



YJG130G04C

N-Channel Enhancement Mode Field Effect Transistor

Product Summary

V_{DS}	40V
I_D	130A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	1.75m
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	2.5m
100% EAS Tested	
100% V_{DS} Tested	

General Description

Split gate trench MOSFET technology
Excellent package for heat dissipation
High density cell design for low $R_{DS(ON)}$
Moisture Sensitivity Level 1
Epoxy Meets UL 94 V-0 Flammability Rating
Halogen Free

Applications

Power switching application
Uninterruptible power supply
DC-DC convertor

Absolute Maximum Ratings ($T_A=25$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	40	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_A=25$	I_D	20	A
	$T_A=100$		12	
	$T_C=25$		130	
T_C				



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Electrical Characteristics (T_J=25 unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	μA
		V _{DS} =40V, V _{GS} =0V, T _J =150	-	-	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	1.0	1.8	2.5	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =65A	-	1.45	1.75	m
		V _{GS} =10V, I _D =20A	-	1.45	1.75	
		V _{GS} =4.5V, I _D =20A	-	2.0	2.5	
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V	-	0.8	1.2	V
Gate resistance	R _G	f=1MHz	-	1.5	-	
Maximum Body-Diode Continuous Current	I _S		-	-	130	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1MHz	-	7400	-	pF
Output Capacitance	C _{oss}		-	1340	-	
Reverse Transfer Capacitance	C _{rss}		-	70	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =20V, I _D =20A	-	129	-	nC
Gate-Source Charge	Q _{gs}		-	18	-	
Gate-Drain Charge	Q _{gd}		-	32	-	
Reverse Recovery Charge	Q _{rr}	I _F =20A, di/dt=100A/us	-	120	-	nC
Reverse Recovery Time	t _{rr}		-	73	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =20V, I _D =20A R _{GEN} =2.2	-	28	-	ns
Turn-on Rise Time	t _r		-	113	-	
Turn-off Delay Time	t _{D(off)}		-	56	-	
Turn-off fall Time	t _f		-	21	-	

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

B. T_J=25 , V_{DD}=30V, V_G=10V, R_G=25 , L=3mH, I_{AS}=21A.

C. P_g is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R_{JA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in the still air environment with T_A =25 .
The maximum allowed junction temperature of 150 . The value in any given application depends on the user's specific board design.



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Typical Electrical and Thermal Characteristics Diagrams

