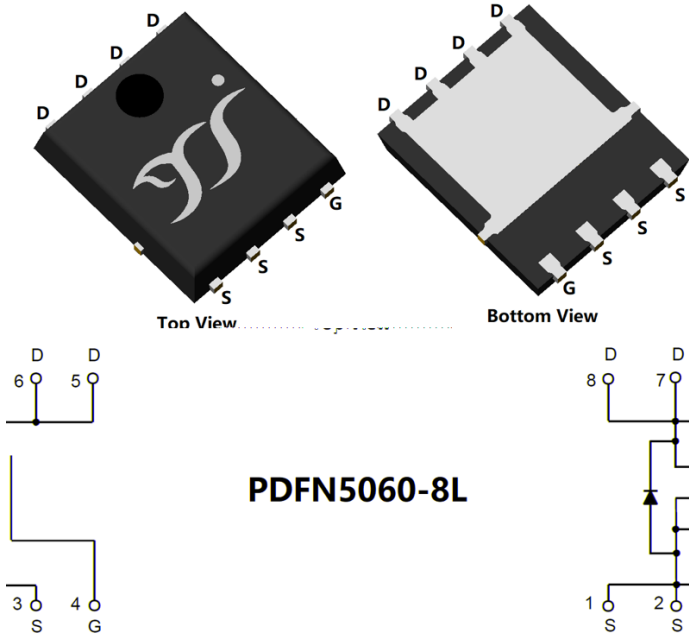


N-Channel Enhancement Mode Field Effect Transistor



Product Summary

V_{DS}	40V
I_D	130A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	<1.9m
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	<2.8m
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 3
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free
- Part no. with suffix "Q" means AEC-Q101 qualified

Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	40	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_A=25^\circ C$	I_D	20	A
	$T_A=100^\circ C$		12	
	$T_C=25^\circ C$		130	
	$T_C=100^\circ C$		90	
Pulsed Drain Current ^A		I_{DM}	450	A
Avalanche energy ^B		EAS	661	mJ
Total Power Dissipation ^C	$T_A=25^\circ C$	P_D	2.5	W
	$T_A=100^\circ C$		1	
	$T_C=25^\circ C$		150	
	$T_C=100^\circ C$		50	
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+175	$^\circ C$

Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	Steady-State	R_{JA}	40	50	$^\circ C/W$
Thermal Resistance Junction-to-Case	Steady-State	R_{JC}	0.8	1	

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJG130G04CQ	F1	YJG130G04C	5000	10000	100000	13" reel



YJG130G04CQ

Electrical Characteristics (T_J=25°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	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 =175°C	-	-	500	
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	1.2	1.8	2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	1.5	1.9	m
		V _{GS} =4.5V, I _D =20A	-	2.0	2.8	
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V	-	0.8	1.2	V
Gate resistance	R _G	f=1MHz	-	1.7	-	
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°C, V_{DD}=30V, V_G=10V, R_G=25Ω, L=3mH, I_{AS}=21A.

C. P_d 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°C. The maximum allowed junction temperature of 175°C. The value in any given application depends on the user's specific board design.



