

N-Channel 500V MOSFET

EX5N50ANC

V_{DS} (V)	$R_{DS(on),max}$ (Ω)	I_D (A)
500V	1.6 @ $V_{GS} = 10V$	5

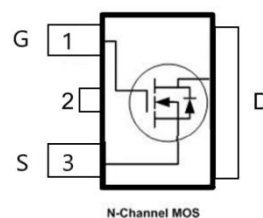
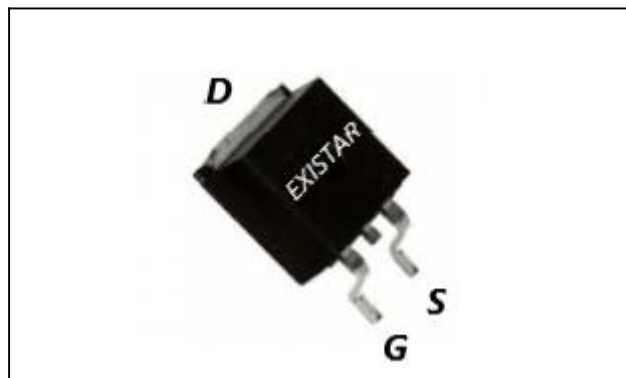
Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- PD charger
- Moto driver

TO-252



Package And Ordering Information

Ordering code	Package	Marking
EX5N50ANC	TO-252	EX5N50ANC

Ordering Information

Package	Units/ Reel	Reels/ Inner Box	Units/ Inner Box
TO-252	2500	1	2500

Key Performance Parameters

Parameter	Value	Unit
VDS, min @ Tj(max)	500	V
ID, pulse	20	A
RDS(ON), max @ VGS=10V	1.6	Ω
Qg	16.5	nC

Absolute Maximum Ratings at Tj=25°C Unless Otherwise Noted

Parameter	Symbol	Limit	Unit
Drain-source voltage	V _{DS}	500	V
Gate-source voltage	V _{GS}	±30	
Continuous drain current	I _D	5	A
		3	
Pulsed drain current	I _{D,pulse}	20	
Avalanche energy, single pulse	E _{AS}	230	mJ
Power dissipation	P _D	48	W
		-	
Operating junction and storage temperature range	T _J , T _{stg}	-55 To 150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	R _{θJC}	2.6	°C/W
Thermal resistance, junction-to-ambient	R _{θJA}	62	

Electrical Characteristics at Tj=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Static						
Drain to source breakdown voltage	V _{(BR)DSS}	500			V	V _{GS} = 0, I _D = 250 μ A
Gate-source threshold voltage	V _{GS(th)}	2	3	4	V	V _{DS} = V _{GS} , I _D = 250 μ A
Gate-body leakage	I _{GSS}			±100	nA	V _{DS} = 0 V, V _{GS} = ±30 V
Zero gate voltage drain current	I _{DSS}			1	μ A	V _{DS} = 500 V, V _{GS} = 0 V
Drain-source on-resistance	R _{DS(on)}		1.25	1.6	Ω	V _{GS} = 10 V, I _D = 2.5 A
Gate resistance	R _g		2.2		Ω	f=1MHz

Gate Charge						
Total gate charge	Qg		16.5		nC	V _{DS} = 400 V, I _D = 5 A, V _{GS} = 10 V
Gate-source charge	Qgs		3.8			
Gate-drain charge	Qgd		5.6			
Gate Plateau Voltage	V _{Plateau}		4.6		V	
Dynamic						
Turn-on delay time	t _{d(on)}		14		ns	V _{DS} = 250 V, I _D = 5 A, R _G = 25 Ω
Rise time	t _r		18			
Turn-off delay time	t _{d(off)}		32			
Fall time	t _f		11			
Input capacitance	C _{iss}		550		pF	V _{DS} =25 V, V _{GS} = 0 V, f = 1.0MHz
Output capacitance	C _{oss}		55			
Reverse transfer capacitance	C _{rss}		3.3			
Body Diode						
Diode forward voltage	V _{SD}			1.4	V	V _{GS} = 0 V, I _{SD} = 5 A
Reverse recovery time	t _{rr}		86		ns	V _R = 300V,
Reverse recovery charge	Q _{rr}		0.18		μC	I _F =5 A, di/dt = 100 A/μs

