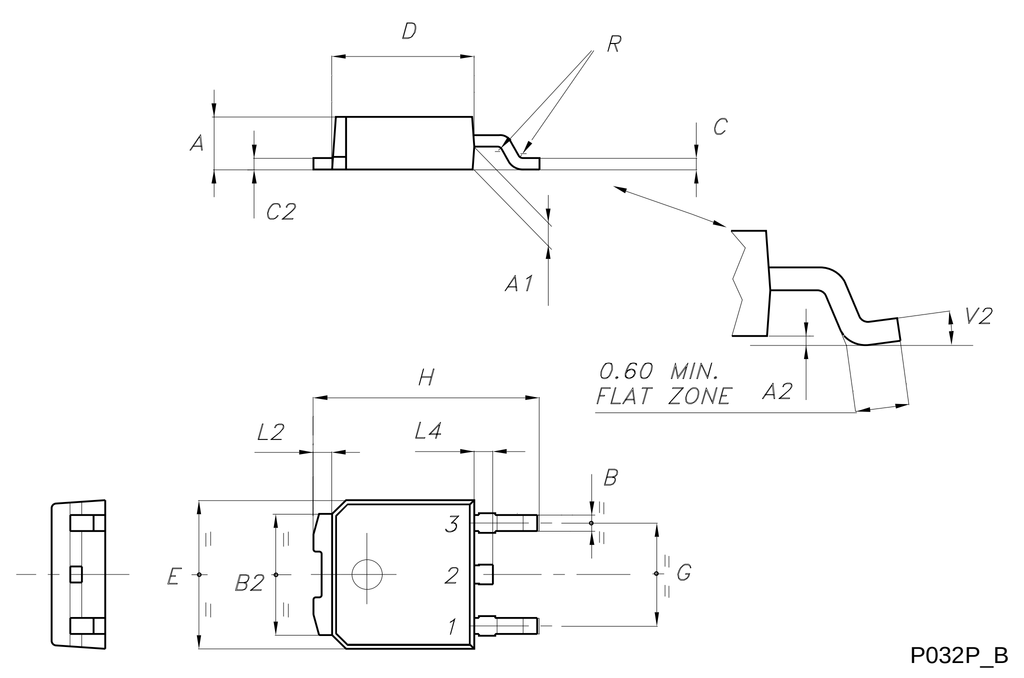


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



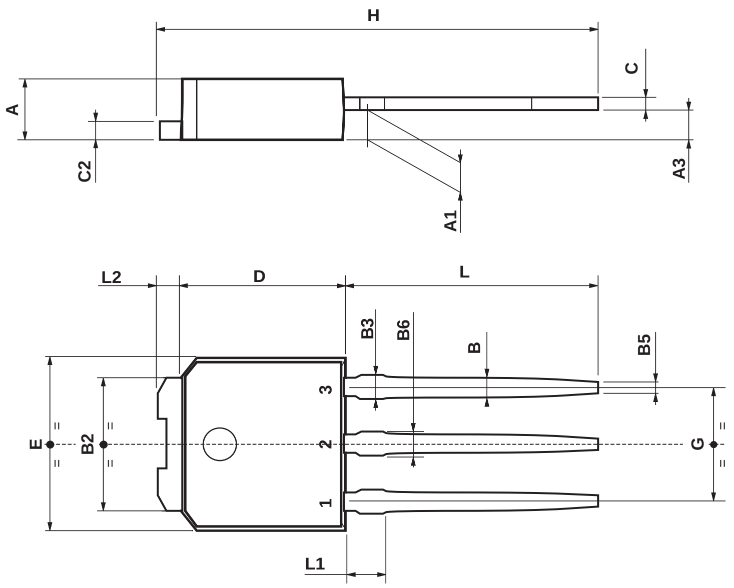
TO-252 (DPAK) MECHANICAL DATA

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



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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