

100V N-Channel Enhancement Mode MOSFET

Description

The NP80N10G uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

- $V_{DS} = 100V$, $I_D = 80A$
 $R_{DS(ON)}(Typ.) = 7.7\ m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)}(Typ.) = 9.7\ m\Omega$ @ $V_{GS} = 4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

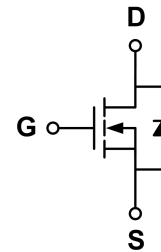
- Automotive applications
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package

- TO-252-2L



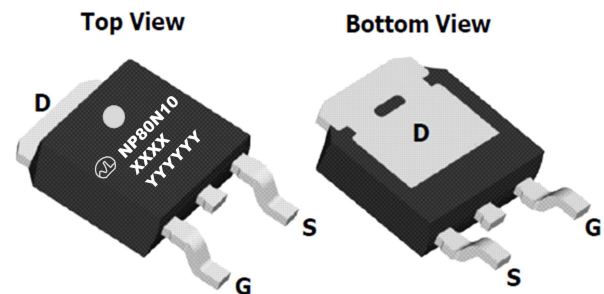
Schematic diagram



Marking and pin assignment

TO-252-2L

(Top View)



XXXX—Wafer Information
 YYYYYY—Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP80N10G-G	-55°C to +150°C	TO-252-2L	2500

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	±20	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	80	A
	$T_C = 70^\circ C$		64	
Pulsed Drain Current		I_{DM}	320	A
Avalanche energy ($V_{DD} = 50V, V_G = 10V, L = 0.5mH, R_g = 25\Omega$)		E_{AS}	72	mJ
Power Dissipation	$T_C = 25^\circ C$	P_D	89	W
	$T_C = 70^\circ C$		57	
Operating junction Temperature range		T_j	-55—150	°C

Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Static Characteristics							
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA		100	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =100V, V _{GS} =0V	T _J =25°C	-	-	1	μA
			T _J =85°C	-	-	30	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V		-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA		1	1.8	2.5	V
Drain-source on-state resistance ¹	R _{DS(ON)}	V _{GS} =10V, I _D =20A		-	7.7	8.5	mΩ
		V _{GS} =4.5V, I _D =20A		-	9.7	12	
On Status Drain Current	I _{D(ON)}	V _{DS} =100V, V _{GS} =10V		80	-	-	A
Diode Characteristics							
Diode Continuous Forward Current	I _S			-	-	80	A
Reverse Recovery Time	t _{rr}	I _F =20A, dI/dt=500A/us		-	34	-	ns
Reverse Recovery Charge	Q _{rr}			-	200	-	nC
Dynamic Characteristics ²							
Intrinsic gate resistance	R _G	V _{GS} =0V, V _{DS} =0V,f=1MHz		-	1.5	-	Ω
Input capacitance	C _{ISS}	V _{GS} =0V ,V _{DS} =50V f=1.0MHz		-	3347	-	pF
Output capacitance	C _{OSS}			-	388	-	
Reverse transfer capacitance	C _{RSS}			-	5.7	-	
Turn-on delay time	t _{D(ON)}	V _{GS} =10V, V _{DS} =50V, R _L =5Ω , R _{GEN} =3 Ω		-	10	-	ns
Turn-on Rise time	t _r			-	4	-	
Turn-off delay time	t _{D(OFF)}			-	31	-	
Turn-off Fall time	t _f			-	6	-	
Total gate charge	Q _g	V _{GS} =10V,I _D =20A V _{DS} =50V		-	46.3	-	nC
Gate-source charge	Q _{gs}			-	11.4	-	
Gate-drain charge	Q _{gd}			-	5	-	
Drain-Source Diode Characteristics							
Diode forward voltage	V _{SD}	I _{SD} =20A,V _{GS} =0V		-	0.68	1.1	V

Note: 1: Pulse test; pulse width ≤ 300ns, duty cycle ≤ 2%.

2: Guaranteed by design, not subject to production testing.