Electrical Characteristics Diagrams

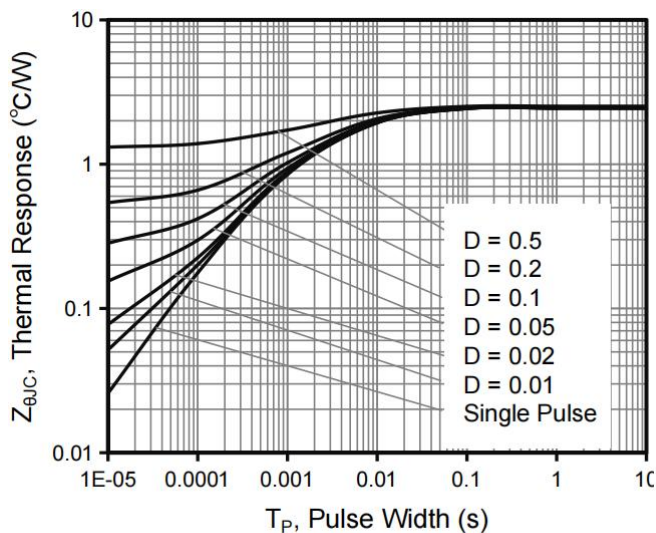


Figure 1. Transient Thermal Impedance

