PWS1G420N105PZ

Silicon Carbide MOSFET 1050V, 420mΩ, 6A

重庆平伟半导体股份有限公司

Features

- 0V turn-off gate voltage can be applied
- High Blocking Voltage with Low RDS(on)
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Qualified according to JEDEC criteria

Applications

- SMPS
- Solar PV inverters
- EV charging infrastructure
- Energy storage and battery formation

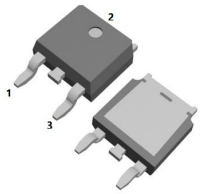
100% DVDS Tested

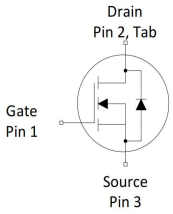
100% AvalancheTested

Product Summary

V_{DS}	1050V
$R_{DS(on)\ typ.}$	420mΩ
I_D	6A

TO-252-2L





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
PWS1G420N105PZ	S1420N105PZ	TO-252-2L	Tape&Reel	13 inches	16mm	2500

Absolute Maximum Ratings

Parameter	**Symbol**	**Value**	**Unit**
Drain-source voltage	V_{DS}	1050	V
Continuous drain current T_C = 25°C TC = 100°C	I_D	6 4	A
Pulsed drain current (T_C = 25°C)	$I_{D\ pulse}$	19	A
Avalanche energy, single pulse (L=5mH)	E_{AS}	16	mJ
Gate-Source voltage,max.transient voltage	V_{GSmax}	-10/+22	V
Recommended operating values	V_{GSsop}	0/+18	V
Power dissipation T_C = 25°C	P_{tot}	29	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

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Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	3.45	5.2	°C/W	-
Thermal resistance, junction - ambient(min.	R_{thJA}	-	-	50.0	°C/W	1 inch²,2oz single copper FR-4 PCB

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	1050	-	-	V	V_{GS}=0V, I_D=500uA
Gate threshold voltage	$V_{GS(th)}$	2.6	3.6	4.6	V	V_{DS}=V_{GS}, I_D=1.3mA
Zero gate voltage drain current	I_{DSS}	-	-	10	μA	V_{DS}=1050V,V_{GS}=0V T_j=25°C
Gate-source leakage current	I_{GSS}	-	-	250	nA	V_{GS}=22V,V_{DS}=0V
		-	-	-200	nA	V_{GS}=-10V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	420	525	mΩ	V_{GS}=18V,I_D=3A，T_J=25℃
Drain-source on-state resistance	$R_{DS(on)}$	-	540	-	mΩ	V_{GS}=15V,I_D=3A，T_J=25℃
Transconductance	g_{fs}	-	1.8	-	S	V_{DS}=20V,I_D=3A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	193	-	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Output Capacitance	C_{oss}	-	40	-		
Reverse Transfer Capacitance	C_{rss}	-	4	-		
Gate Total Charge	Q_G	-	8	-	nC	V_{DS}=600V,I_D=6A ,V_{GS}=0/18V
Gate-Source charge	Q_{gs}	-	3	-		
Gate-Drain charge	Q_{gd}	-	4	-		
Turn-on delay time	$t_{d(on)}$	-	84	-	ns	V_{GS}=0/18V, V_{DD}=600V, R_G=10Ω,I_D=6A
Rise time	t_r	-	19	-		
Turn-off delay time	$t_{d(off)}$	-	11	-		
Fall time	t_f	-	22	-		
Turn-on energy	E_{on}	-	36	-	uJ	
Turn-off energy	E_{off}	-	35	-		
Gate resistance	R_G	-	8.9	-	Ω	V_{GS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	- -	4.5 4	- -	V	V_{GS}=-5V, I_{SD}=2.1A T_j=25°C T_j=175°C
Body Diode Continuous Forward Current	I_S	-	6		A	T_C = 25°C
		-	4		A	T_C = 100°C
Body Diode Reverse Recovery Time	t_{rr}	-	17	-	ns	V_{GS}=0/18V,I_{SD}=6A, V_R=600V di/dt=1200A/us
Body Diode Reverse Recovery Charge	Q_{rr}	-	34	-	nC	
Peak Reverse Recovery Current	I_{RRM}	-	3.0	-	A	