Typical Electrical and Thermal Characteristics Diagrams

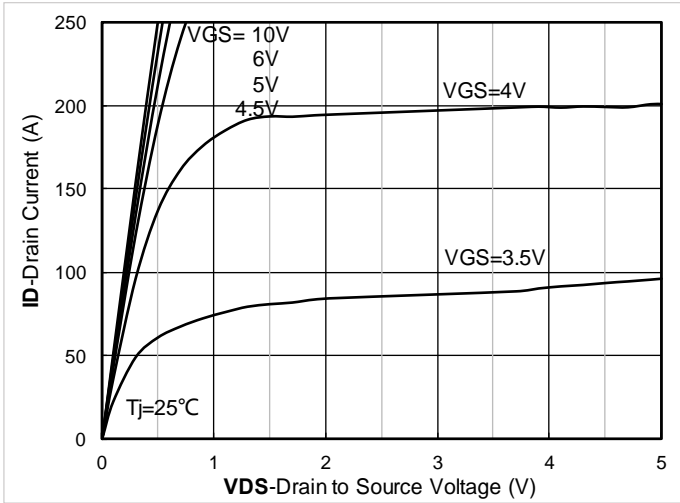


Figure 1. Output Characteristics

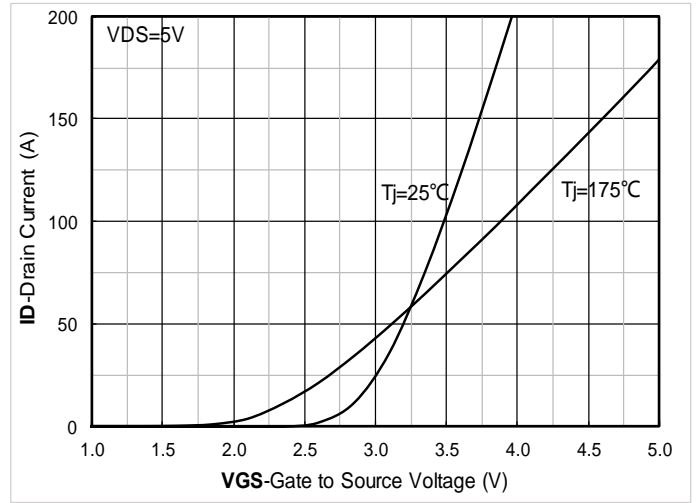


Figure 2. Transfer Characteristics

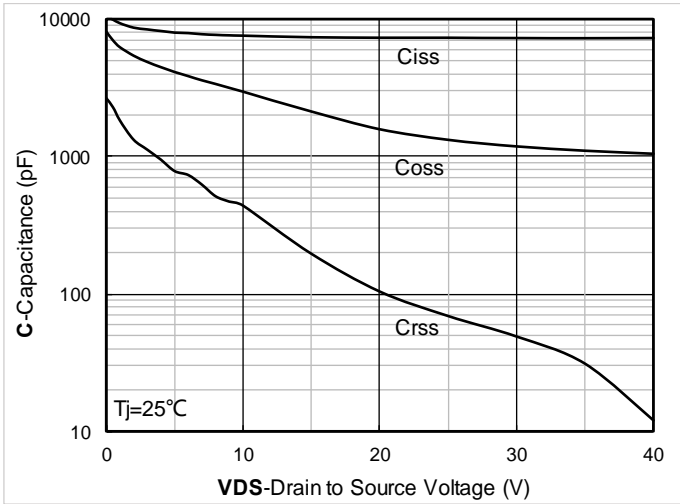


Figure 3. Capacitance Characteristics

