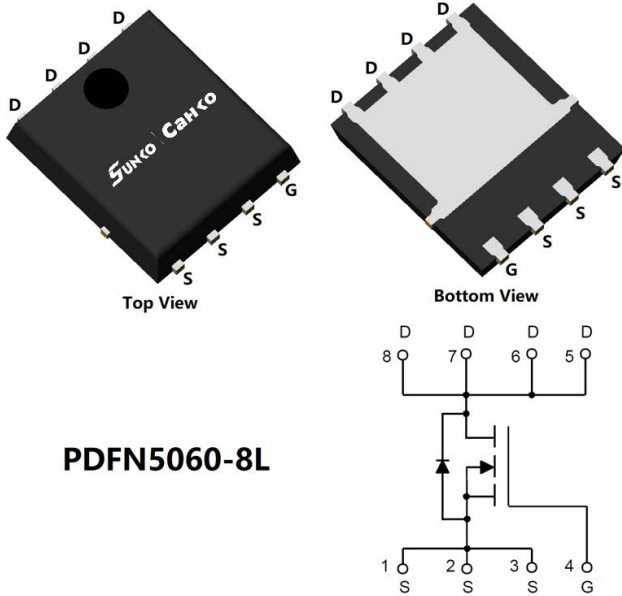


P-Channel Enhancement Mode Field Effect Transistor



PDFN5060-8L

Product Summary

- V_{DS} -15V
- I_D -175A
- $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) <2.7m Ω
- $R_{DS(ON)}$ (at $V_{GS}=-2.5V$) <3.7m Ω
- $R_{DS(ON)}$ (at $V_{GS}=-1.8V$) <5.2m Ω
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- 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

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage	$T_J \geq 25^\circ C; T_J \leq 150^\circ C$		V_{DS}	-	-15	V
Gate-source Voltage	$T_J \leq 150^\circ C; DC$		V_{GS}	-10	10	
Continuous Drain Current (Note 1,2)	Steady-State	$T_A = 25^\circ C, V_{GS} = -4.5V$	I_D	-	-26	A
		$T_A = 100^\circ C, V_{GS} = -4.5V$		-	-17	
Continuous Drain Current (Note 1,3)	Steady-State	$T_C = 25^\circ C, V_{GS} = -4.5V, \text{Chip limitation}$		-	-175	
		$T_C = 100^\circ C, V_{GS} = -4.5V$		-	-110	
Pulsed Drain Current	$T_C = 25^\circ C, t_p \leq 10\mu s$		I_{DM}	-	-700	
Maximum Body-Diode Continuous Current	$T_C = 25^\circ C$		I_S		-175	
Avalanche energy (non-repetitive)	$T_J = 25^\circ C, V_G = -5V, R_G = 25\Omega, L = 2mH, I_{AS} = -20A$		EAS	-	400	mJ
Total Power Dissipation (Note 1,2)	Steady-State	$T_A = 25^\circ C$	P_D	-	2.8	W
		$T_A = 100^\circ C$		-	1.1	
Total Power Dissipation (Note 1,3)	Steady-State	$T_C = 25^\circ C$		-	125	
		$T_C = 100^\circ C$		-	50	
Junction and Storage Temperature Range			T_J, T_{STG}	-55	150	$^\circ C$

Thermal Resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	-	52	$^\circ C/W$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	-	1	

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SCG2D7P015A	F1	SCG2D7P015A	5000	10000	100000	13" reel