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Typical Performance Characteristics

Fig 1: Output Characteristics Tj=25°C

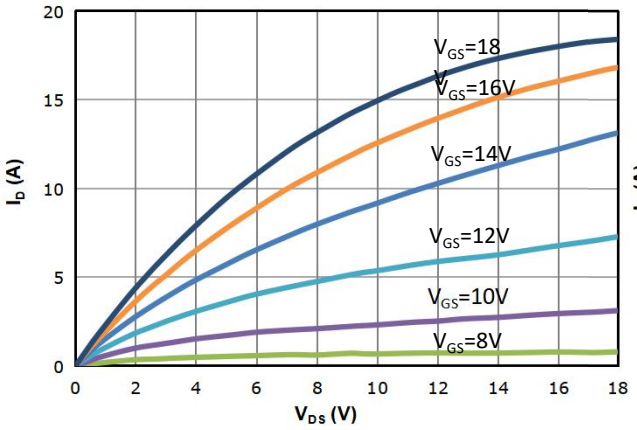


Fig 2: Output Characteristics Tj=175°C

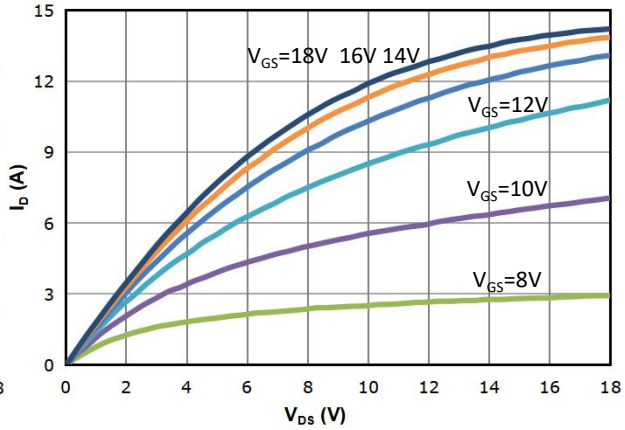


Fig 3: Transfer Characteristics

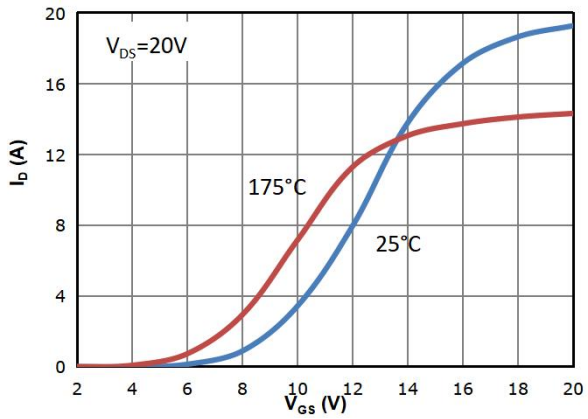


