

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Product Summary



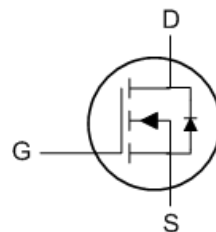
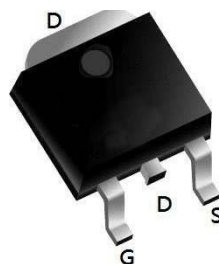
BVDSS	RDSON	ID
60V	60 mΩ	10A

Description

The XR10N06 is the high cell density trench N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The XR10N06 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration

■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	60	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_A=25^\circ\text{C}$	I_D	10	A
	$T_A=100^\circ\text{C}$		8	
Pulsed Drain Current ^A		I_{DM}	18	A
Total Power Dissipation ^B	$T_A=25^\circ\text{C}$	P_D	1.2	W
	$T_A=100^\circ\text{C}$		0.45	
Junction and Storage Temperature Range		T_J, T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^C	Steady-State	$R_{\theta JA}$	85	105	$^\circ\text{C/W}$

■ Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
		V _{DS} =60V, V _{GS} =0V, T _j =150°C	-	-	100	
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	0.9	1.35	2	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =3A	-	60	82	mΩ
		V _{GS} =4.5V, I _D =3A	-	68	92	
Diode Forward Voltage	V _{SD}	I _S =3A, V _{GS} =0V	-	0.85	1.2	V
Gate resistance	R _G	f=1MHz, Open drain	-	2	-	Ω
Maximum Body-Diode Continuous Current	I _S		-	-	10	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f=1MHz	-	500	-	pF
Output Capacitance	C _{oss}		-	28	-	
Reverse Transfer Capacitance	C _{rss}		-	22	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =30V, I _D =3A	-	10	-	nC
Gate-Source Charge	Q _{gs}		-	1.7	-	
Gate-Drain Charge	Q _{gd}		-	2.1	-	
Reverse Recovery Charge	Q _{rr}	I _F =3A, di/dt=100A/us	-	7	-	nC
Reverse Recovery Time	t _{rr}		-	33	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =30V, R _L =20Ω R _{GEN} =3Ω	-	3.6	-	ns
Turn-on Rise Time	t _r		-	17.6	-	
Turn-off Delay Time	t _{D(off)}		-	13	-	
Turn-off fall Time	t _f		-	23	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B. P_d is based on max. junction temperature, using junction-case thermal resistance.C. The value of $R_{\theta JA}$ is measured with the device mounted on the minimum recommend pad size, in the still air environment with $T_A=25^\circ\text{C}$. The maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design.