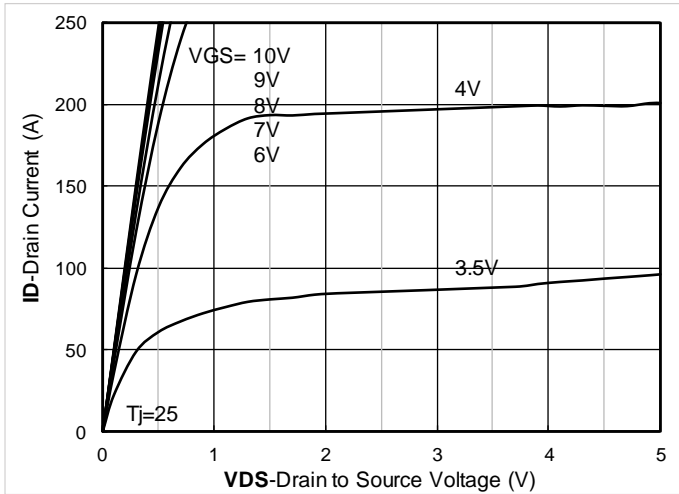


Figure 1. Output Characteristics

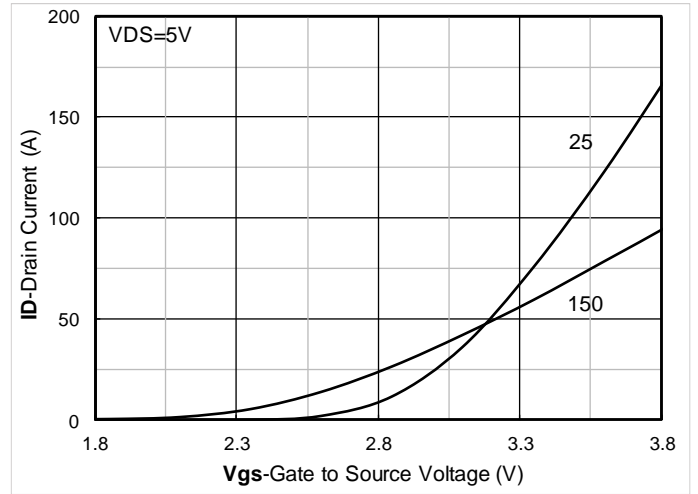


Figure 2. Transfer Characteristics

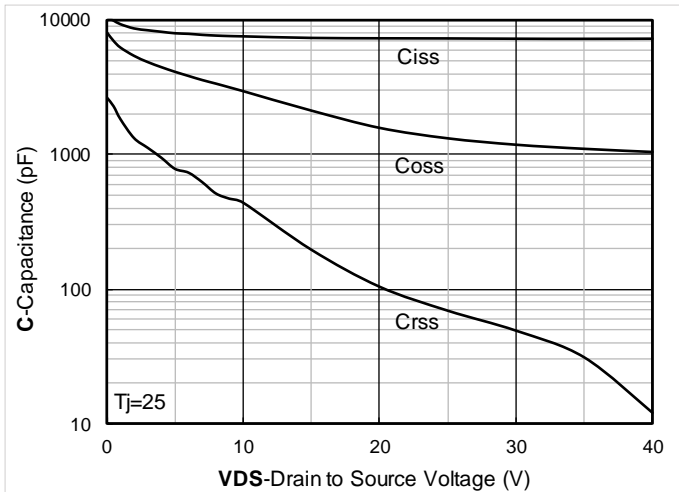


Figure 3. Capacitance Characteristics

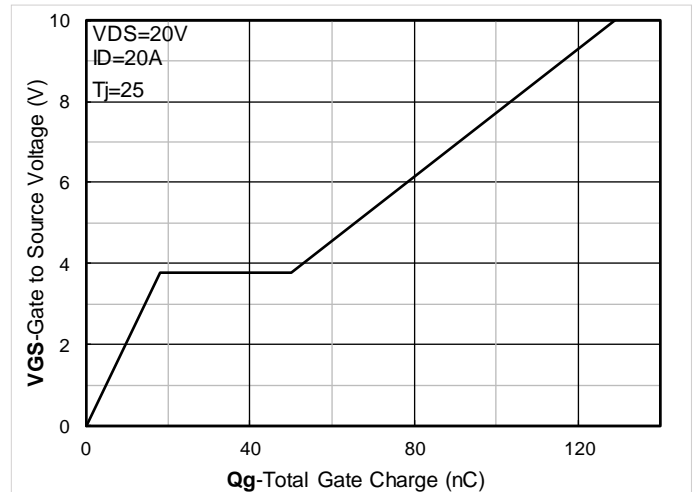