■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A, T_j=25^\circ C$	-15	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-15V, V_{GS}=0V, T_j=25^\circ C$	-	-	-1	μA
		$V_{DS}=-15V, V_{GS}=0V, T_j=150^\circ C$	-	-	-100	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V, T_j=25^\circ C$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A, T_j=25^\circ C$	-0.4	-0.62	-1.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-50A, T_j=25^\circ C$	-	2.1	2.7	$m\Omega$
		$V_{GS}=-2.5V, I_D=-15A, T_j=25^\circ C$	-	2.8	3.7	$m\Omega$
		$V_{GS}=-1.8V, I_D=-10A, T_j=25^\circ C$	-	4.0	5.2	$m\Omega$
Diode Forward Voltage	V_{SD}	$I_S=-50A, V_{GS}=0V, T_j=25^\circ C$	-	-0.83	-1.2	V
Gate Resistance	R_G	$f=1MHz, T_j=25^\circ C$	-	12	-	Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=-9V, V_{GS}=0V, f=1MHz, T_j=25^\circ C$	-	5960	-	pF
Output Capacitance	C_{oss}		-	1320	-	
Reverse Transfer Capacitance	C_{rss}		-	760	-	
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=-4.5V, V_{DS}=-10V, I_D=-52.5A, T_j=25^\circ C$	-	112	-	nC
Gate-Source Charge	Q_{gs}		-	18	-	
Gate-Drain Charge	Q_{gd}		-	34	-	
Reverse Recovery Charge	Q_{rr}	$I_F=-20A, di/dt=100A/\mu s, V_{GS}=0V, V_R=-7.5V, T_j=25^\circ C$	-	674	-	nC
Reverse Recovery Time	t_{rr}		-	312	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=-4.5V, V_{DS}=-10V, I_D=-52.5A, R_L=0.19\Omega, R_{GEN}=3\Omega, T_j=25^\circ C$	-	19	-	ns
Turn-on Rise Time	t_r		-	121	-	
Turn-off Delay Time	$t_{D(off)}$		-	478	-	
Turn-off Fall Time	t_f		-	321	-	

Note:

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 2oz. Copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$. The value in any given application depends on the user's specific board design.
- Thermal resistance from junction to soldering point (on the exposed drain pad)