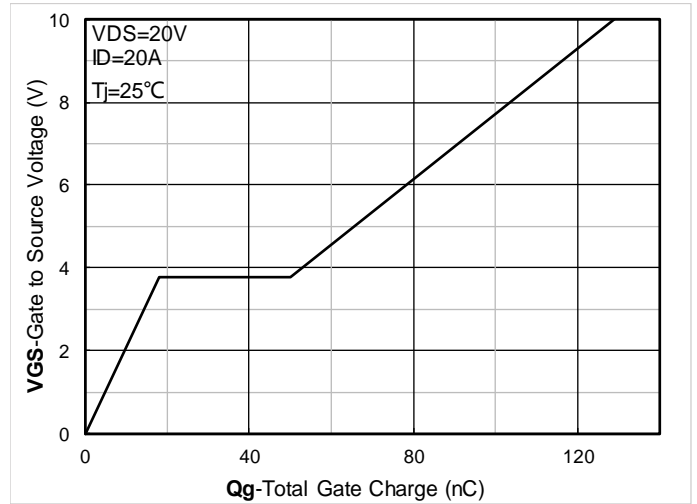


Figure 4. Gate Charge

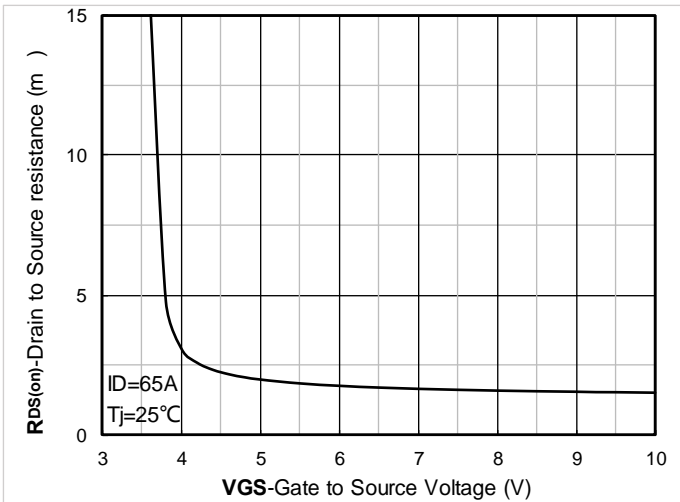


Figure 5. On-Resistance vs Gate to Source Voltage

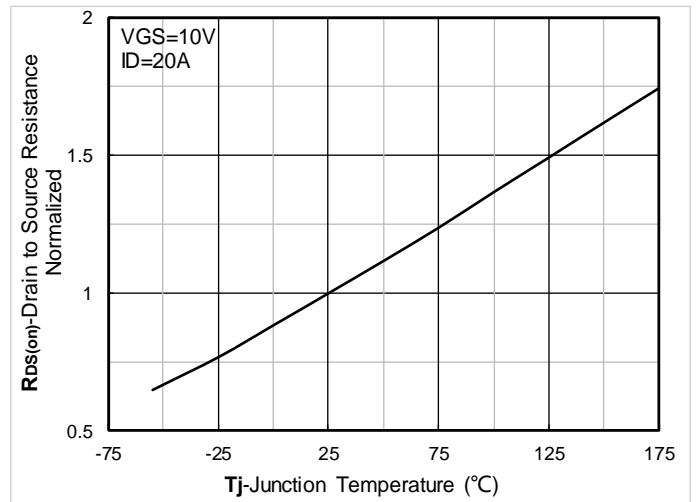


Figure 6. Normalized On-Resistance



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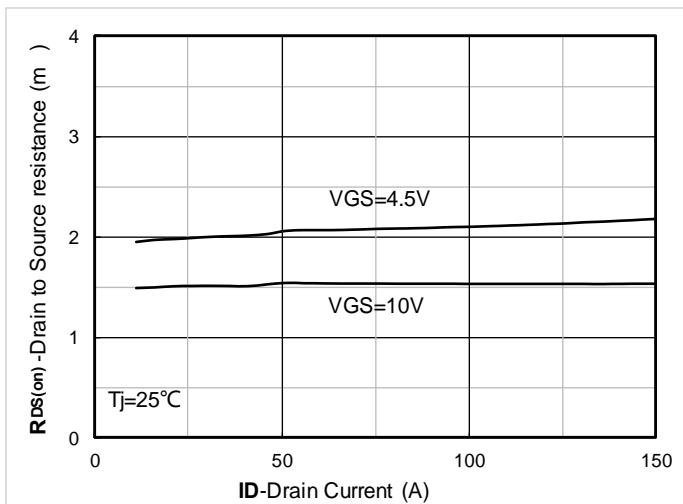


