Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

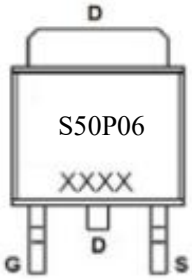
Bvdss	Rdson	ID
-60V	20mΩ	-50A

Application

- DC-DC Converters
- Synchronous-rectification applications
- Power management functions

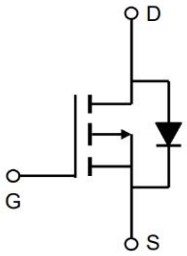
RoHS

Package



Marking and pin assignment

TO-252-3L Top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
50P06	S50P06	TO-252-3L	2500

Absolute Maximum Ratings (T_J=25℃unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25° C	I_D	-50	A
	T_C=100° C	I_D	-25	A
Pulsed Drain Current		I_{DM} [1]	-150	A
Single Pulse Avalanche Energy		E_{AS} [2]	200	mJ
Power Dissipation	T_C = 25℃	P_D	95	W
Operating junction and storage temperature		T_J, T_{STG}	150, -55 ~ 150	℃
Maximum Temperature for Soldering		T_L	260	℃

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Case	$R_{\theta JC}$	1.32	℃/W
Thermal Resistance, Junction -to-Ambient	$R_{\theta JA}$	60	℃/W

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HLS50P06	TO-252-3L	1	2	3	Tape Reel

Electrical Characteristics (Tj=25℃ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-60	-	-	V
Gate-body Leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -60V, V_{GS} = 0V	-	-	1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} =V_{GS} , I_D = -250μA	-1.3	-1.8	-2.3	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -10A	-	20	25	mΩ
		V_{GS} = -4.5V, I_D = -8A	-	25	32	
Forward Transconductance	g_{fs}	V_{DS} = -5V, I_D = -5A	-	20	-	S
Input Capacitance	C_{ISS}	V_{DS} = -30V,V_{GS} =0V, f =1MHz	-	1500	-	pF
Output Capacitance	C_{OSS}		-	248	-	
Reverse Transfer Capacitance	C_{RSS}		-	12	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS} Open	-	8.0	-	Ω
Total Gate Charge	Q_g	V_{GS} = -10V,V_{DS} = -30V, I_D = -10A	-	22	-	nC
Gate-Source Charge	Q_{gs}		-	3.7	-	
Gate-Drain Charge	Q_{gd}		-	3	-	
Turn-On Delay Time	$T_{d(on)}$	V_{GS} = -10V, V_{DS} = -30V, R_G = 3Ω, I_D = -10A R_L = 3Ω	-	15	-	ns
Rise Time	T_R		-	17	-	
Turn-Off Delay Time	$T_{d(off)}$		-	40	-	
Fall Time	T_F		-	45	-	
Diode Forward Current	I_S	T_C=25℃	-	-	-50	A
Diode Pulse Current	I_{SM}		-	-	-150	A
Diode Forward Voltage	V_{SD}	I_S=-5A, V_{GS}=0V	-	-	-1.2	V

Reverse Recovery time	T_{rr}	I_S=-10A, V_{DD}=-30V	-	60	-	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs	-	105	-	nC

Note :