■ Typical Electrical and Thermal Characteristics Diagrams

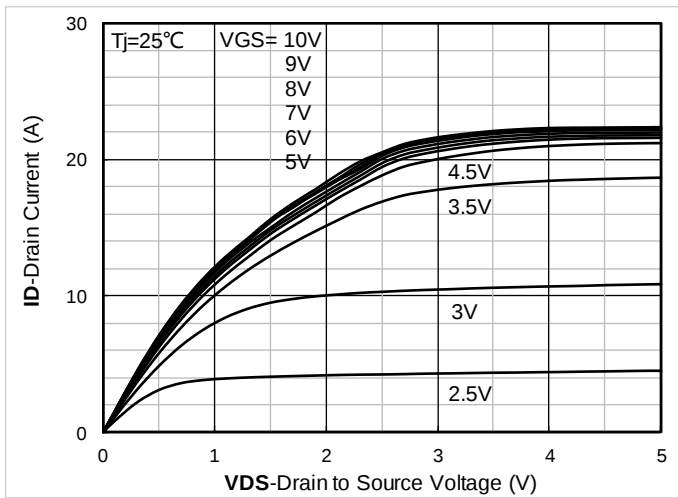


Figure 1. Output Characteristics

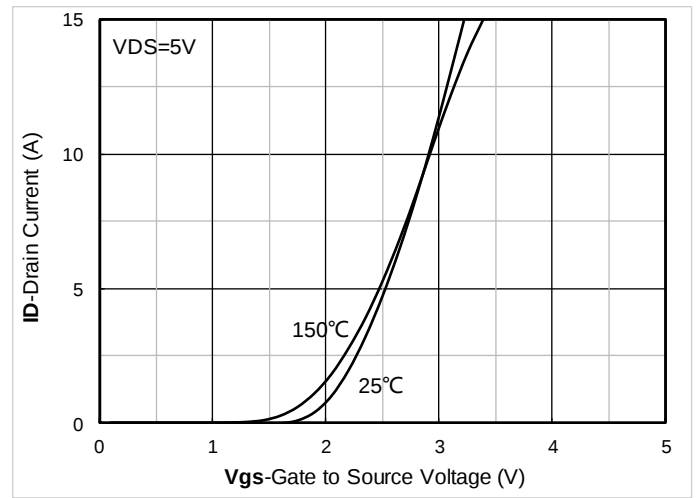


Figure 2. Transfer Characteristics

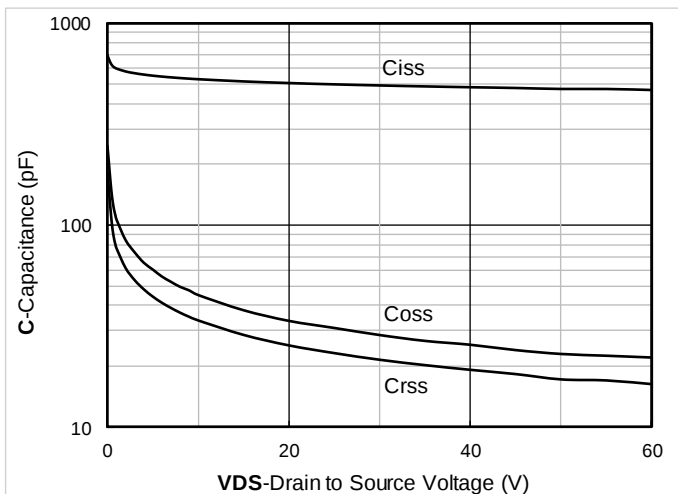