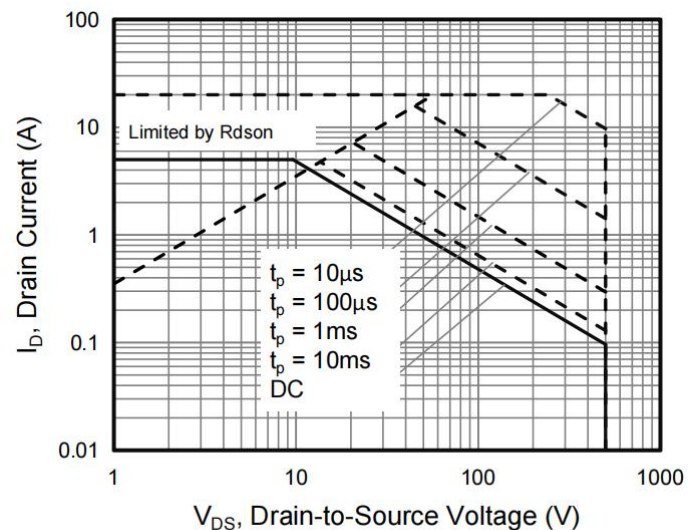
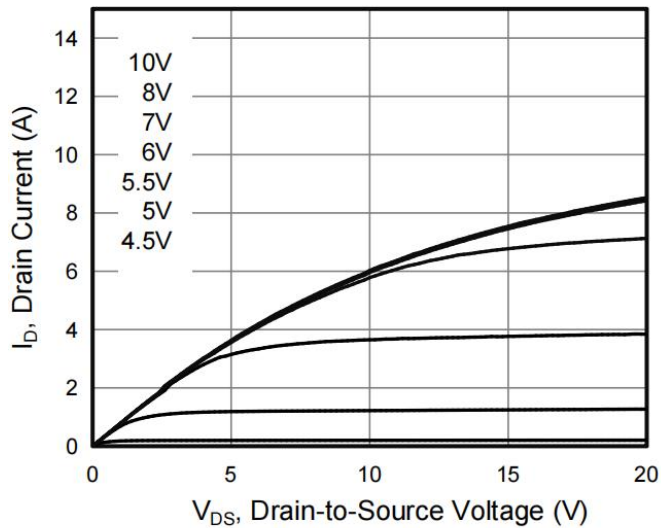
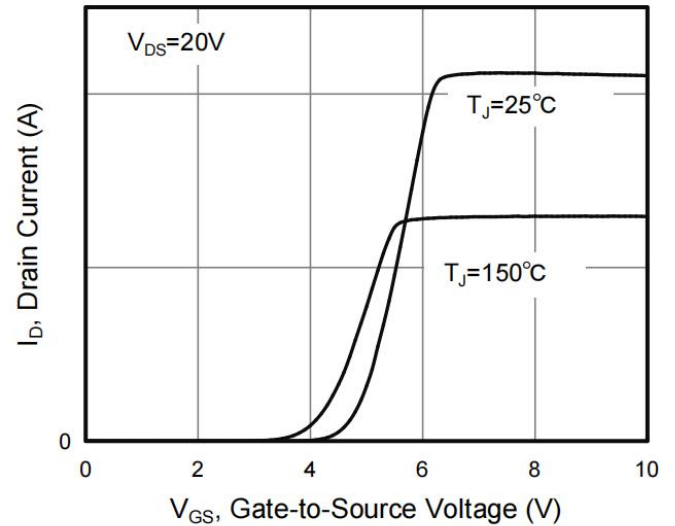
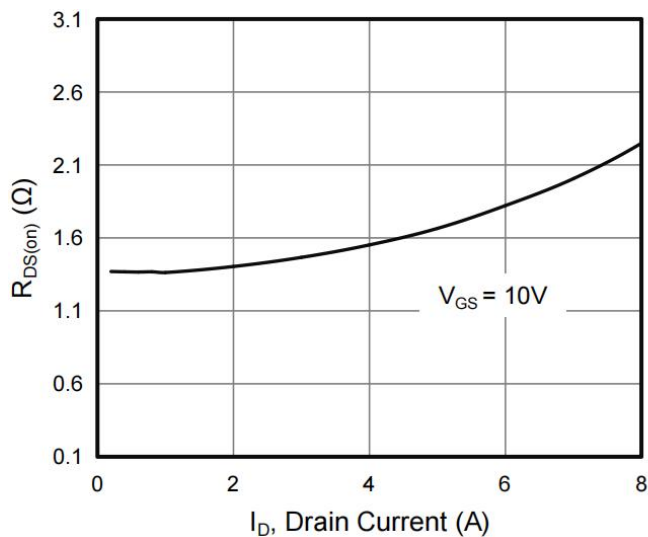