1.Repetitive rating; pulse width limited by maximum junction temperature

2.V_{DD} =30V, L=0.3mH, R_G =25Ω, Starting T_j=25℃

Typical Performance Characteristics

Fig1:Typ. output characteristics

$I_D=f(-V_{DS})$

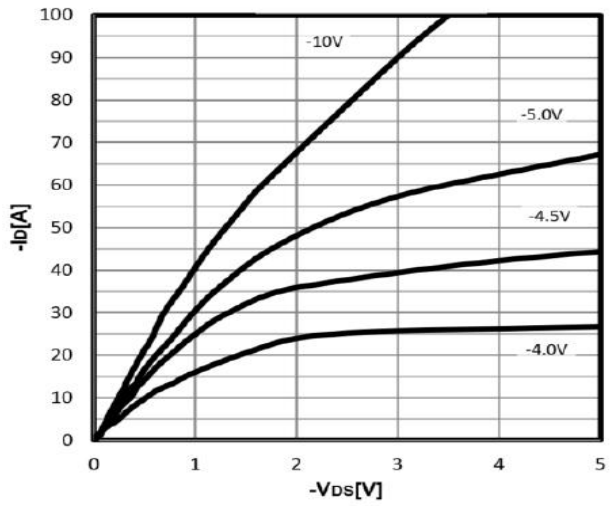


Fig2:Typ. drain-source on resistance

$R_{DS(on)}=f(-I_D)$

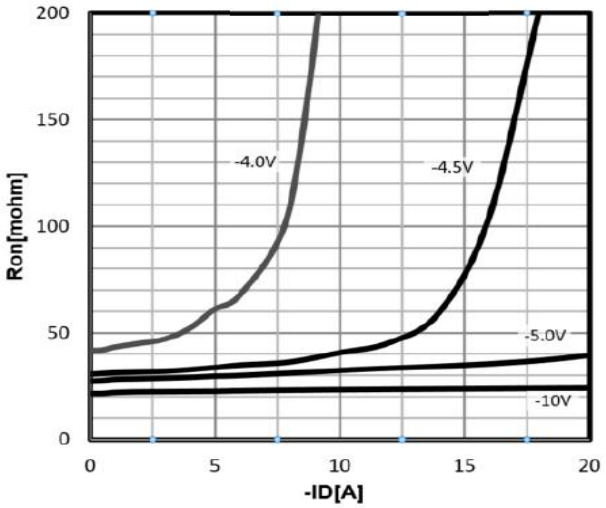


Fig3:Typ. transfer characteristics

$-I_D=f(-V_{GS})$;

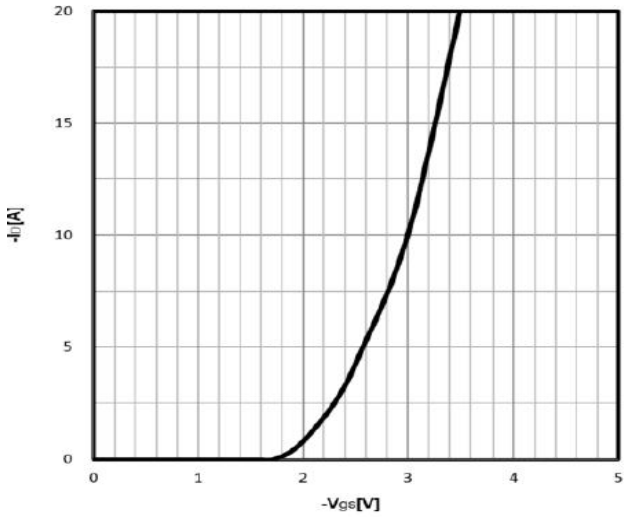


Fig4:Typ. drain-source on resistance

$R_{DS(on)}$= f(Tj); I_D=-10A; V_{GS}=-10V

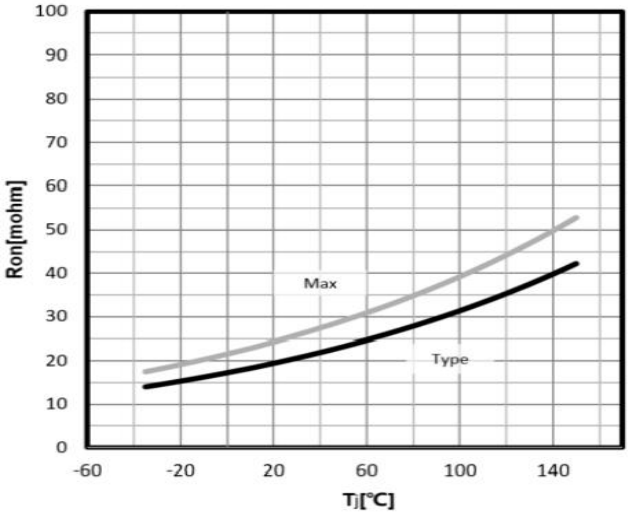


Fig5:Typ. gate threshold voltage

V_{GS}=f(Tj), V_{GS}=V_{DS}, I_D=-250μA;