Thermal Characteristics

Thermal Resistance junction-to case	R _{thJC}	1.4	°C/W
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Typical Performance Characteristics

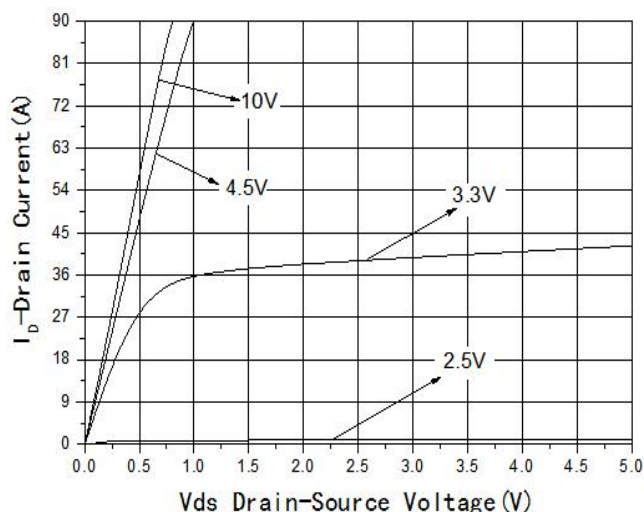
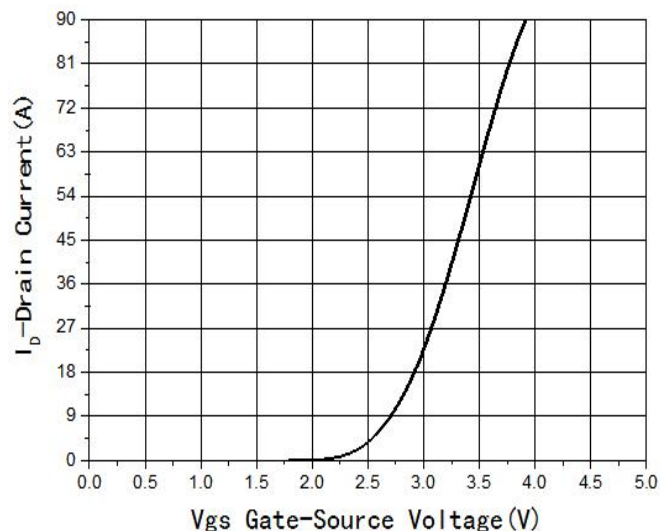
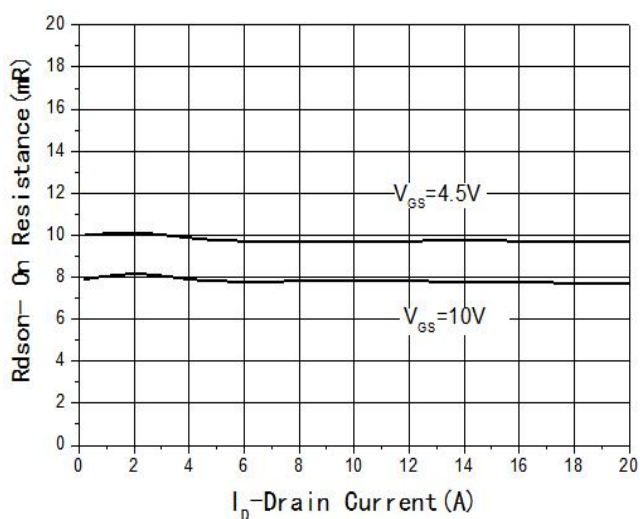
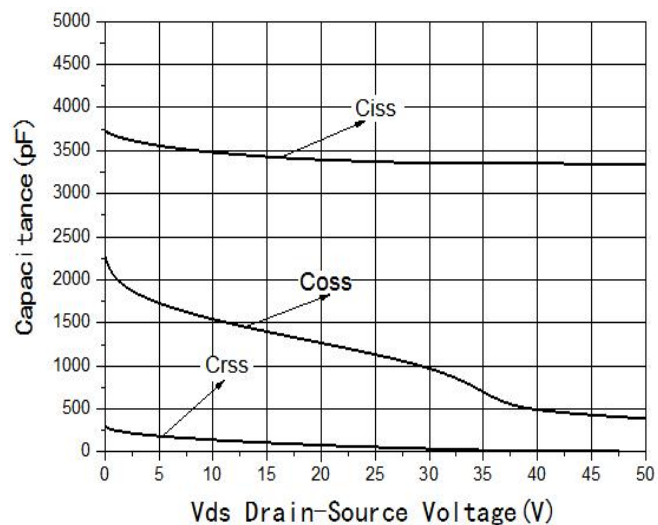
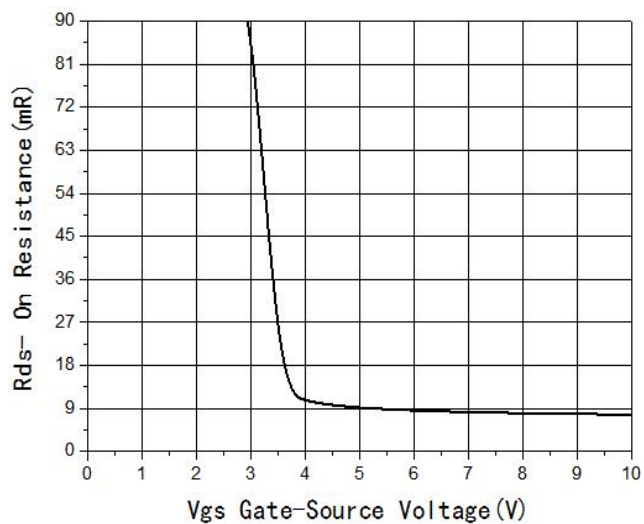
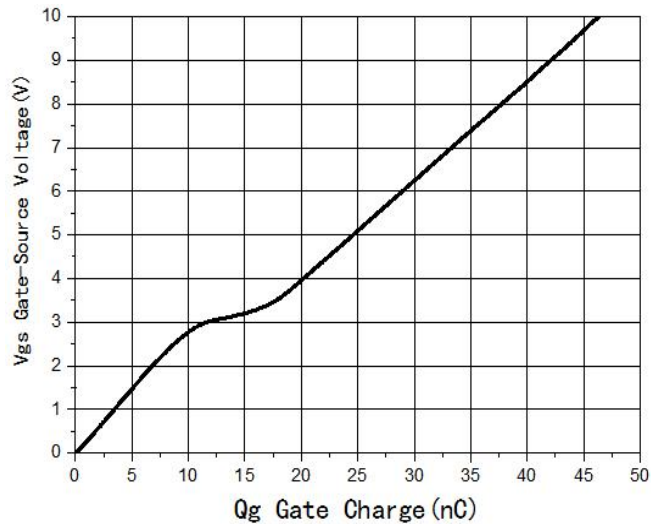
Fig1 Output Characteristics