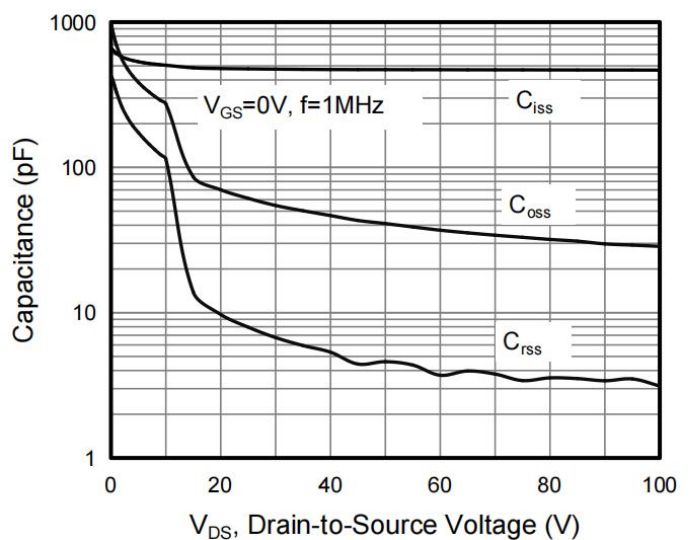
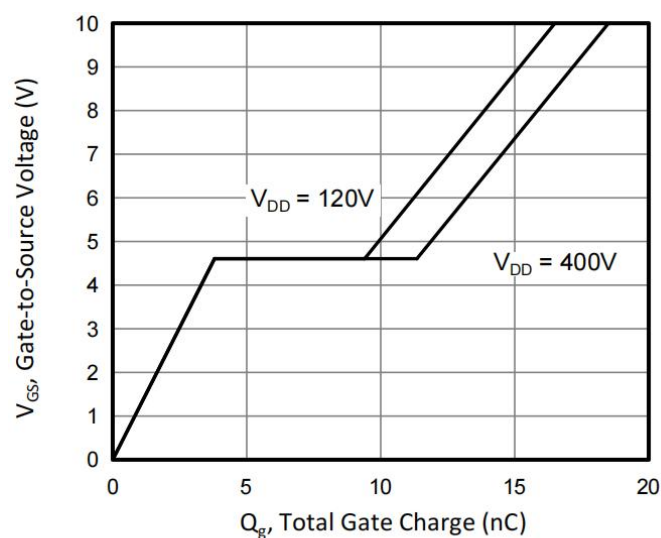
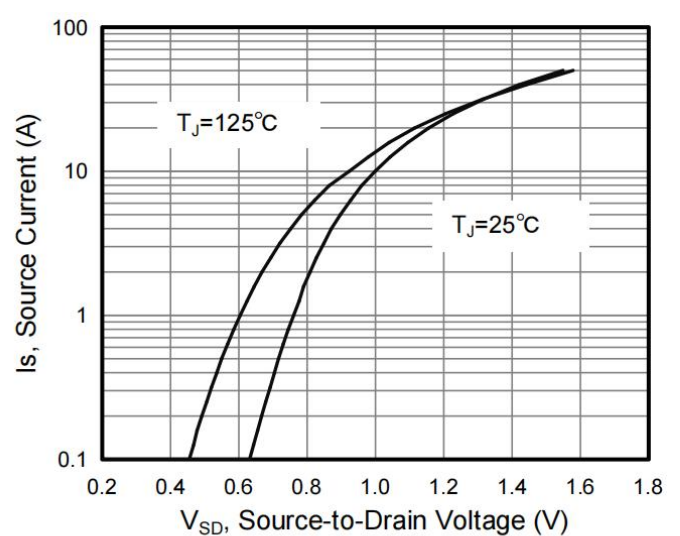