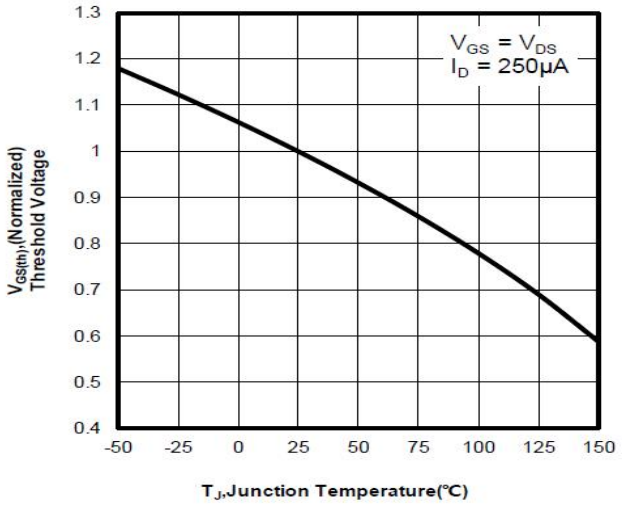


Fig6:Drain-source breakdown voltage

$V_{BR(DSS)}$=f(Tj); I_D=-250μA;

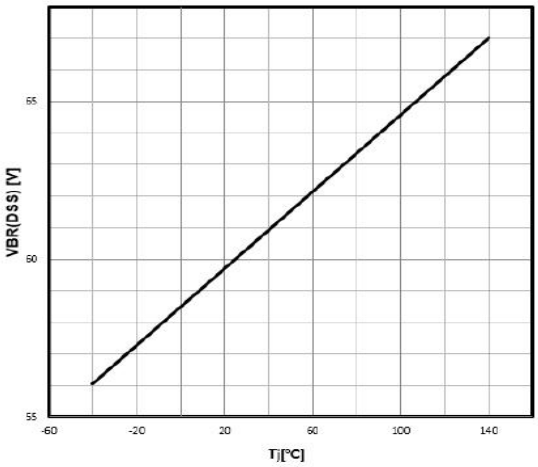


Fig7:Typ. gate charge

V_{GS}=f(Q_g), I_D=-5A, T_j=25℃;

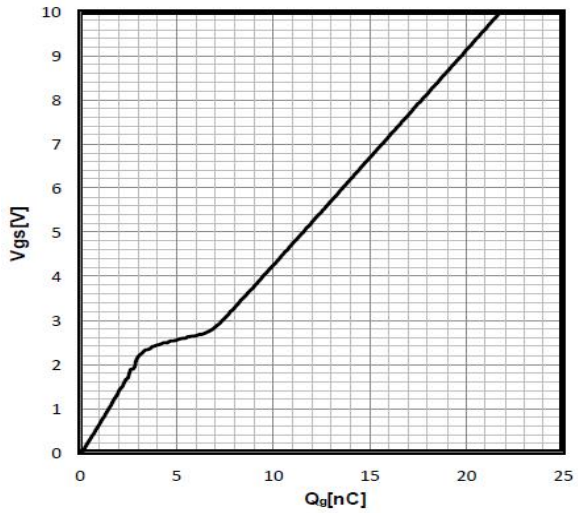


Fig8:Typ. Capacitances

C=f(V_{DS}); V_{GS}=0V; f=1.0 MHz;