■ Typical Electrical and Thermal Characteristics Diagrams

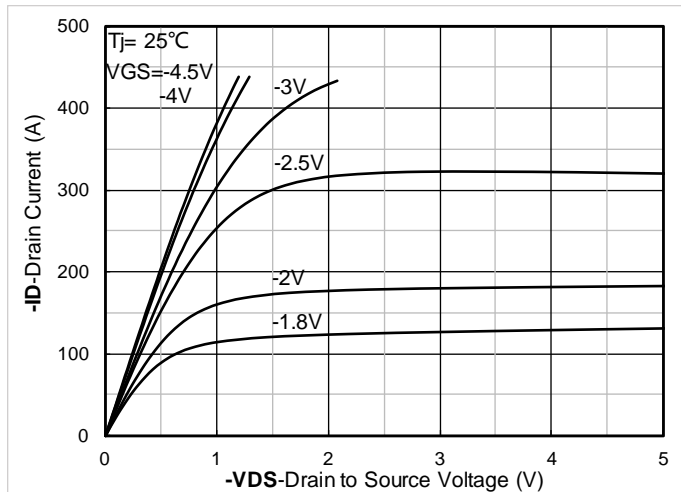


Figure 1. Output Characteristics; typical values

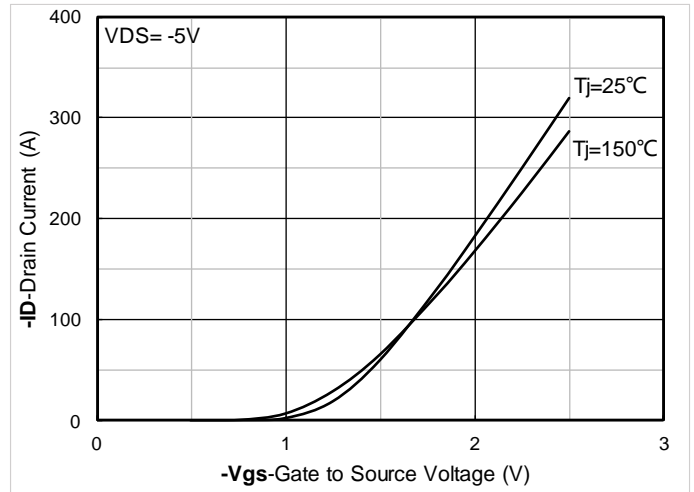


Figure 2. Transfer Characteristics; typical values

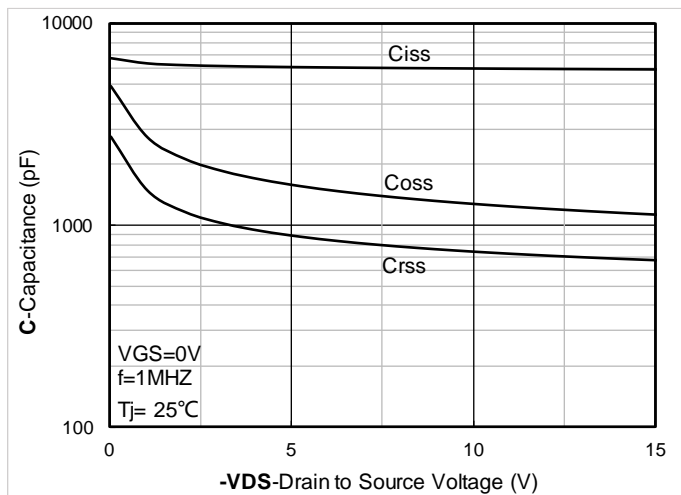


Figure 3. Capacitance Characteristics; typical values

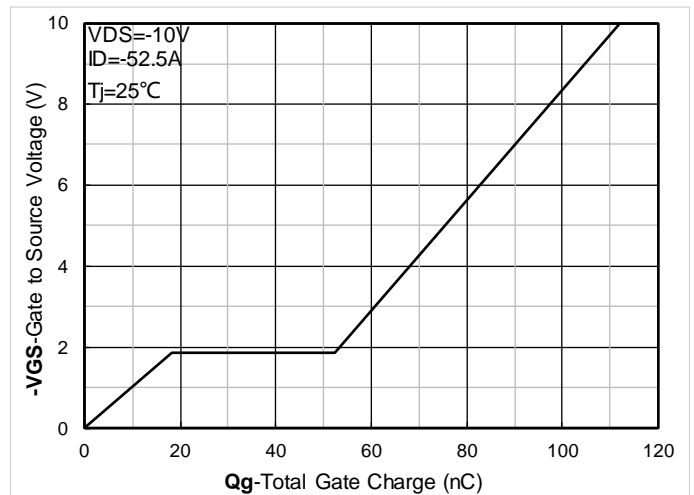