Fig 4: Rds(on) vs Drain Current and Gate Voltage

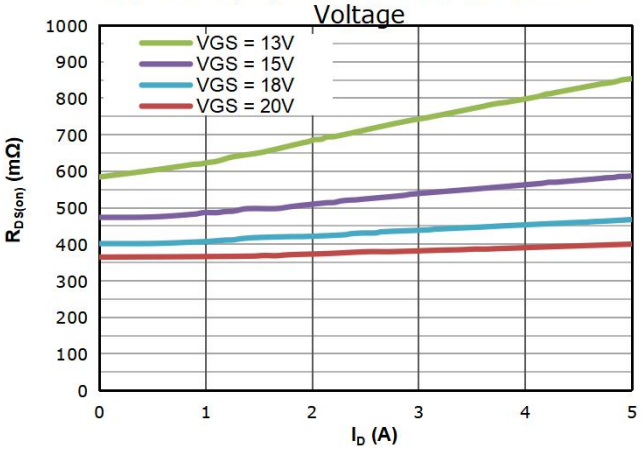


Fig 5: Rds(on) vs. Temperature

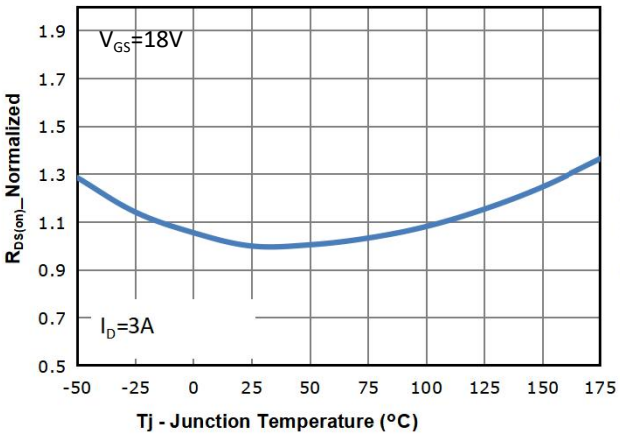
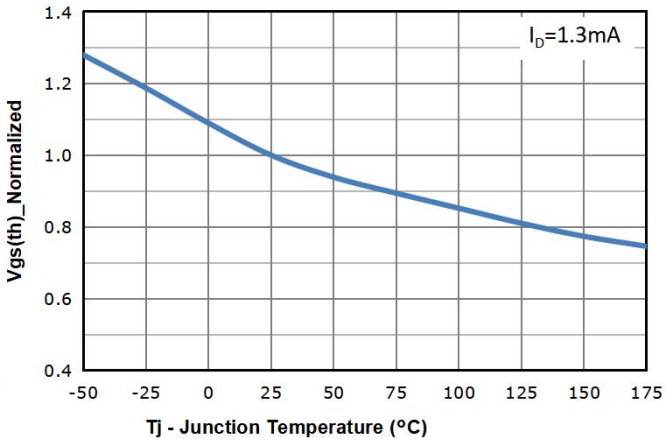


Fig 6: Vgs(th) vs. Temperature



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Fig 7: BVdss vs. Temperature