Figure 2. Safe Operation Area For


Figure 3 . Output Characteristics

Figure 4. Transfer Characteristics

Figure 5. On-Resistance vs Drain Current

Figure 6. Capacitance

Figure 7. Gate Charge

Figure 8. Body Diode Forward Voltage

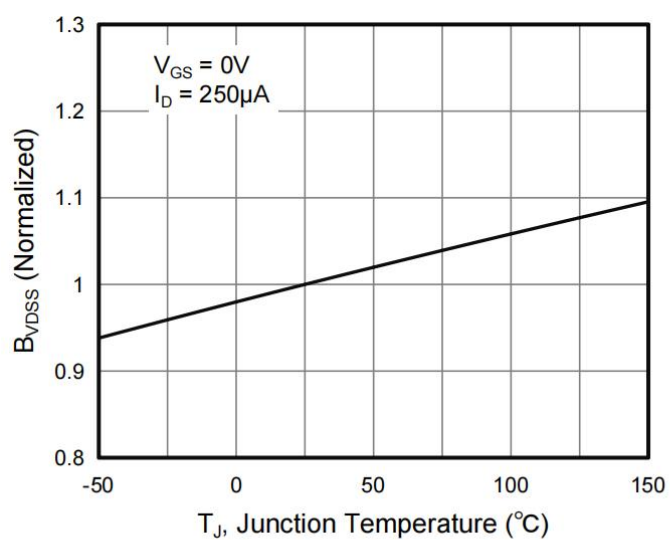


Figure 9. Breakdown Voltage vs Junction Temperature

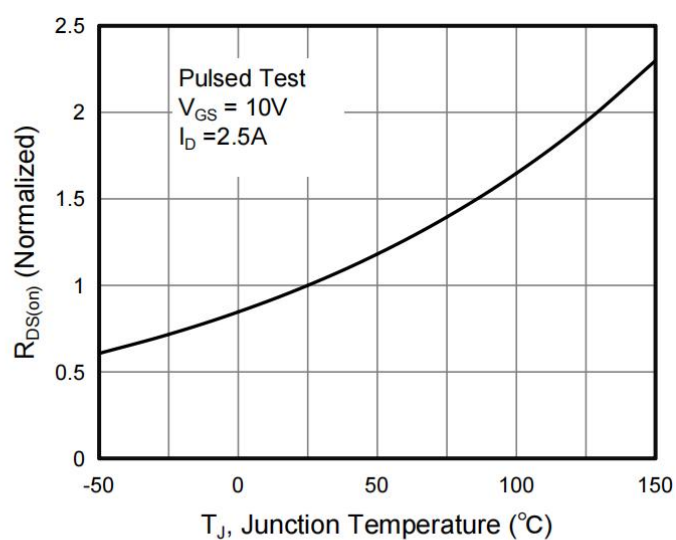


Figure 10. On-Resistance vs Temperature

Test circuits and waveforms