Fig2 Transfer Characteristics

Fig3 $R_{DS(on)}$ -Drain current

Fig4 Capacitance vs V_{DS}

Fig5 $R_{DS(on)}$ -Gate Drain voltage

Fig6 Gate Charge


Fig7 Power De-rating

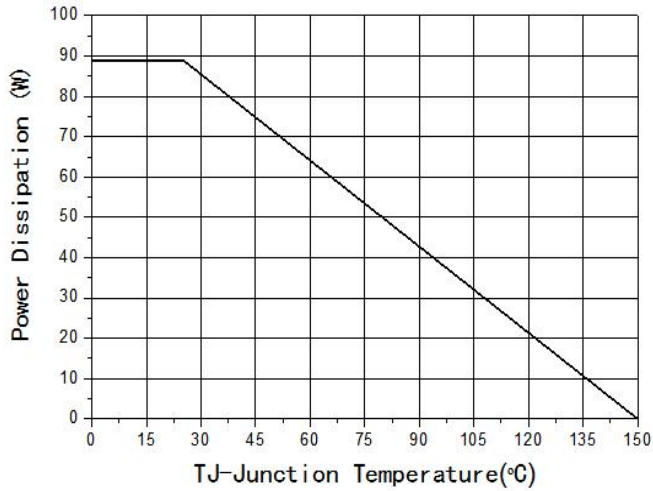


Fig8 Source-Drain Diode Forward