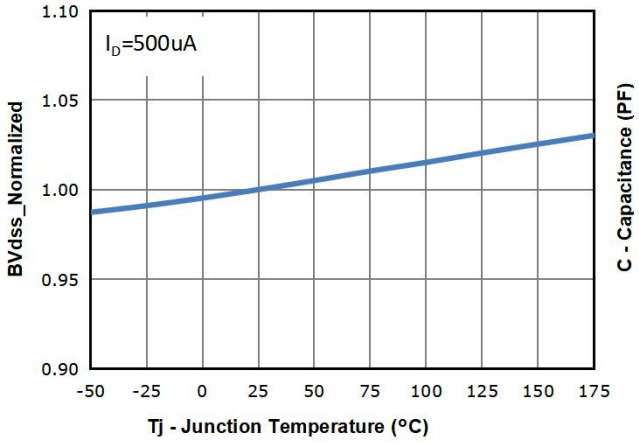


Fig 8: Capacitance Characteristics

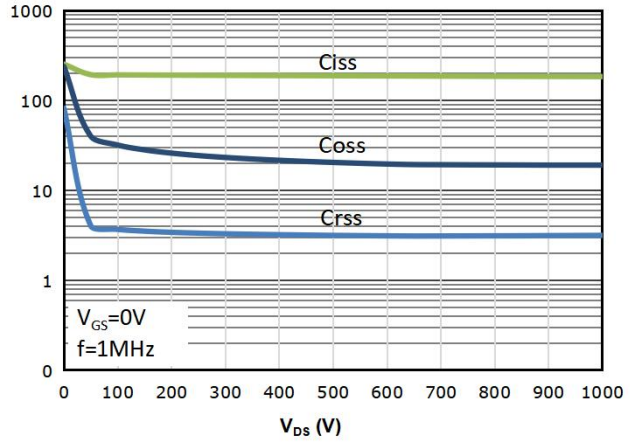


Fig 9: Gate ChargeCharacteristics

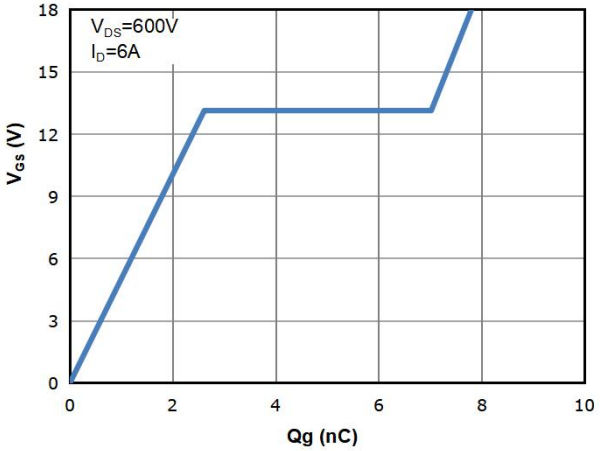


Fig 10: Body-diode Forward Characteristics

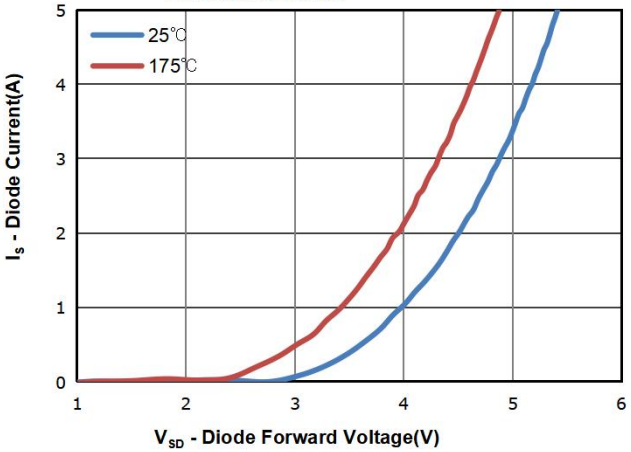


Fig 11: Power Dissipation

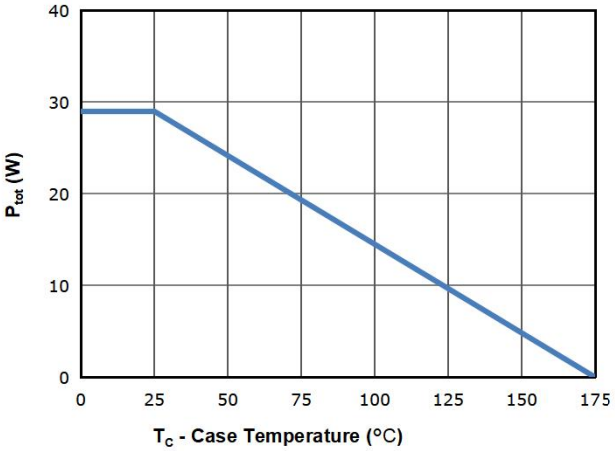
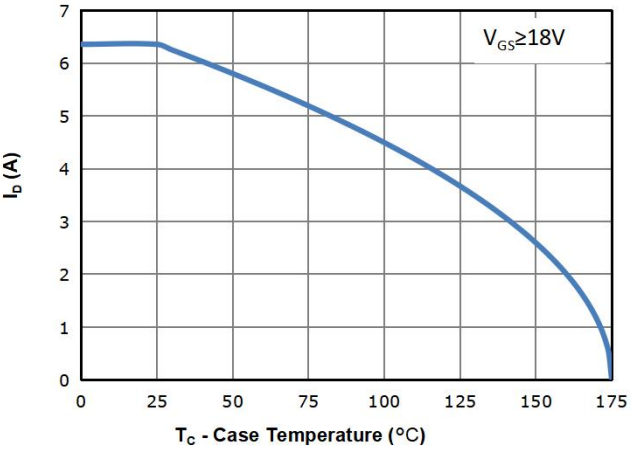