Figure 4. Gate Charge; typical values

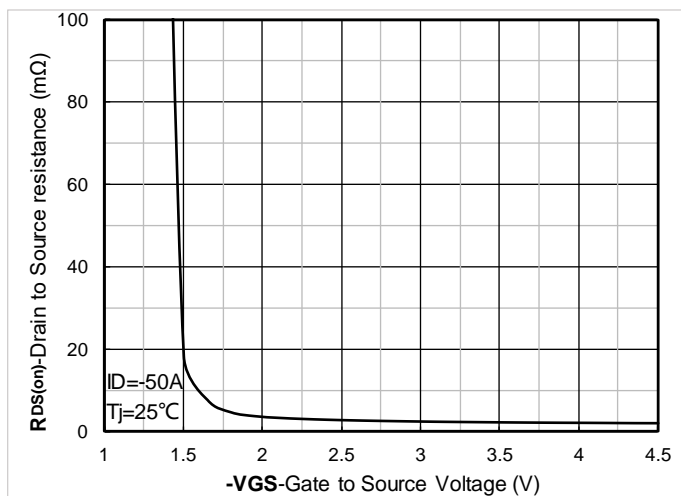


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

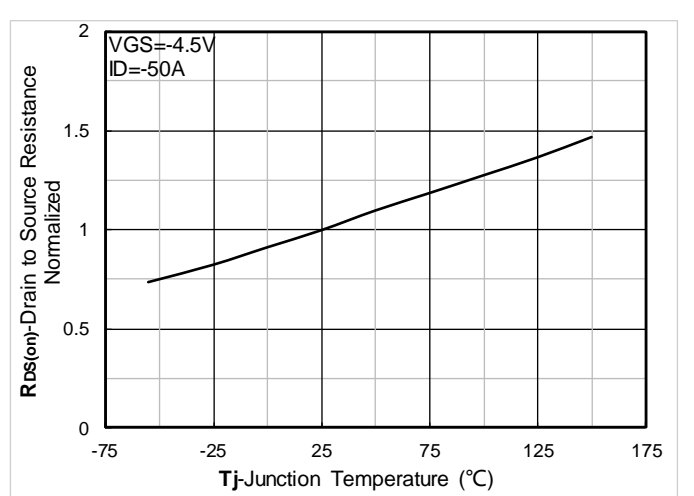


Figure 6. Normalized On-Resistance

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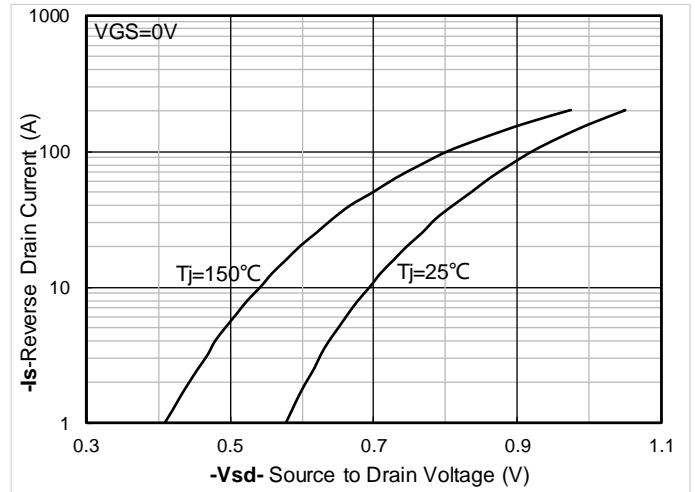
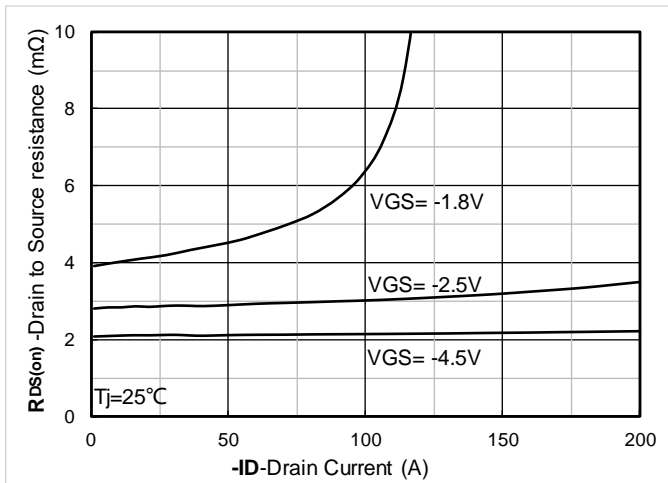