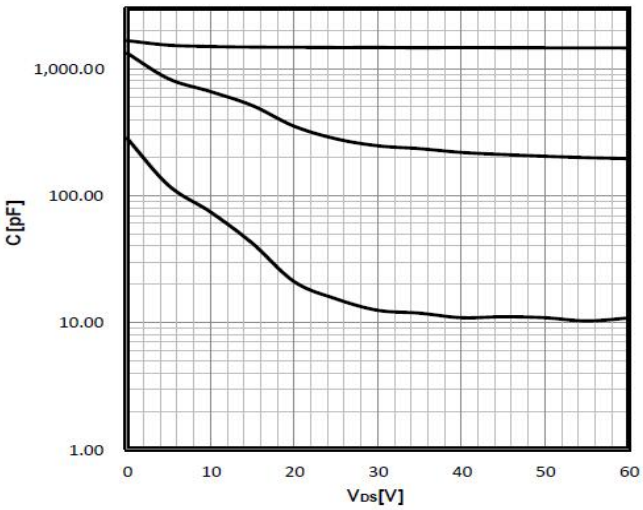


Fig9:Power Dissipation

P_{tot}=f(T_C)

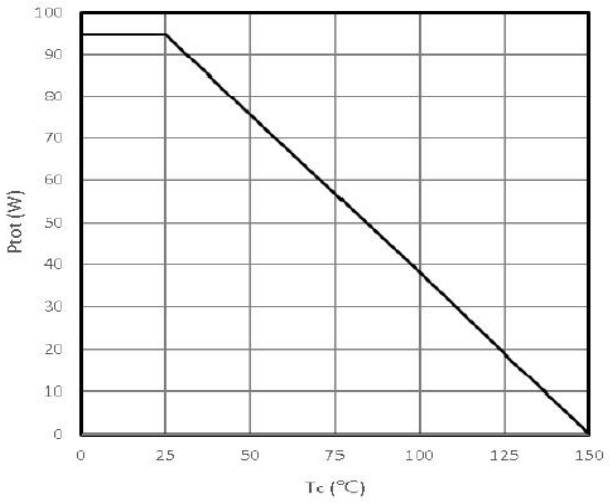


Fig10:Drain current

I_D=f(T_C)

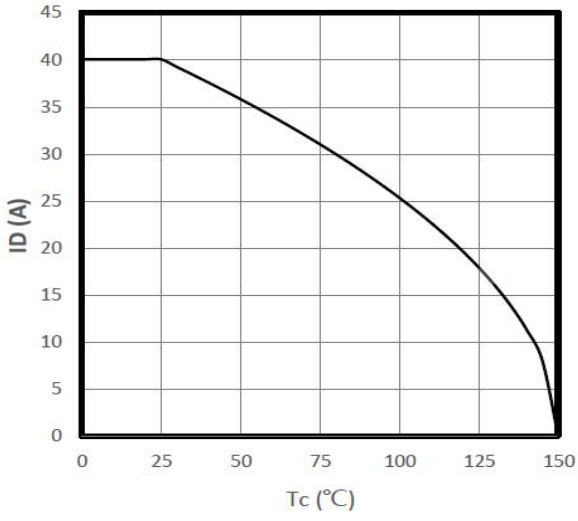


Fig11:Safe operating area

$I_D=f(V_{DS})$; $T_C=25℃$

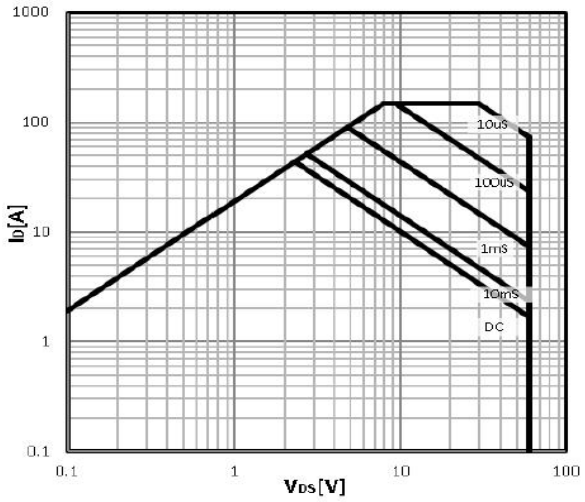


Fig12:Typ. forward characteristics

$I_F=f(V_{SD})$;