Fig 12: Drain Current Derating



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Fig 13: Safe Operating Area

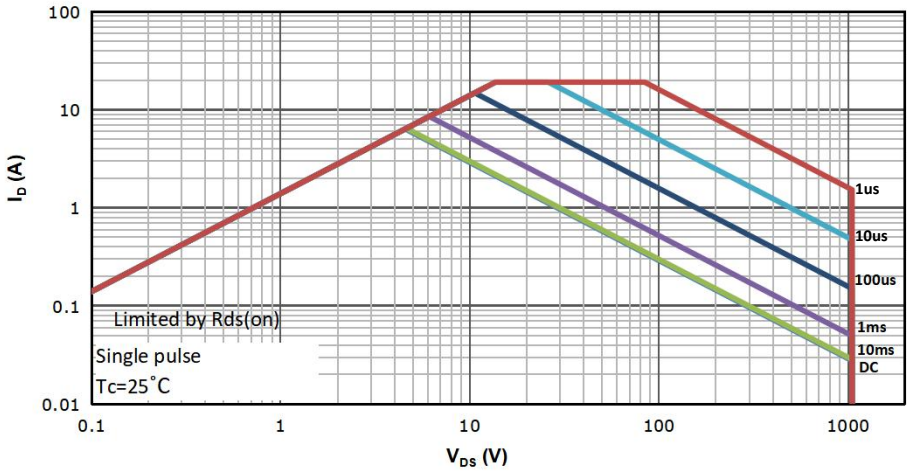
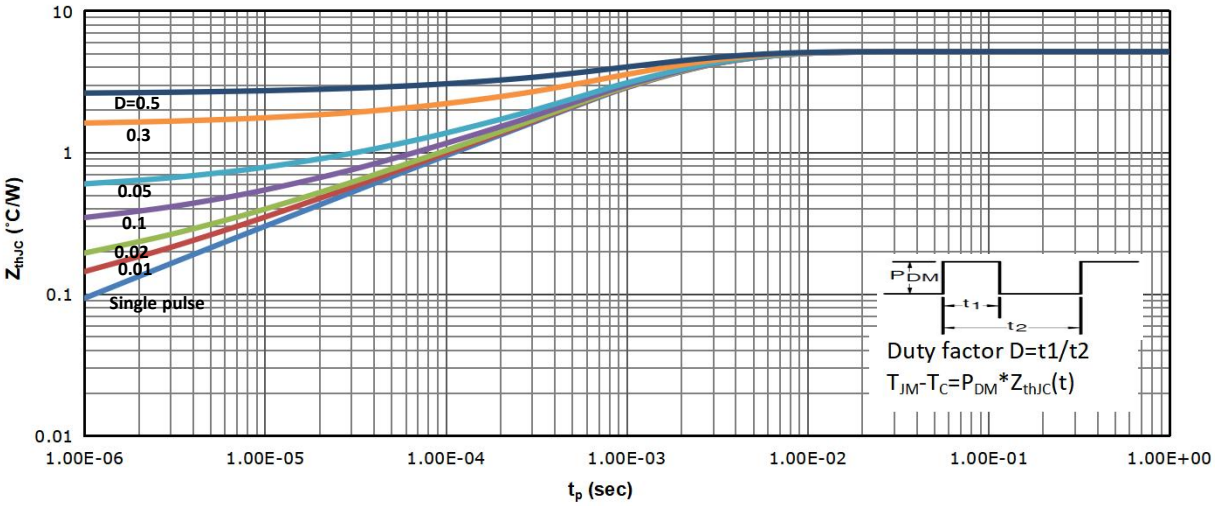