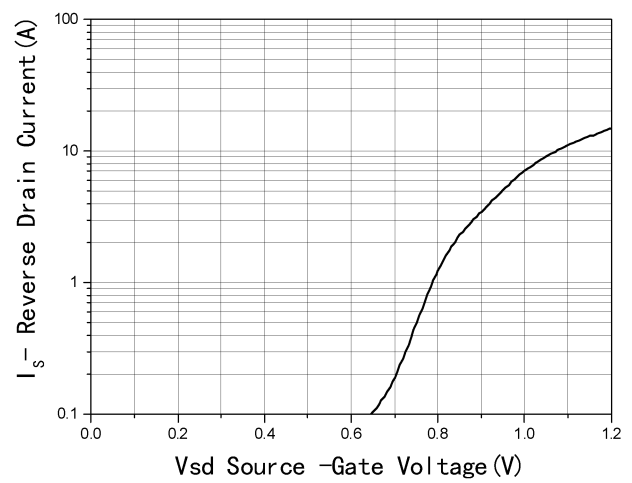


Fig9 Safe Operation Area

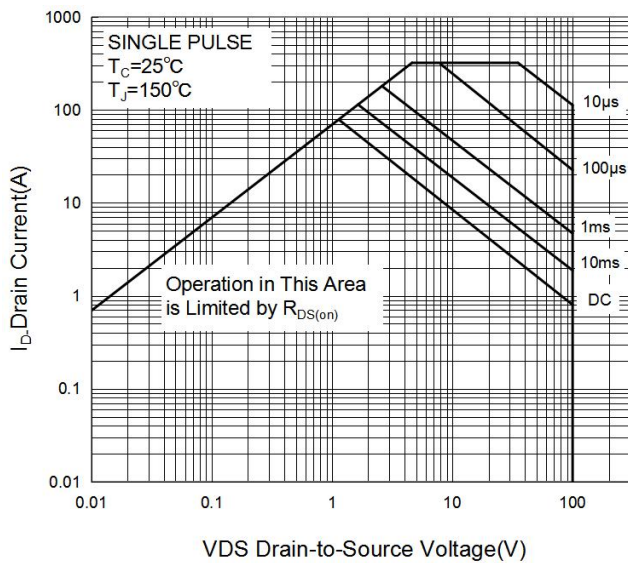


Fig10 Current De-rating

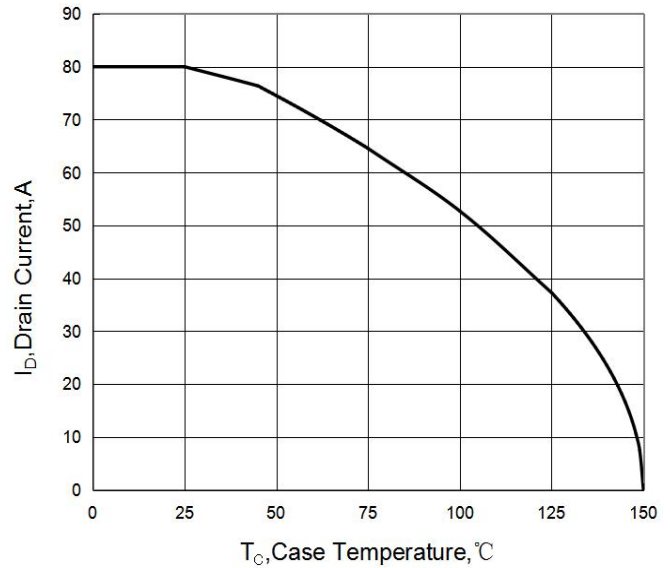
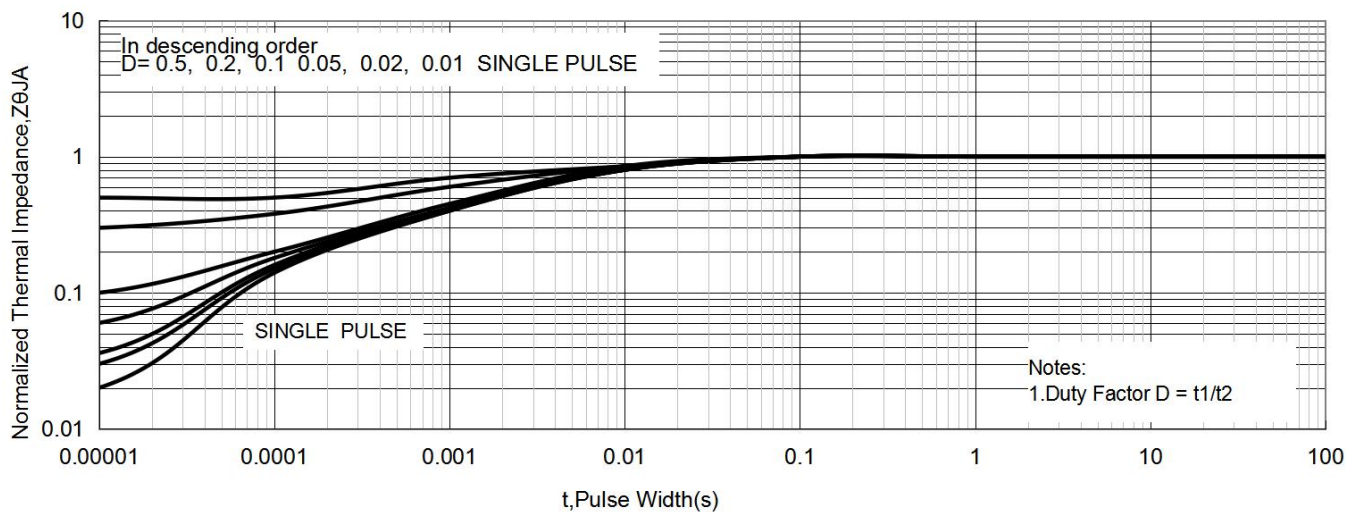