Figure 3. Capacitance Characteristics

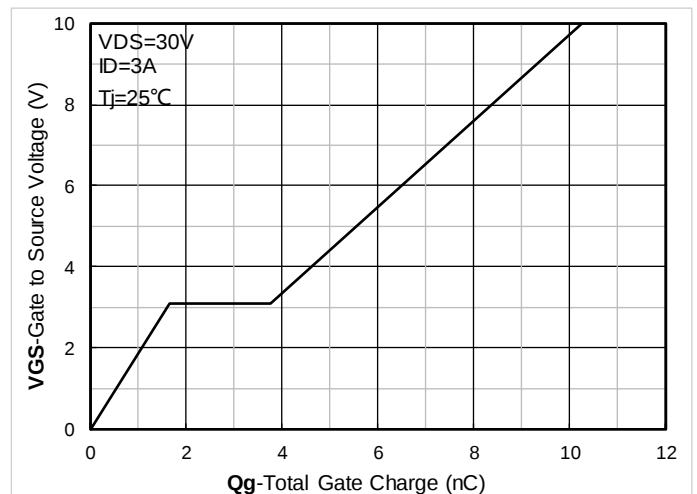


Figure 4. Gate Charge

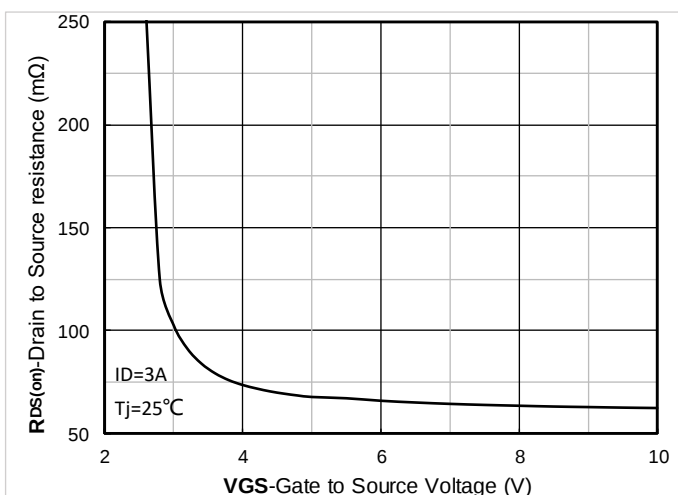


Figure 5. On-Resistance vs Gate to Source Voltage

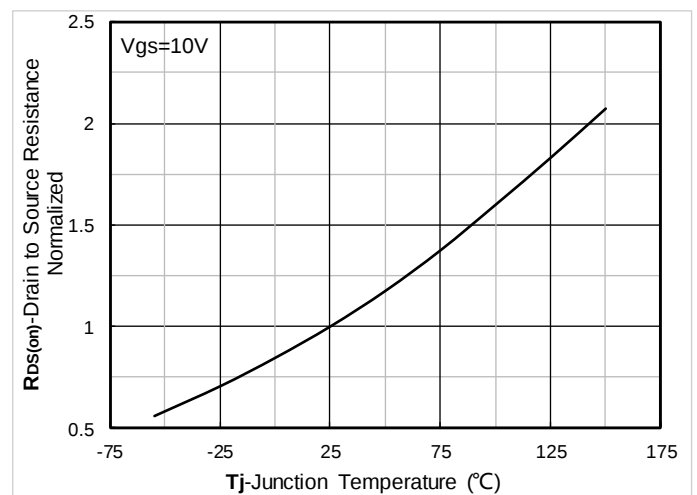


Figure 6. Normalized On-Resistance