Figure 7. $R_{DS(on)}$ VS Drain Current; typical values

Figure 8. Forward characteristics of reverse diode; typical values

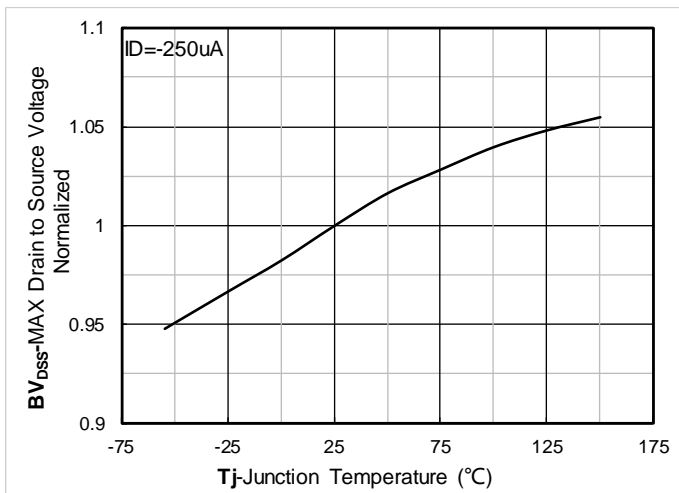


Figure 9. Normalized breakdown voltage

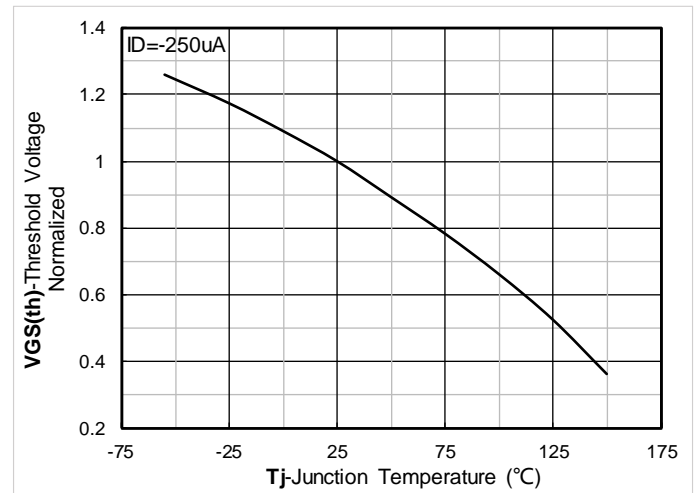


Figure 10. Normalized Threshold voltage

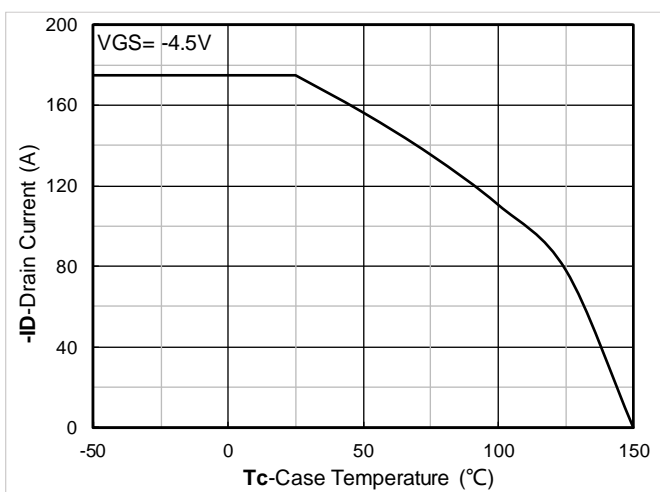


Figure 11. Current dissipation

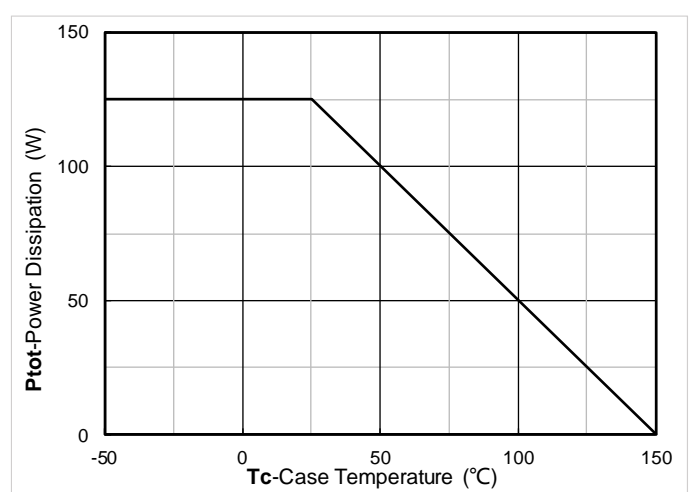


Figure 12. Power dissipation

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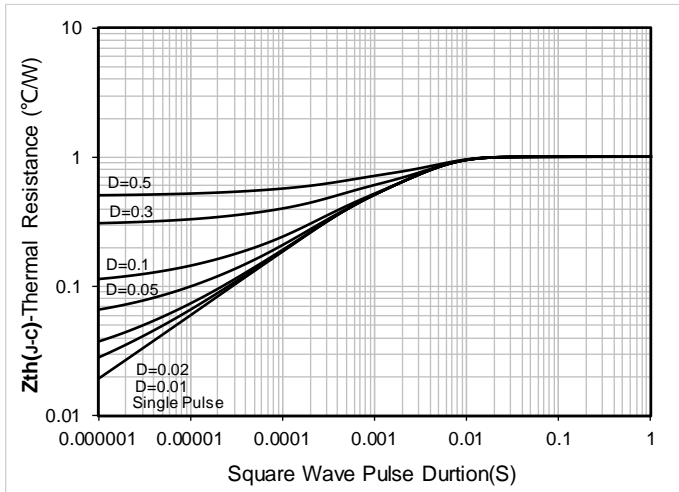