Figure 7. RDS(on) VS Drain Current

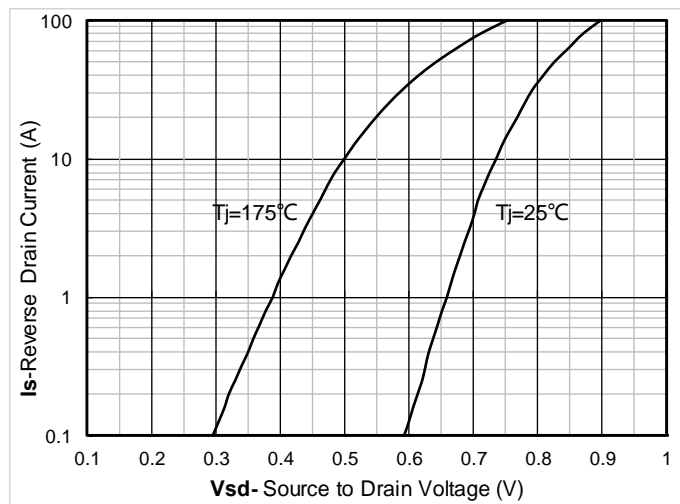


Figure 8. Forward characteristics of reverse diode

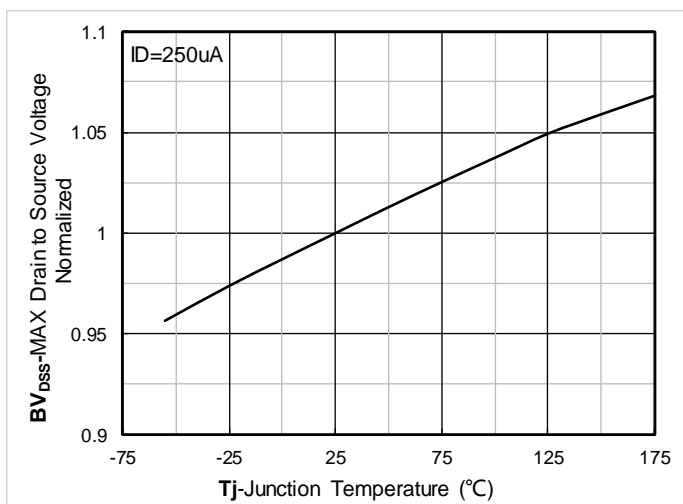


Figure 9. Normalized breakdown voltage

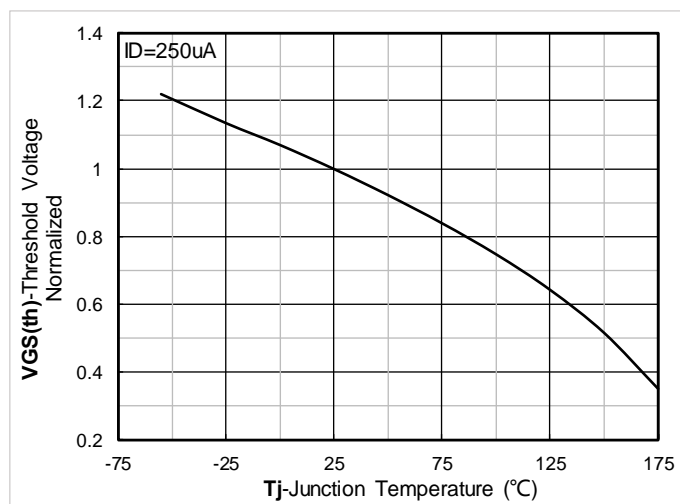


Figure 10. Normalized Threshold voltage