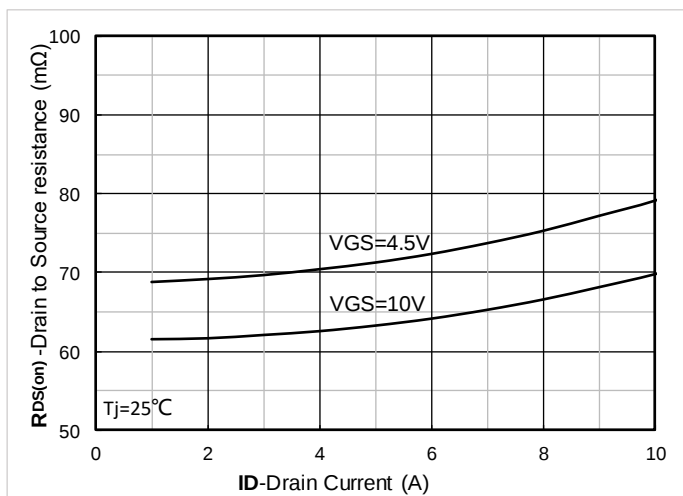


Figure 7. $R_{DS(on)}$ VS Drain Current

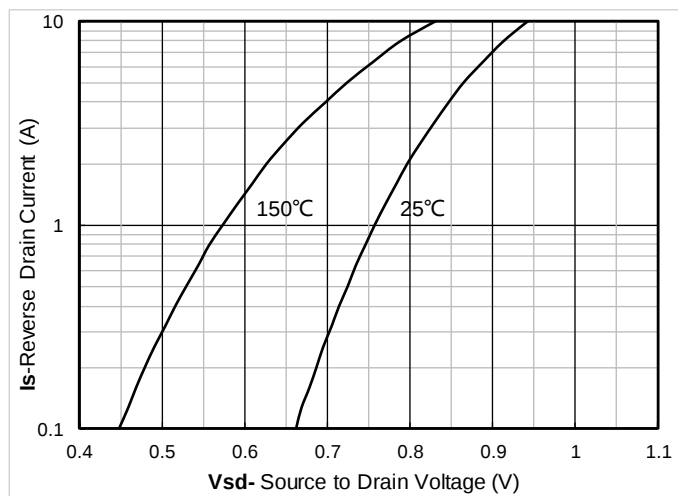


Figure 8. Forward characteristics of reverse diode

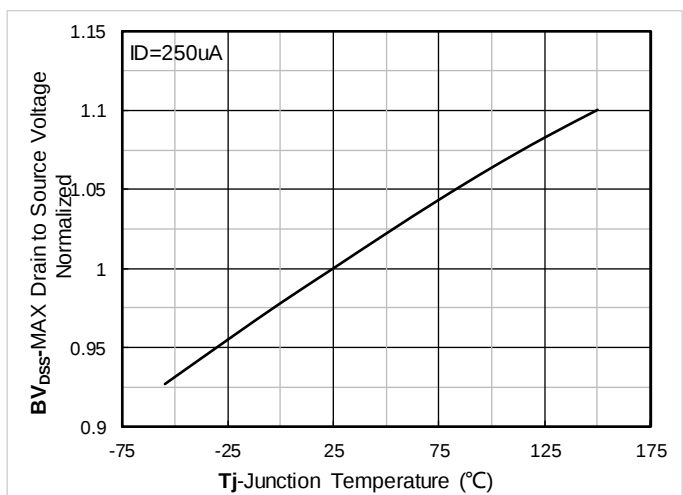


Figure 9. Normalized breakdown voltage