Fig11 Normalized Maximum Transient Thermal Impedance



Test Circuit

Figure A: Gate Charge Test Circuit & Waveforms

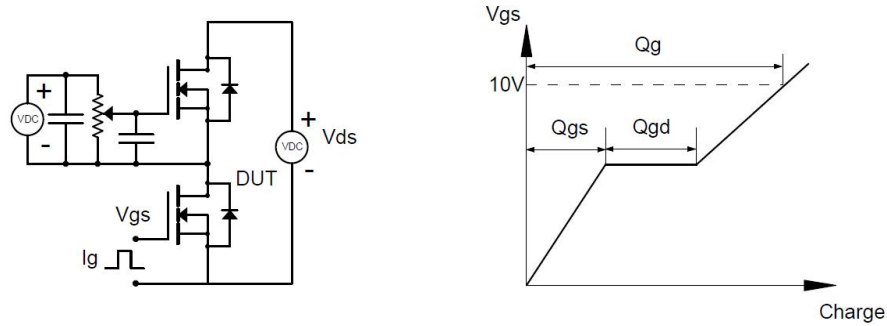


Figure B: Resistive Switching Test Circuit & Waveforms

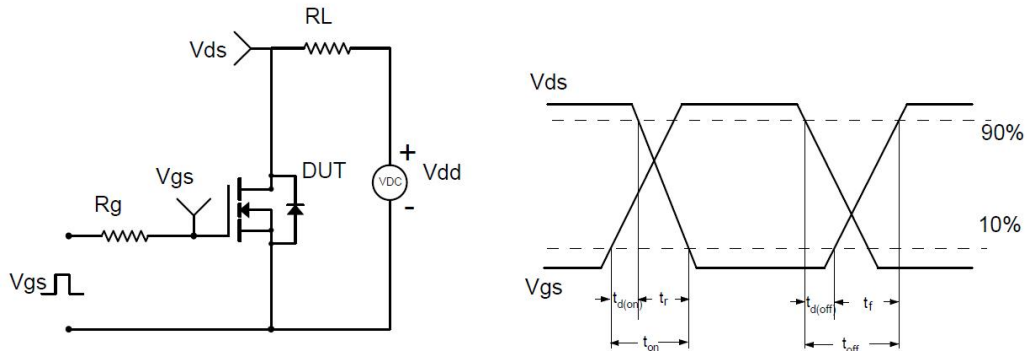


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