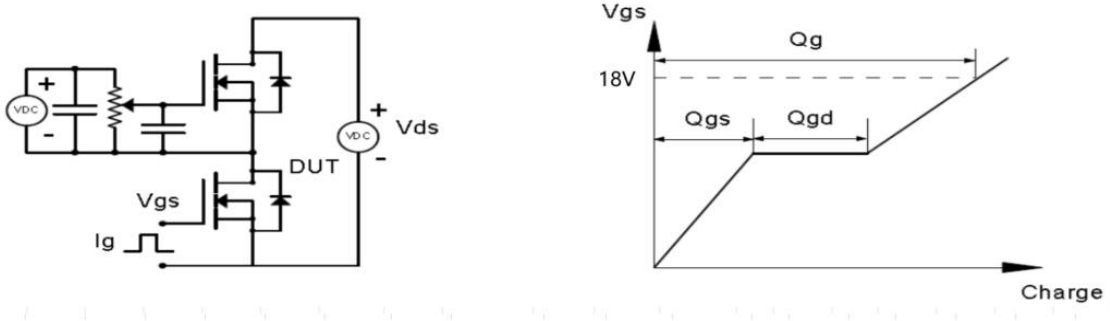
Fig 14: Max. Transient Thermal Impedance



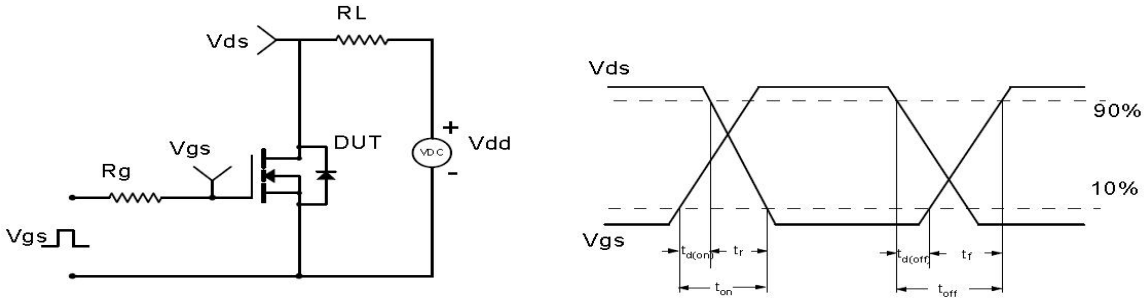
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Test Circuit & Waveform