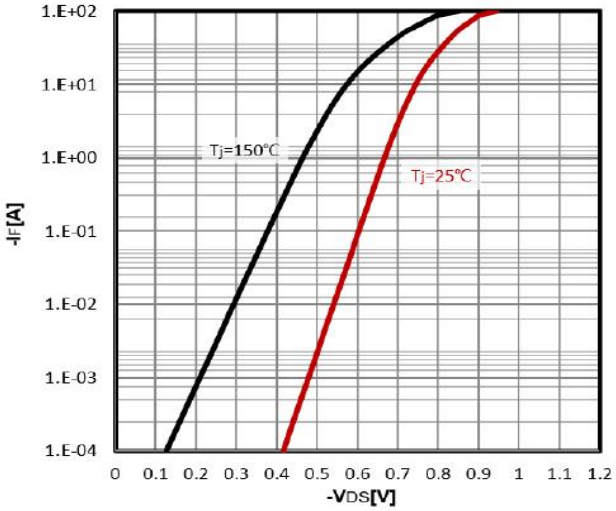
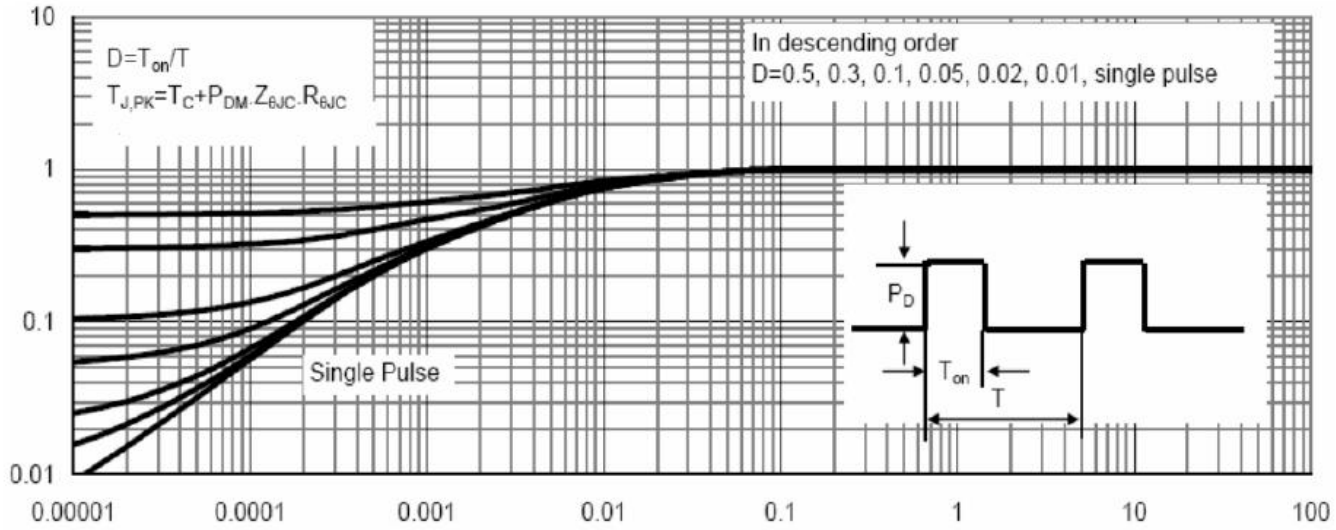


Figure 13: Max. Transient Thermal Impedance

$Z_{thJC}=f(t_p)$; parameter: D



Test Circuit and Waveform:

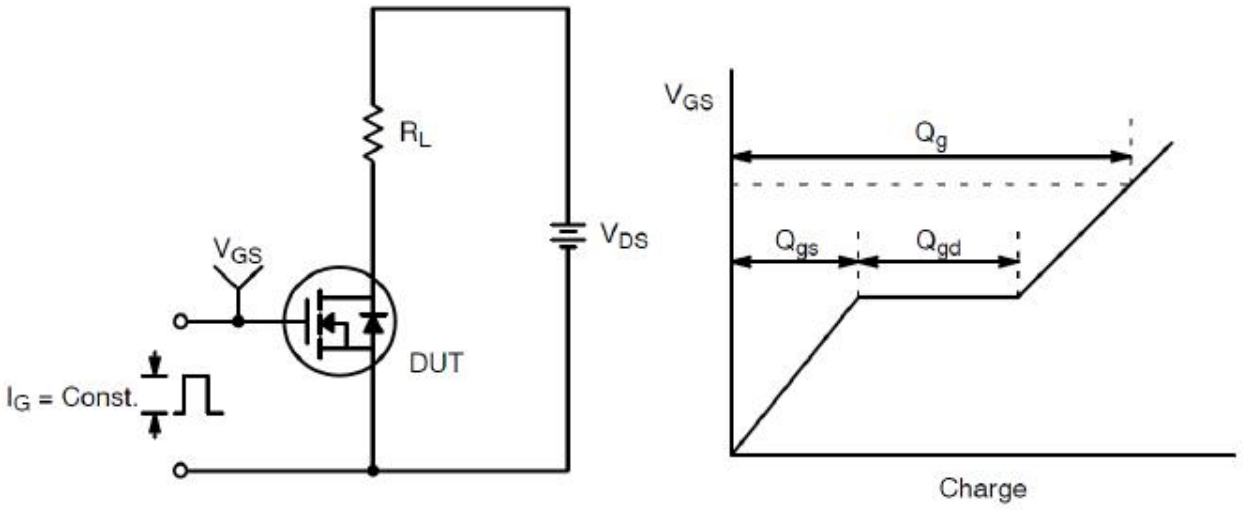


Fig-1:Gate Charge Test Circuit & Waveform

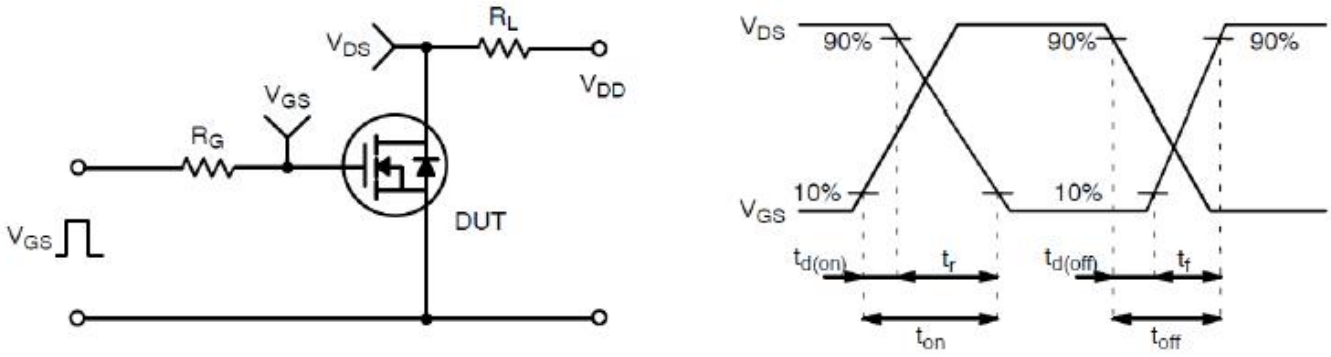


Fig-2:Resistive Switching Test Circuit & Waveforms

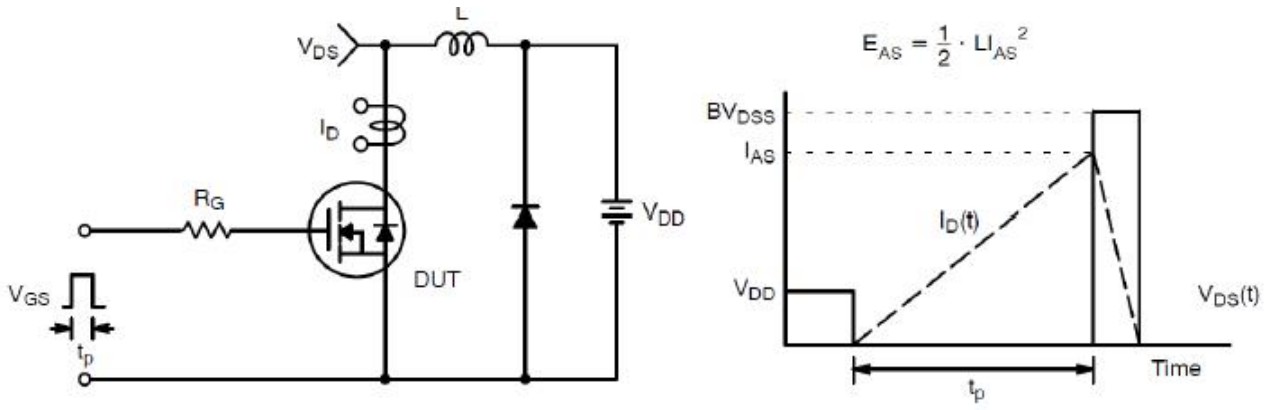
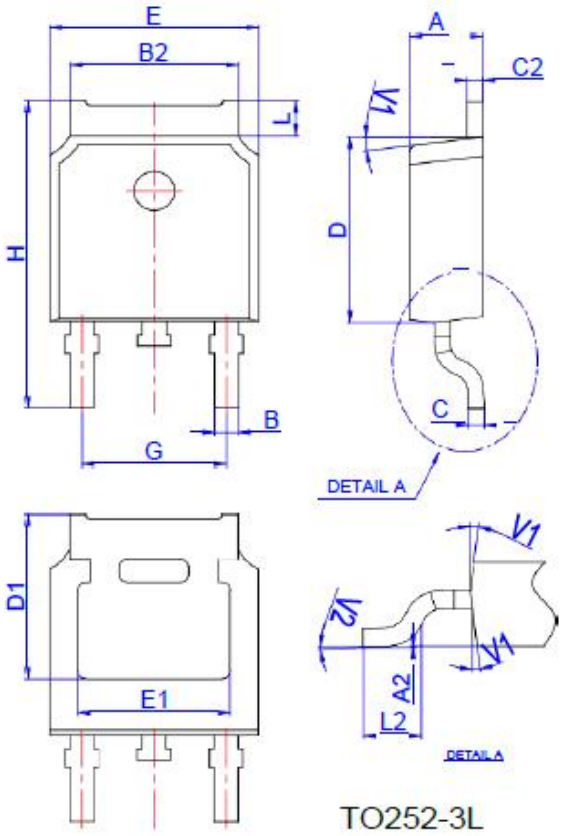