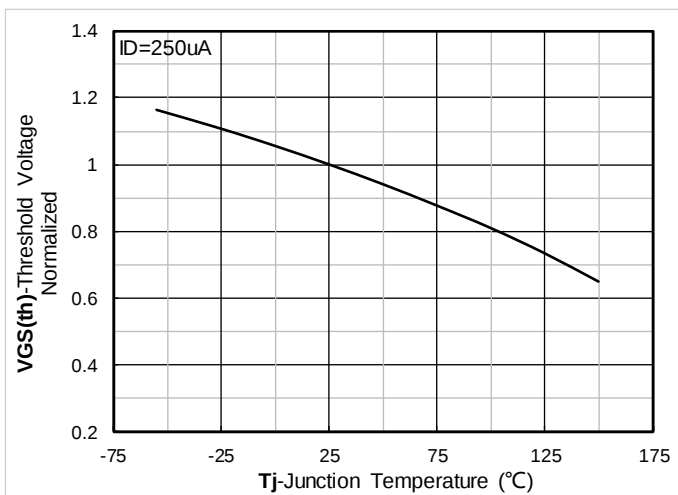


Figure 10. Normalized Threshold voltage

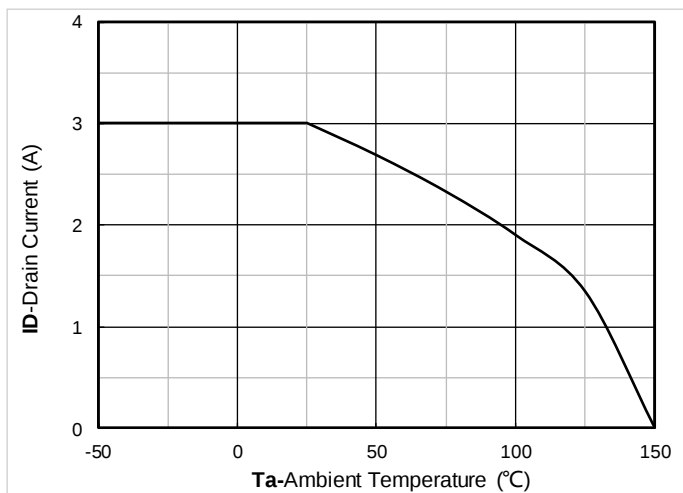


Figure 11. Current dissipation

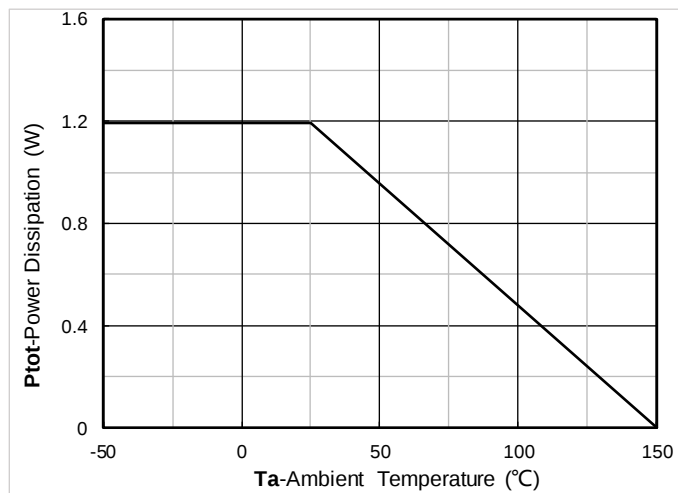


Figure 12. Power dissipation