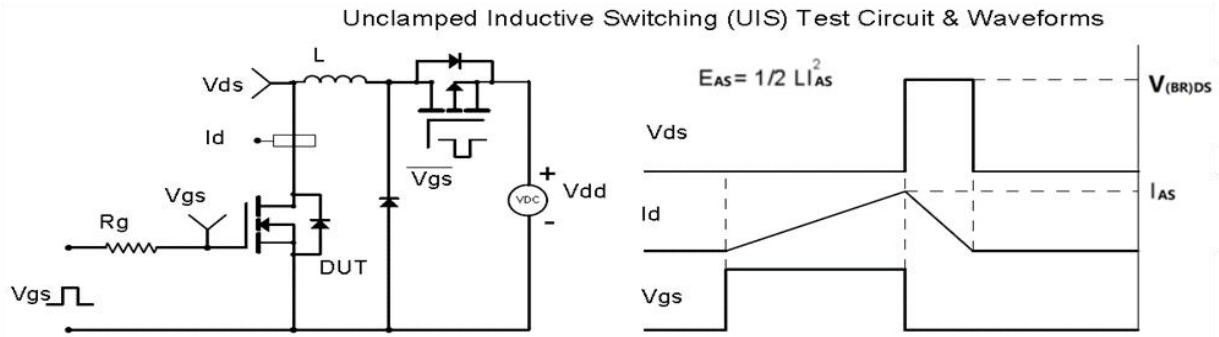
Gate Charge Test Circuit & Waveform



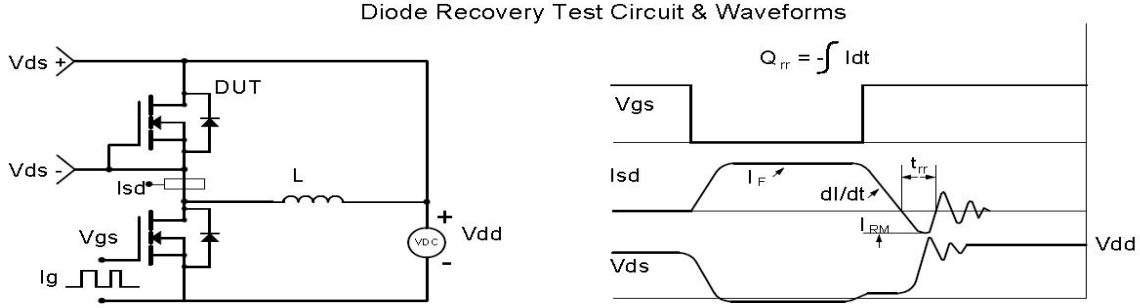
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

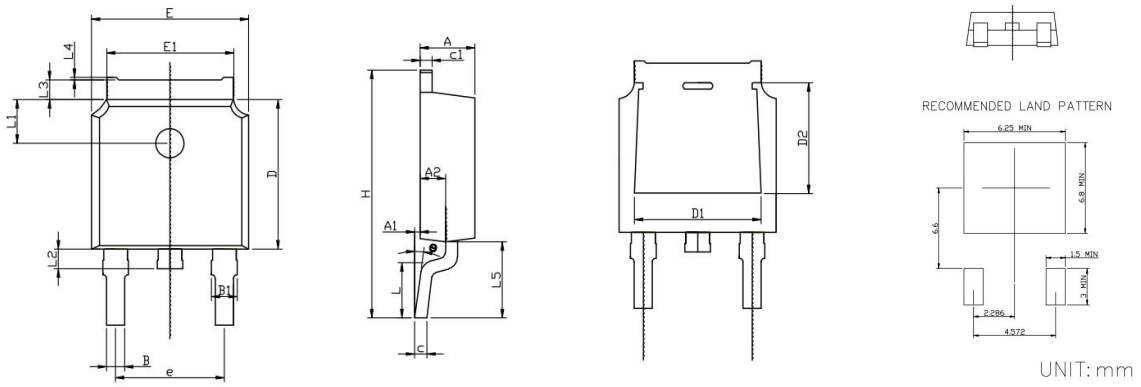


Diode Recovery Test Circuit & Waveforms



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Package Outline: TO-252-2L



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.15	2.45	0.085	0.096
A1	0.05	0.20	0.002	0.008
A2	0.91	1.22	0.036	0.048
B	0.66	0.86	0.026	0.034
B1	0.93	1.23	0.037	0.048
C	0.40	0.60	0.016	0.024
C1	0.40	0.60	0.016	0.024
D	5.95	6.25	0.234	0.246
D1	4.80		0.189	
D2	3.80		0.150	
E	6.45	6.75	0.254	0.266
E1	5.12	5.52	0.202	0.217
L	1.65		0.065	
L1	1.58	1.98	0.062	0.078
L2	0.60	1.00	0.024	0.039
L3	0.70	1.00	0.028	0.039
L4	0.00	0.20	0.000	0.008
L5	2.80	3.40	0.110	0.134
H	9.80	10.40	0.386	0.409
θ	0.00	8.00	0.000	0.315
e	4.57		0.180	

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