Figure 4. Gate Charge

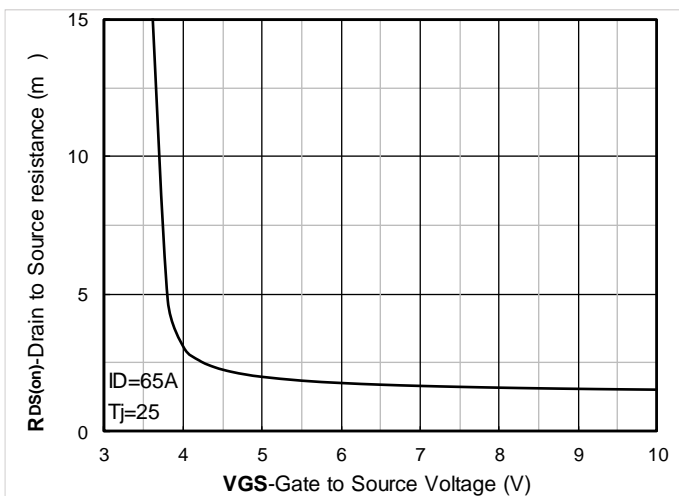


Figure 5. On-Resistance vs Gate to Source Voltage

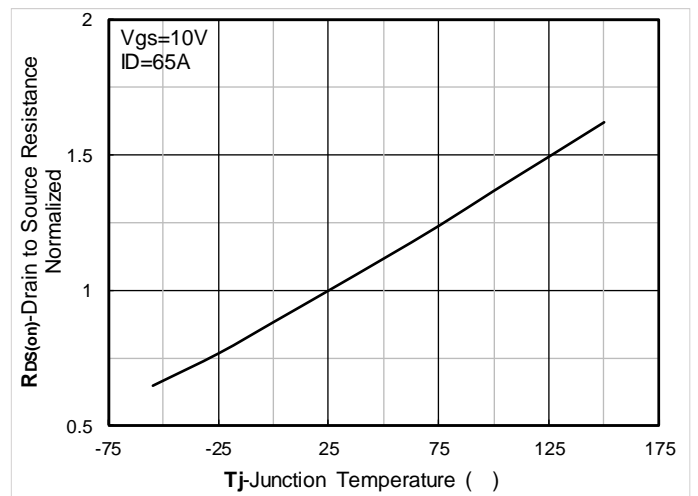


Figure 6. Normalized On-Resistance



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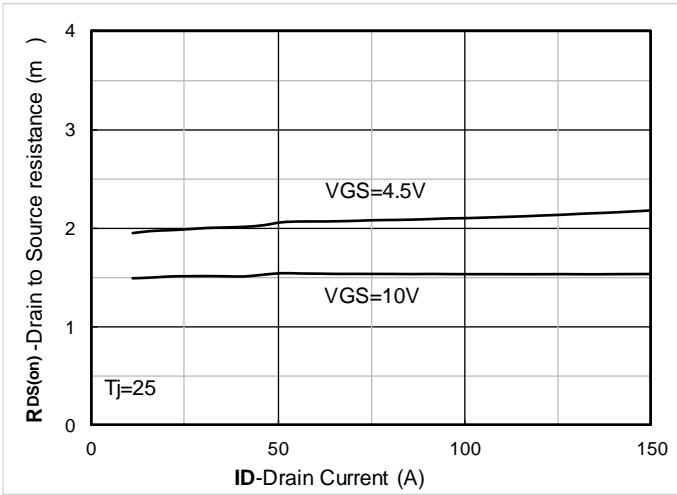