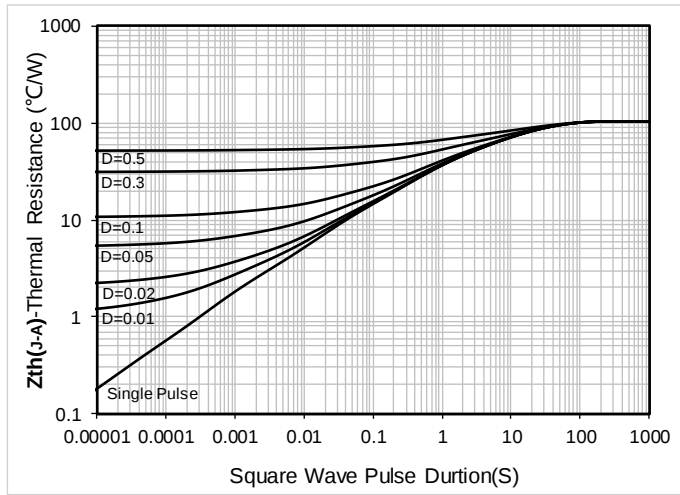


Figure 13. Maximum Transient Thermal Impedance

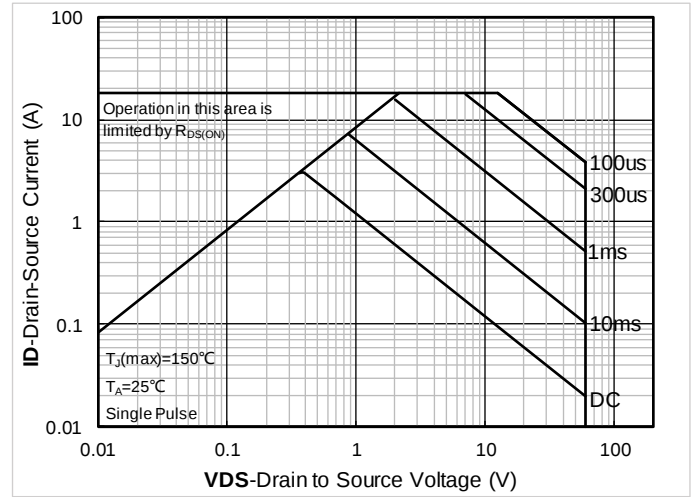


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

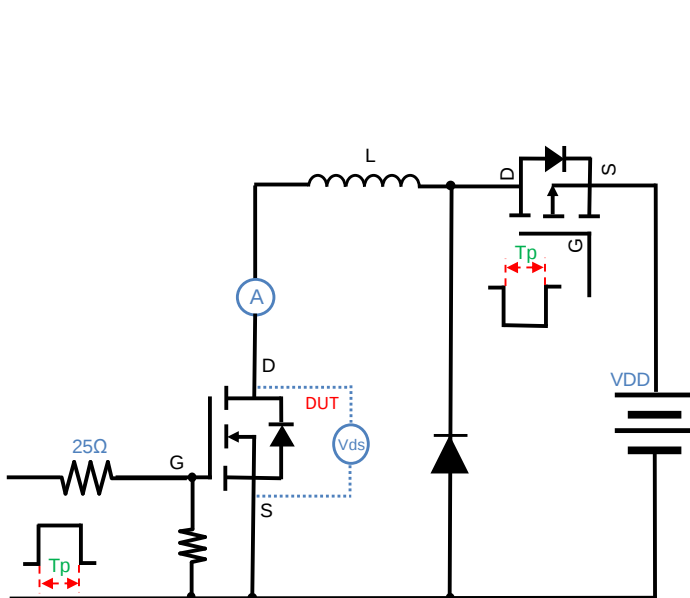
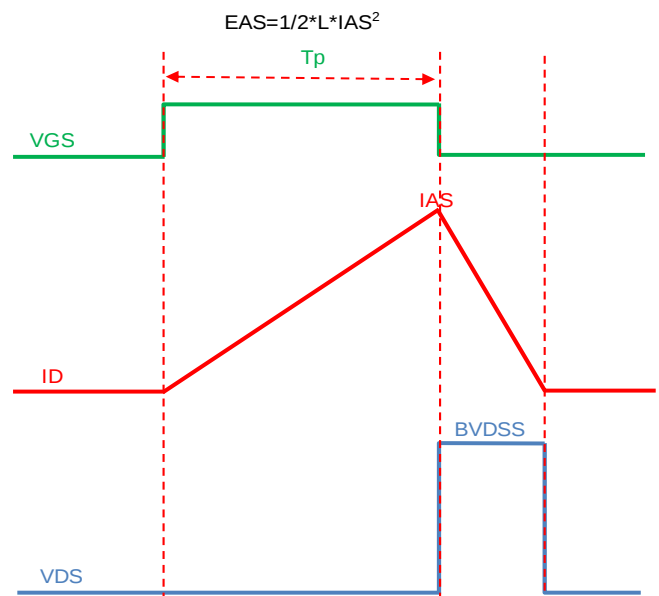