Figure A: Gate Charge Test Circuit and Waveform

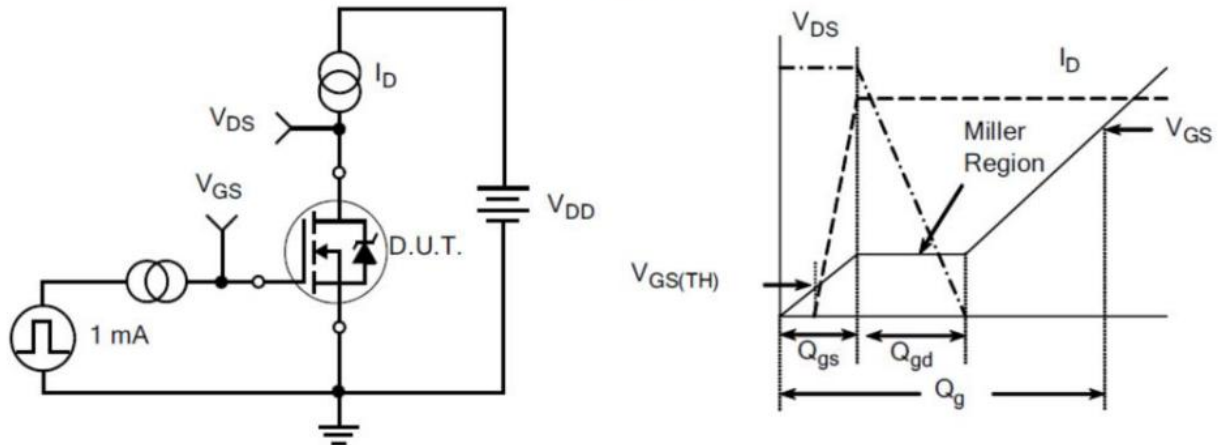


Figure B: Resistive Switching Test Circuit and Waveform

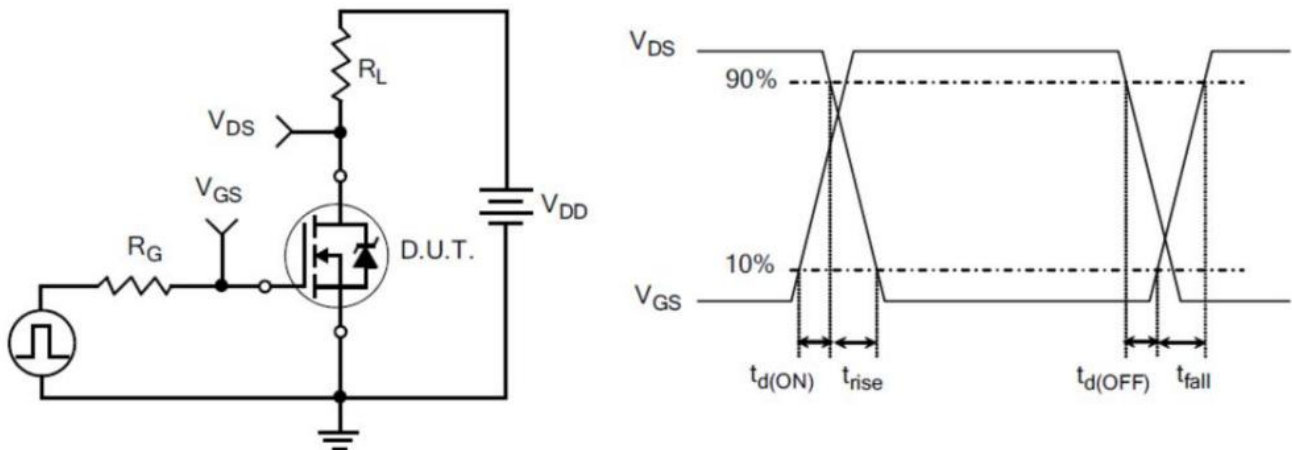


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

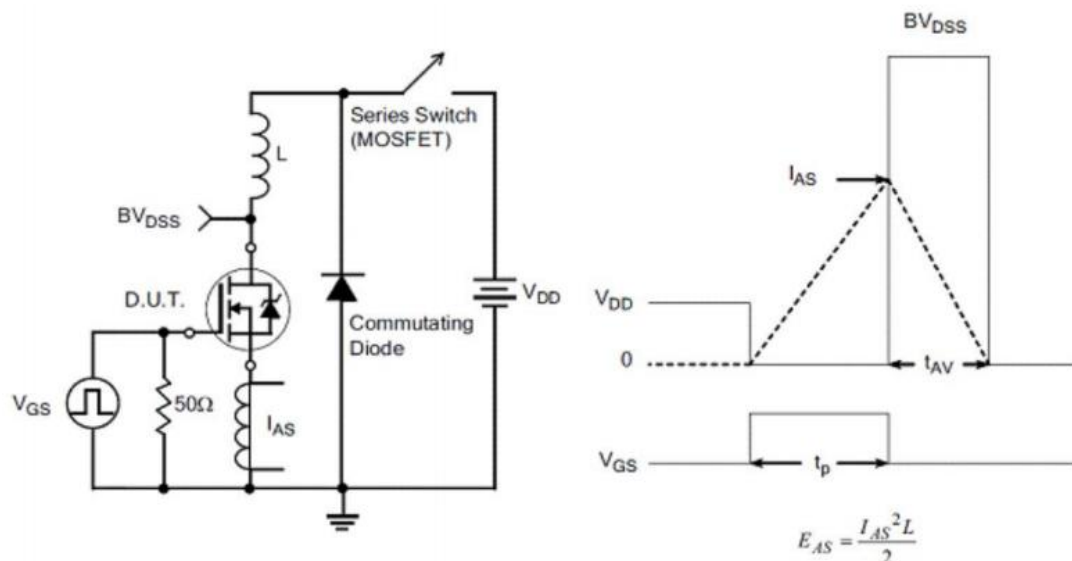
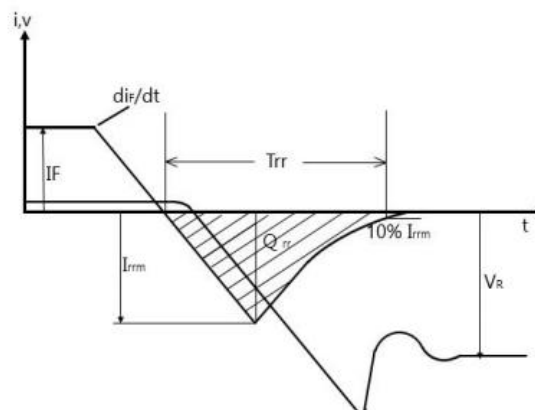
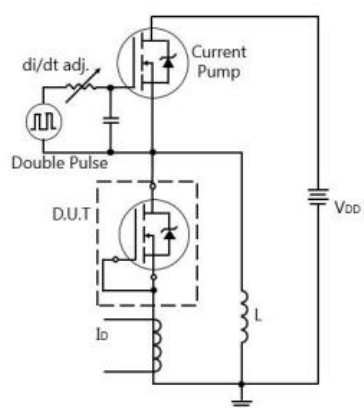
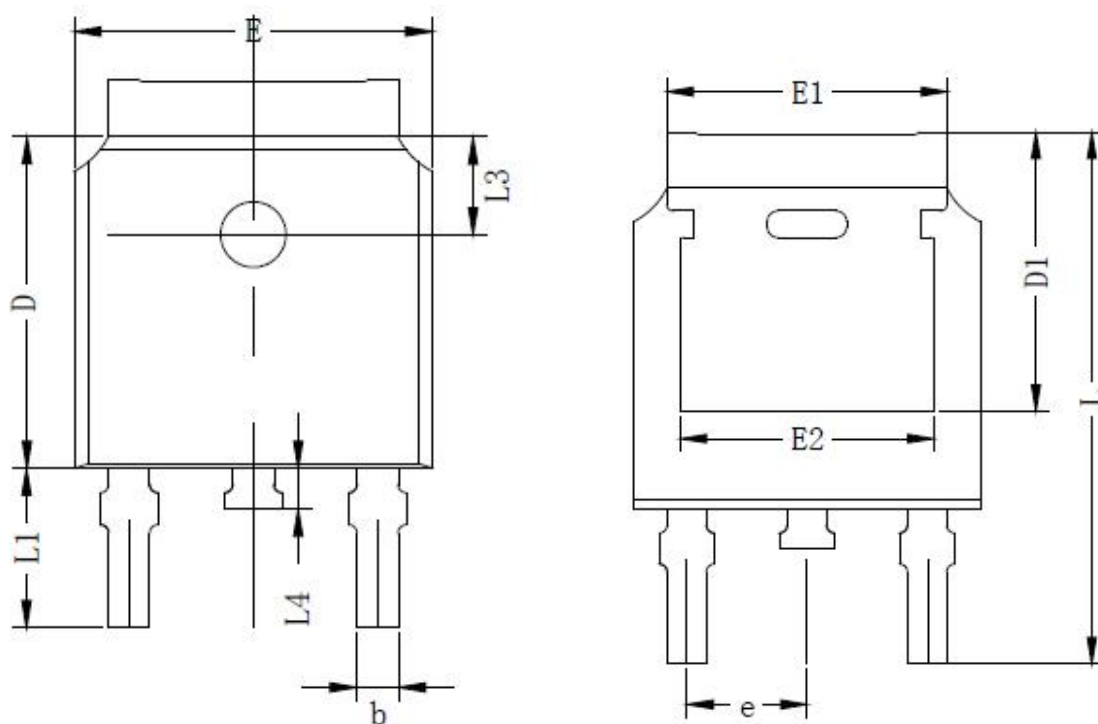


Figure D: Diode Reverse Recovery Test Circuit and Waveform



Package Outline Dimensions



SYMBOL	MIN	NOM	MAX
A	2.10	2.30	2.50
A1	0.97	1.07	1.17
A2	0.00	—	0.12
b	0.66	0.76	0.86
c	0.45	0.51	0.60
D	5.90	6.10	6.30
D1	5.10	5.30	5.45
E	6.40	6.60	6.80
E1	5.10	5.33	5.45
E2	4.63	4.83	5.03
L	9.90	10.10	10.30
L1	2.74	2.94	3.14
L2	1.40	1.50	1.70
L3	1.65	1.80	1.95
L4	0.60	0.80	1.00
e	2.286BSC		
θ	5°	7°	10°
θ1	0°	—	3°

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