Figure 7. $R_{DS(on)}$ VS Drain Current

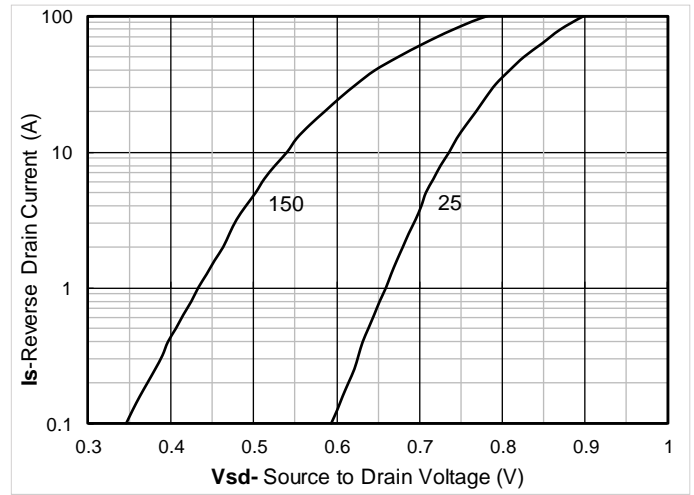


Figure 8. Forward characteristics of reverse diode

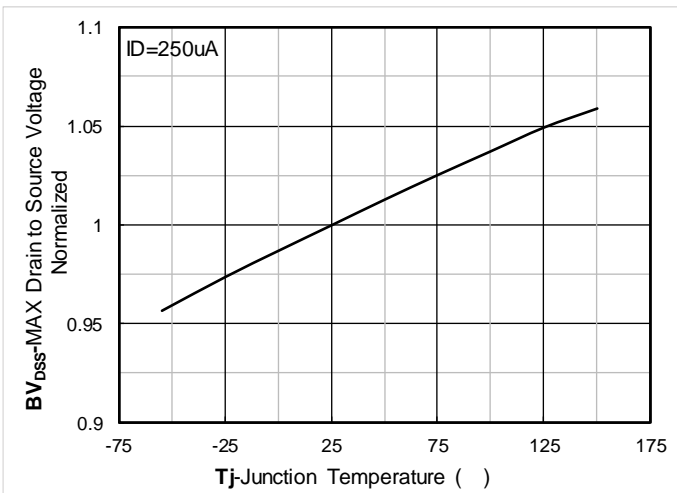


Figure 9. Normalized breakdown voltage

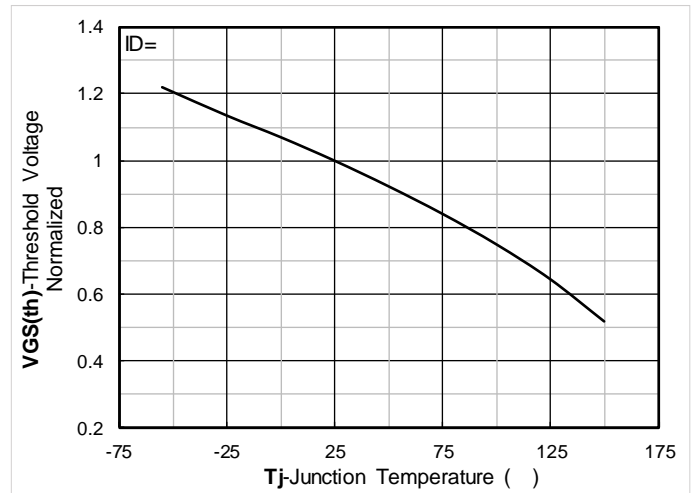


Figure 10. Normalized Threshold voltage

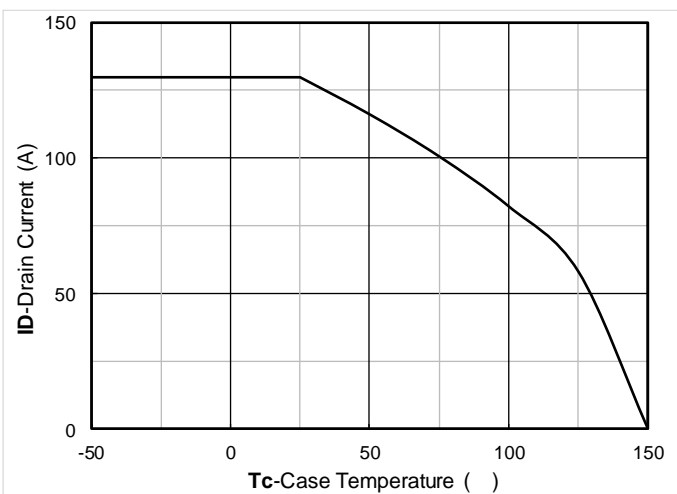