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform



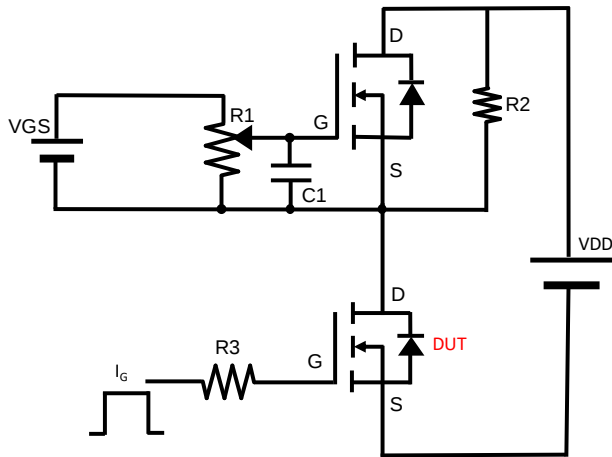


Figure B. Gate Charge Test Circuit & Waveform

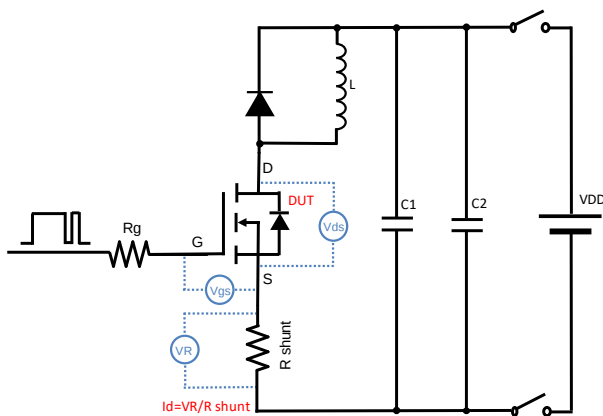


Figure C. Resistive Switching Test Circuit & Waveform

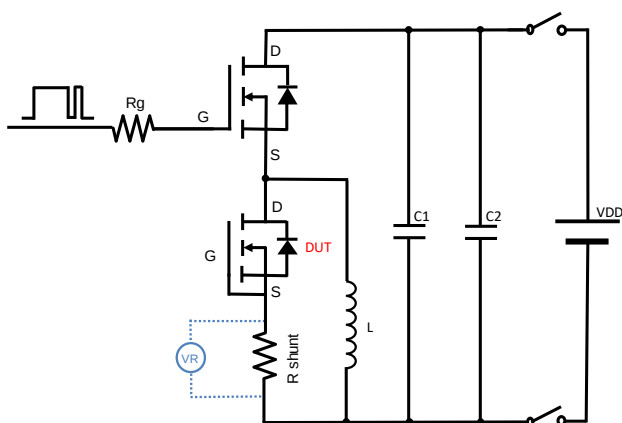
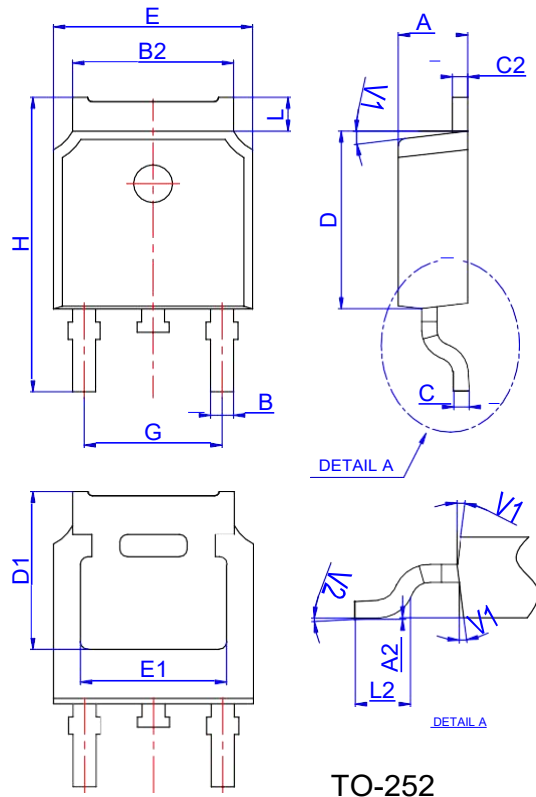


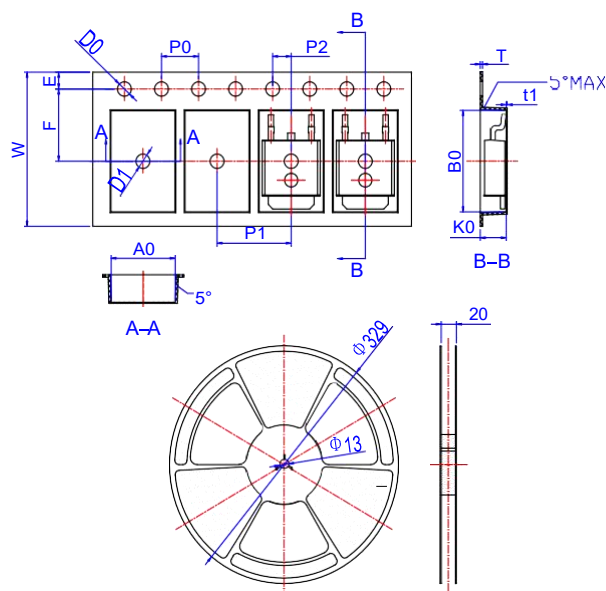
Figure D. Diode Recovery Test Circuit & Waveform

Package Mechanical Data-TO-252



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°

Reel Specification-TO-252-4R



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