Figure 13. Maximum Transient Thermal Impedance

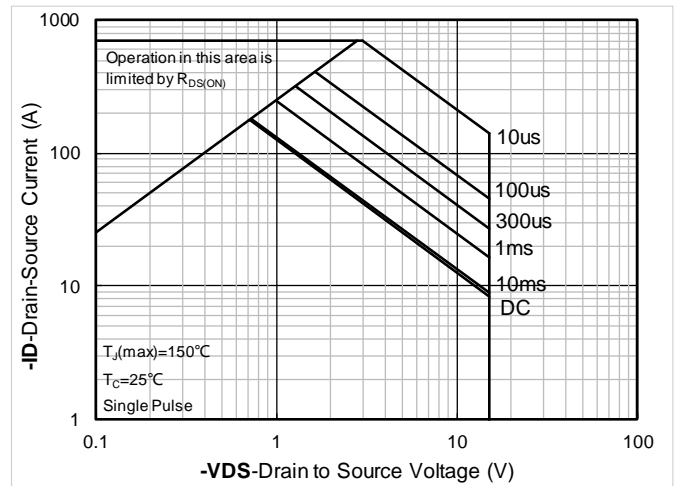
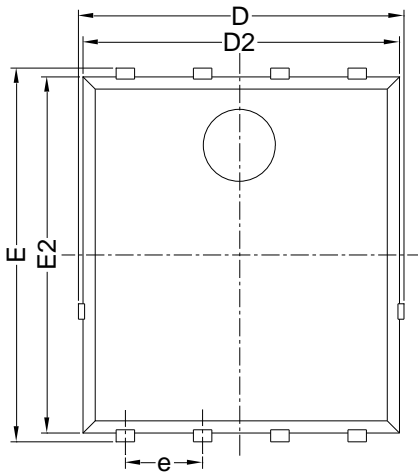
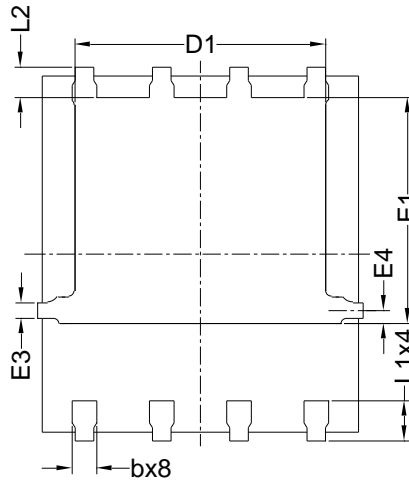


Figure 14. Safe Operation Area

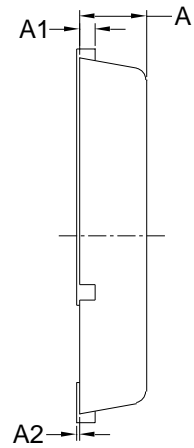
■ PDFN5060-8L-B-1.1MM Package information



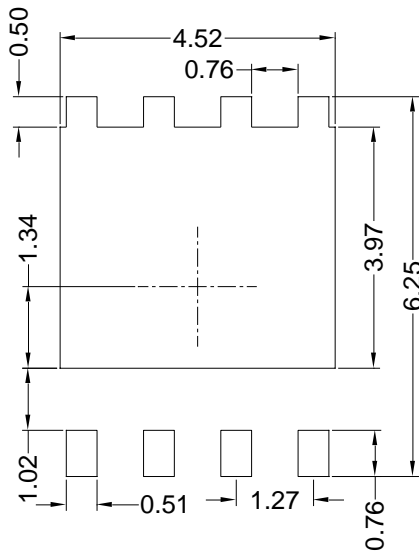
Top View
正面视图



Bottom View
背面视图



Side View
侧面视图



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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