Figure 11. Current dissipation

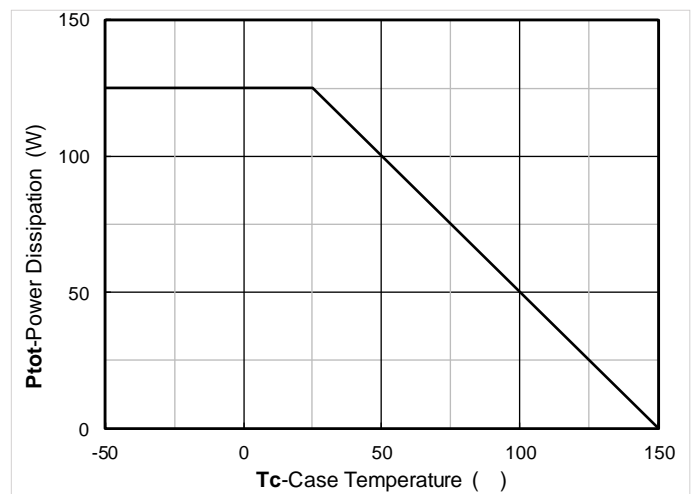


Figure 12. Power dissipation

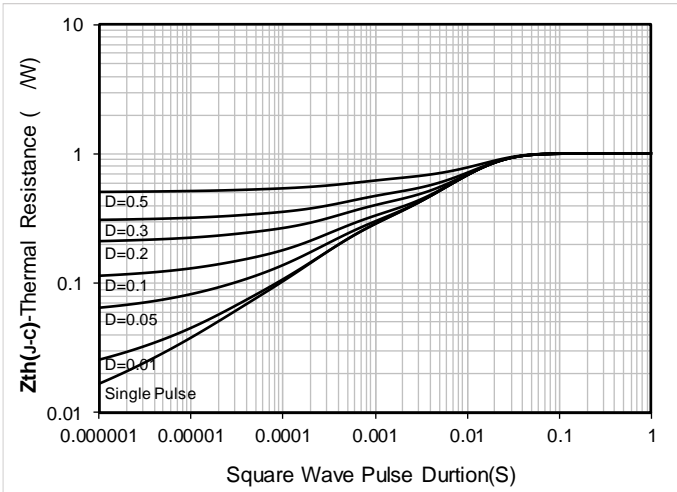


Figure 13. Maximum Transient Thermal Impedance

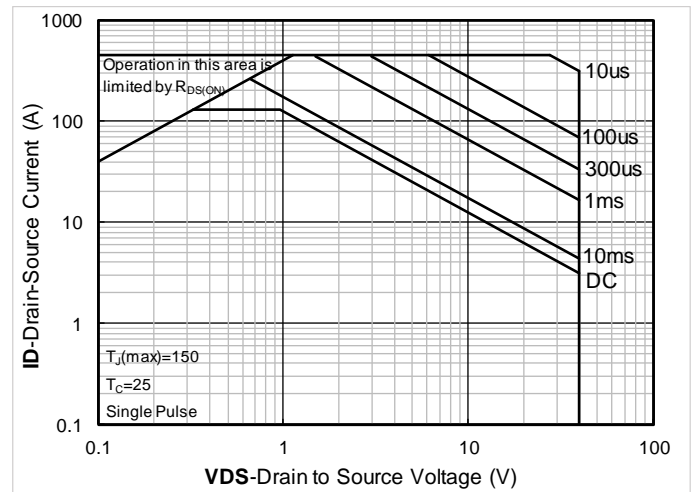


Figure 14. Safe Operation Area

Test Circuits & Waveforms

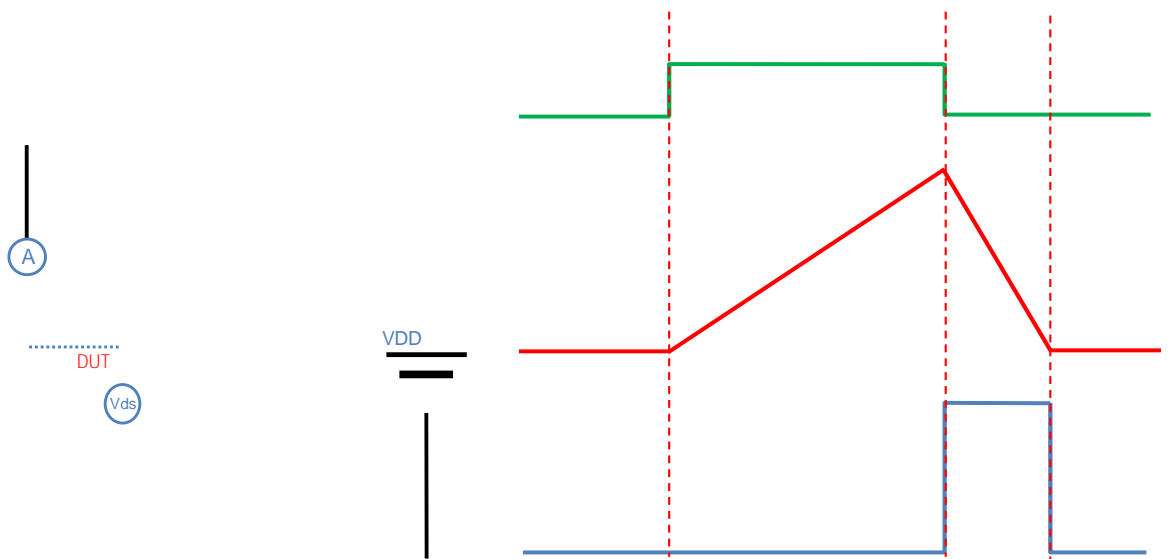