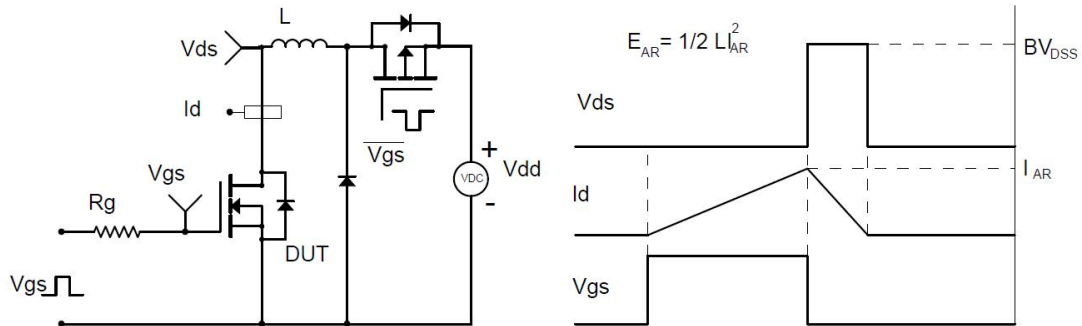
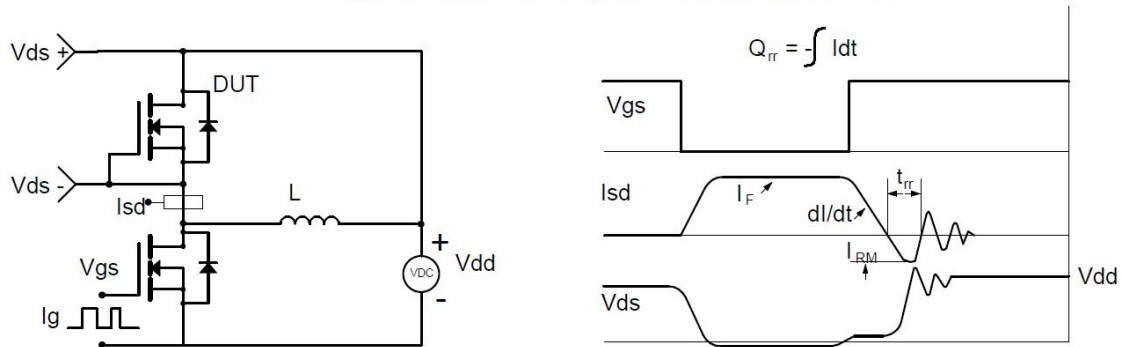
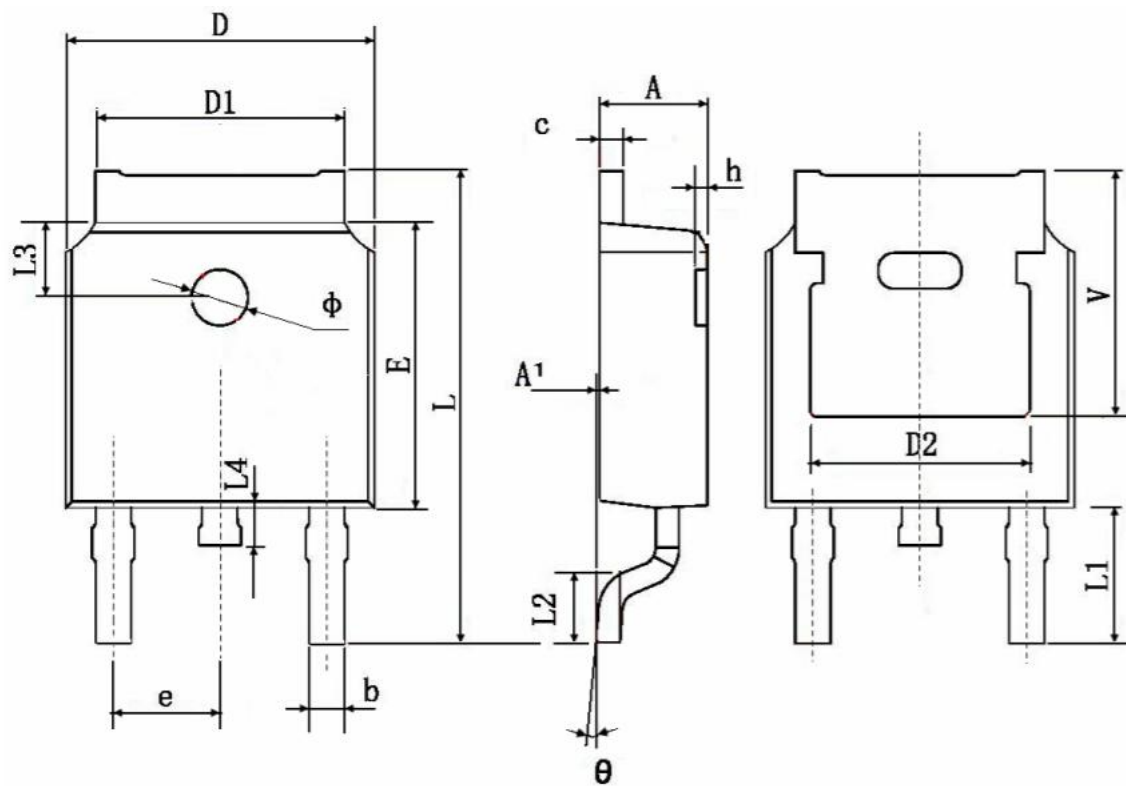


Figure D: Diode Recovery Test Circuit & Waveforms



Package Information

- TO-252-2L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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