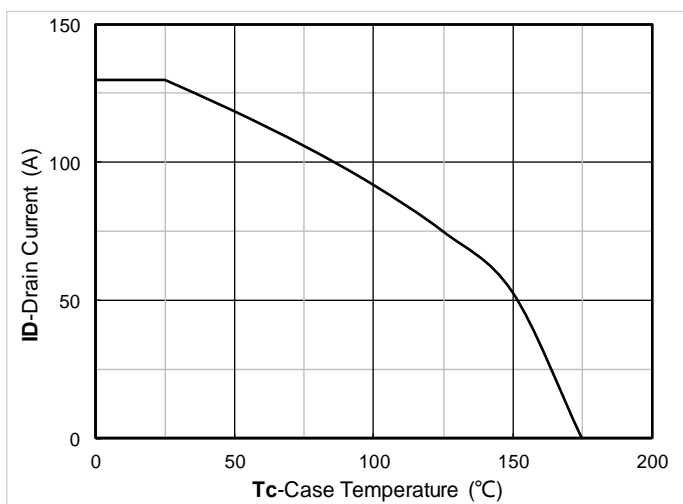


Figure 11. Current dissipation

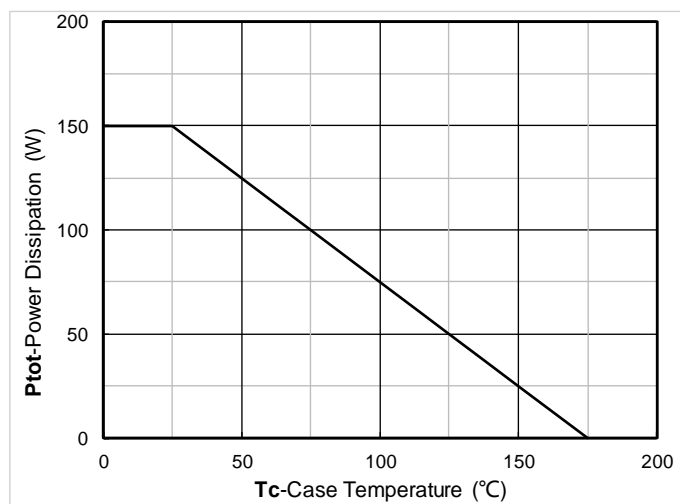


Figure 12. Power dissipation

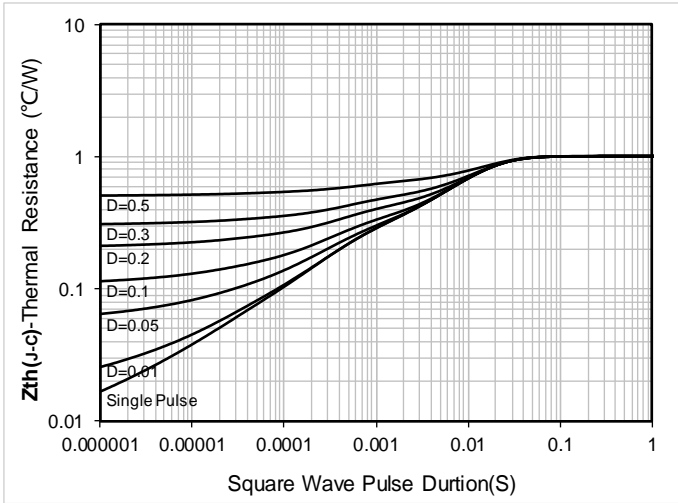


Figure 13. Maximum Transient Thermal Impedance

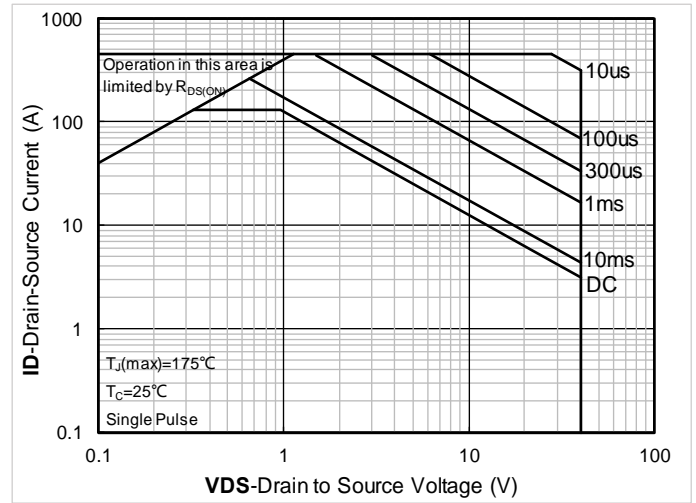
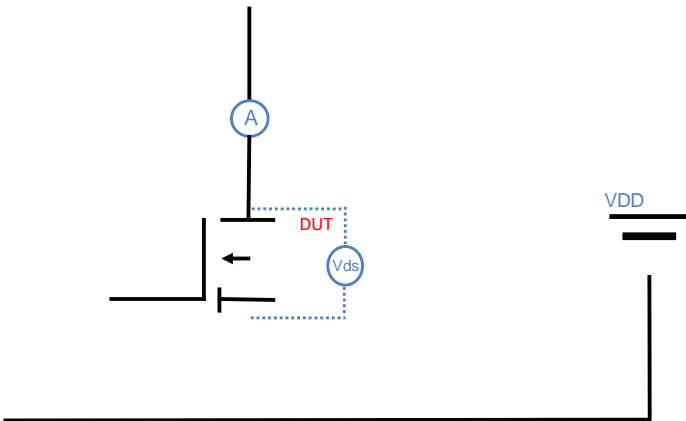