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

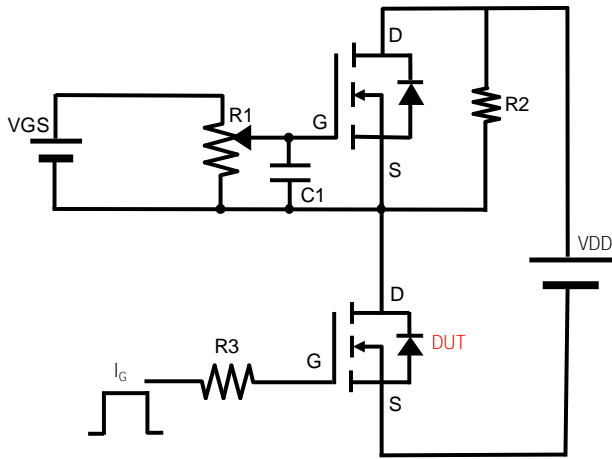


Figure B. Gate Charge Test Circuit & Waveform

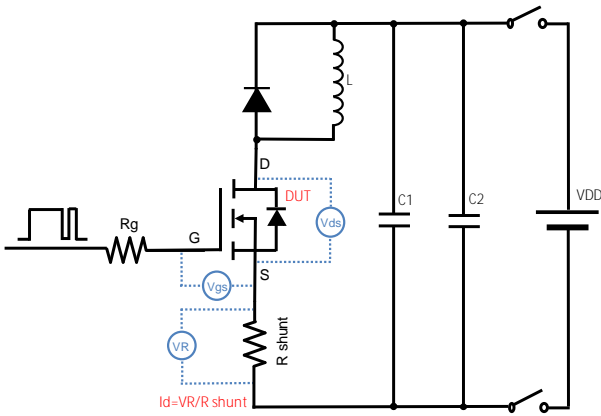


Figure C. Resistive Switching Test Circuit & Waveform

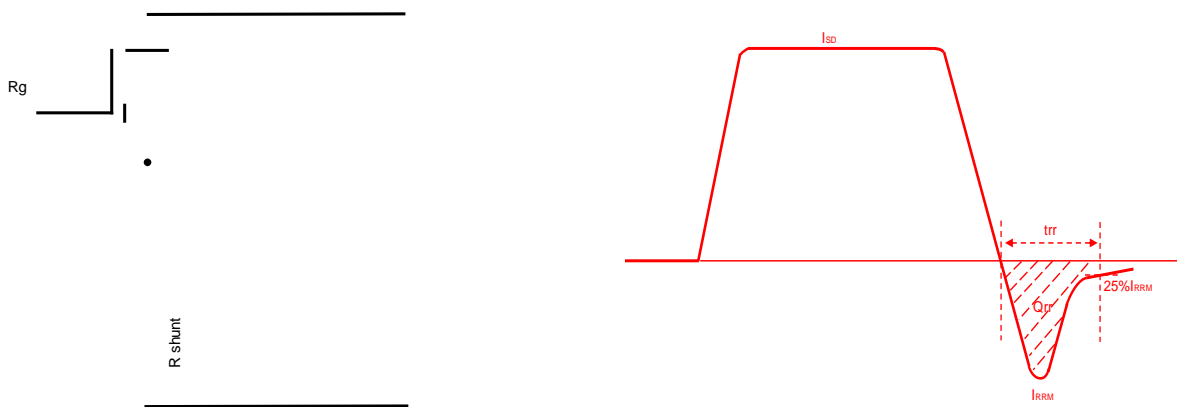


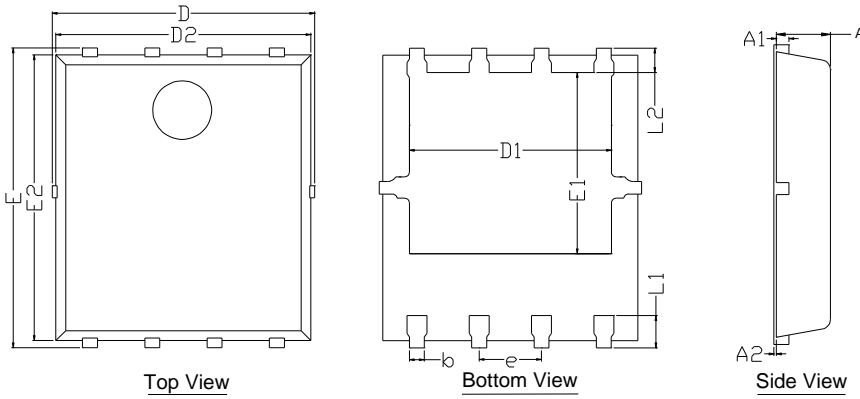
Figure D. Diode Recovery Test Circuit & Waveform