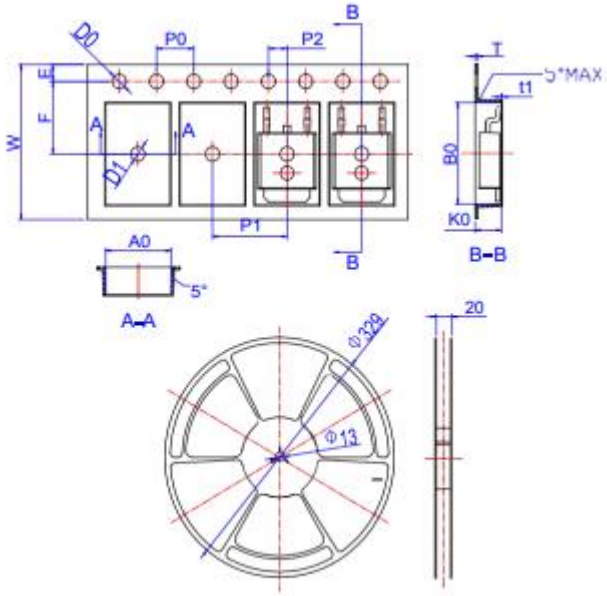
Fig-3:Unclamped Inductive Switching Test Circuit & Waveforms

Package Dimensions TO252-3L



TO252-3L

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

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