Figure 14. Safe Operation Area

Test Circuits & Waveforms



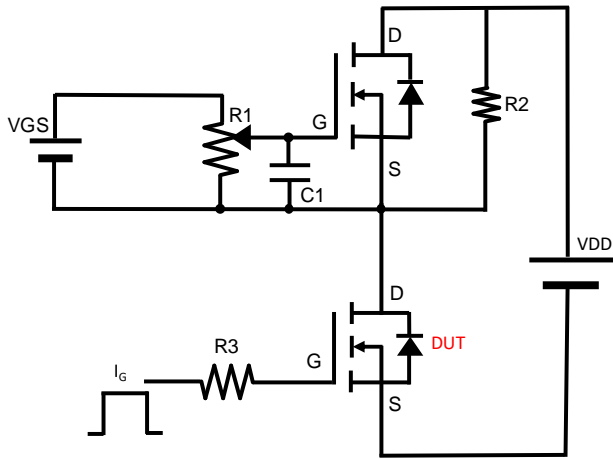


Figure B. Gate Charge Test Circuit & Waveform

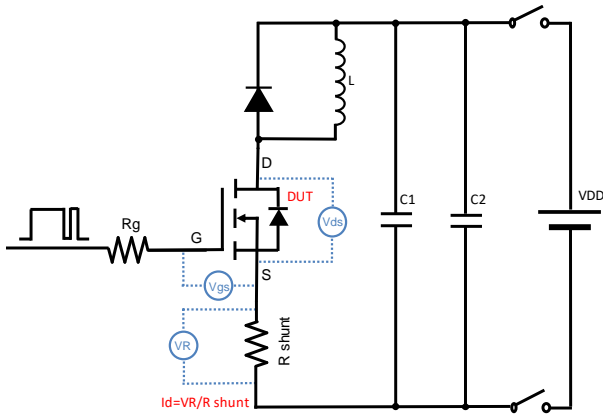


Figure C. Resistive Switching Test Circuit & Waveform

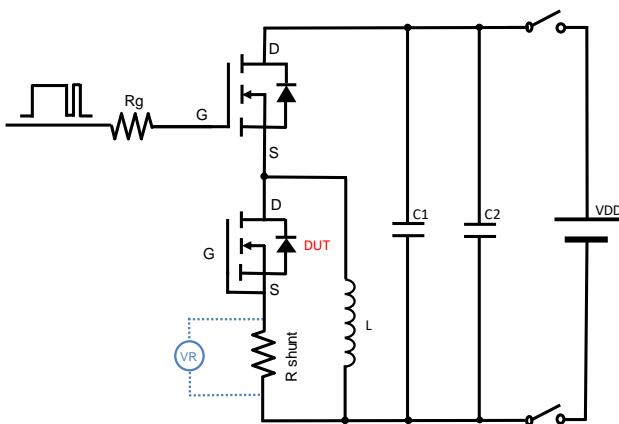
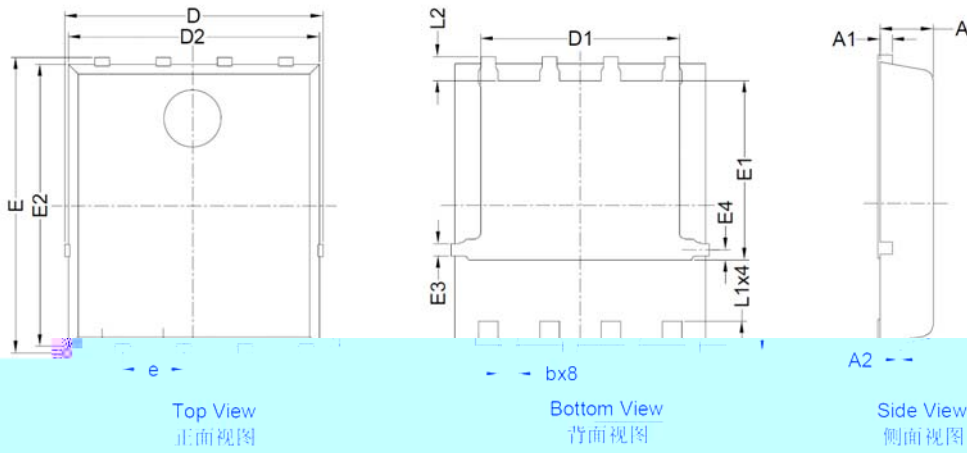


Figure D. Diode Recovery Test Circuit & Waveform



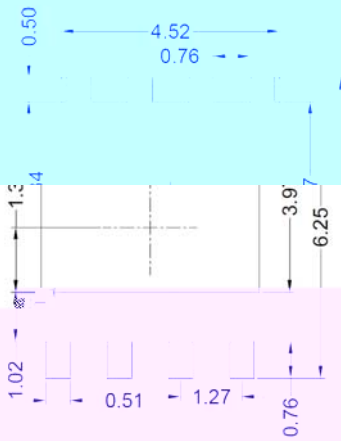
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PDFN5060-8L-1.1MM Package information



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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