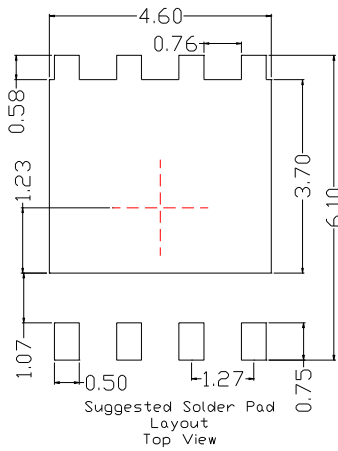
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PDFN5060-8L-E-1.0MM Package information

Type E



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	4.85	5.05	5.25
E	5.80	6.00	6.20
A	0.90	1.00	1.10
A1	0,254 BSC		
A2			0.10
D1	4.00	4.20	4.40
E1	3.35	3.55	3.75
D2	4.70	4.90	5.10
E2	5.55	5.75	5.95
L1	0.55	0.65	0.75
L2	0,575 BSC		
b	0.20	0.30	0.40
e	1.27 BSC		

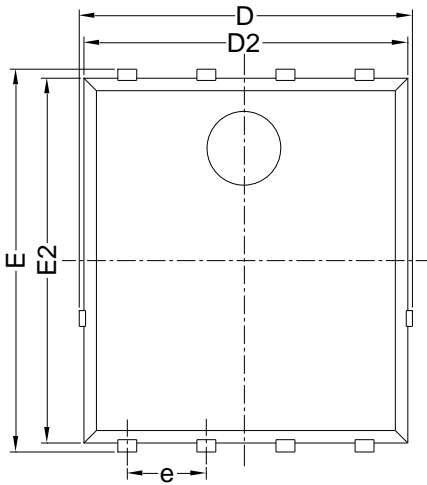


Note:
 1. Controlling dimension in millimeters.
 2. General tolerance: ± 0.10 mm.
 3. The pad layout is for reference purposes only.

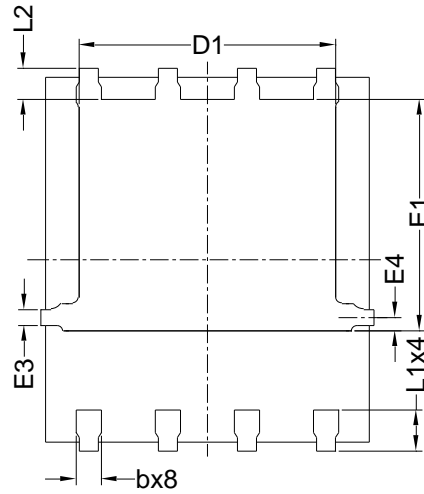


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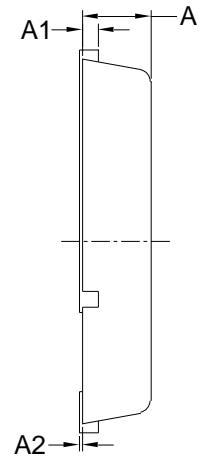
Type B



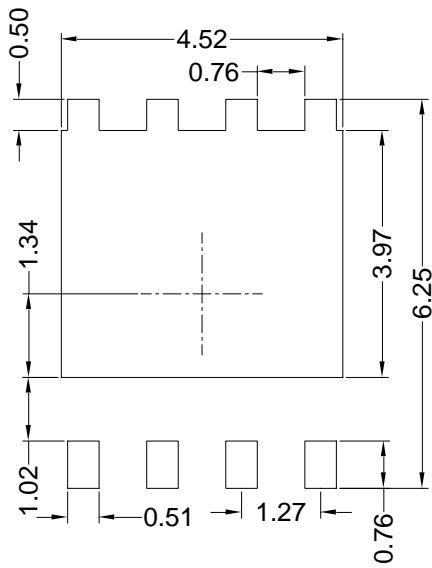
Top View



Bottom View



Side View



Suggested Solder Pad Layout
Top View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	5.15	5.35	5.55
E	5.95	6.15	6.35
A	1.00	1.10	1.20
A1	0.254 BSC		
A2			0.10
D1	3.92	4.12	4.32
E1	3.52	3.72	3.92
D2	5.00	5.20	5.40
E2	5.66	5.86	6.06
E3	0.254 REF		
E4	0.21 REF		
L1	0.56	0.66	0.76
L2	0.50 BSC		
b	0.31	0.41	0.51
e	1.27 BSC		

Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.10 mm.
3. The pad layout is for reference purposes only.



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