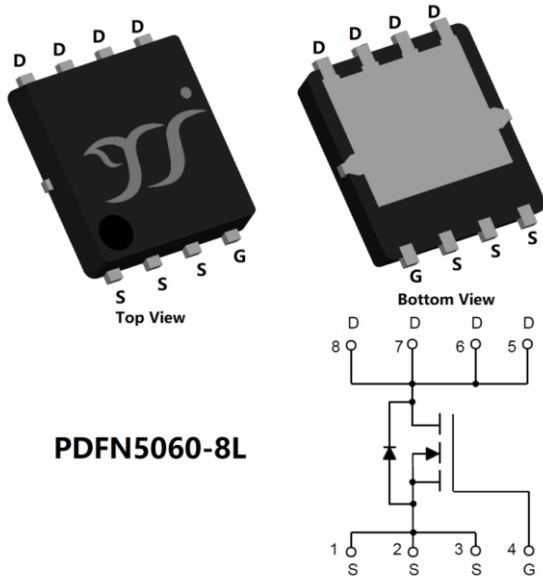


## N-Channel Enhancement Mode Field Effect Transistor



### Product Summary

- $V_{DS}$  100V
- $I_D$  120A
- $R_{DS(ON)}$  ( at  $V_{GS}=10V$ ) <4 mohm
- $R_{DS(ON)}$  ( at  $V_{GS}=4.5V$ ) <5 mohm
- 100% UIS Tested
- 100%  $\nabla V_{DS}$  Tested

### General Description

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$

### Applications

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

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

Parameter	Symbol	Limit	Unit
Drain-source Voltage	$V_{DS}$	100	V
Gate-source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current	$I_D$	$T_C=25^\circ C$	120
		$T_C=100^\circ C$	76
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	480	A
Avalanche energy <sup>B</sup>	EAS	529	mJ
Total Power Dissipation <sup>C</sup>	$P_D$	$T_C=25^\circ C$	108
		$T_C=100^\circ C$	46
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 <sup>D</sup>	$R_{\theta JA}$	42	51	$^\circ C/W$
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.89	1.08	

### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJG120G10AR	F1	G120G10AR	5000	10000	100000	13" reel



# YJG120G10AR

## ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	-	-	1	μA
		V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C	-	-	100	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.8	2.5	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =60A	-	3.2	4	mΩ
		V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	3.2	4	
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	4	5	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =60A, V <sub>GS</sub> =0V	-	0.9	1.2	V
Gate resistance	R <sub>G</sub>	f=1MHz, Open drain	-	0.9	-	Ω
Maximum Body-Diode Continuous Current	I <sub>S</sub>		-	-	120	A
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz	-	4400	-	pF
Output Capacitance	C <sub>oss</sub>		-	1600	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	30	-	
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, I <sub>D</sub> =60A	-	65	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	10	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	13	-	
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =60A, di/dt=350A/us	-	90	-	nC
Reverse Recovery Time	t <sub>rr</sub>		-	35	-	ns
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =50V, I <sub>D</sub> =60A R <sub>GEN</sub> =2.2Ω	-	25	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	90	-	
Turn-off Delay Time	t <sub>D(off)</sub>		-	27	-	
Turn-off fall Time	t <sub>f</sub>		-	7	-	

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

B. T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>G</sub>=10V, R<sub>G</sub>=25Ω, L=2mH, I<sub>AS</sub>=23A.

C. P<sub>d</sub> is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R<sub>θJA</sub> is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.



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## Typical Electrical and Thermal Characteristics Diagrams

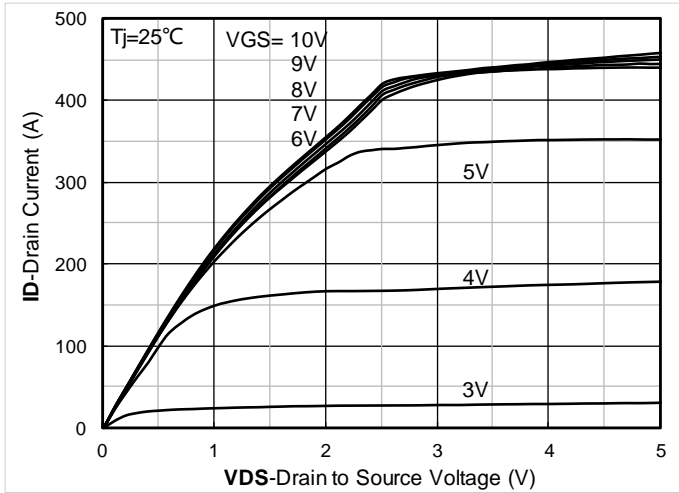


Figure1. Output Characteristics

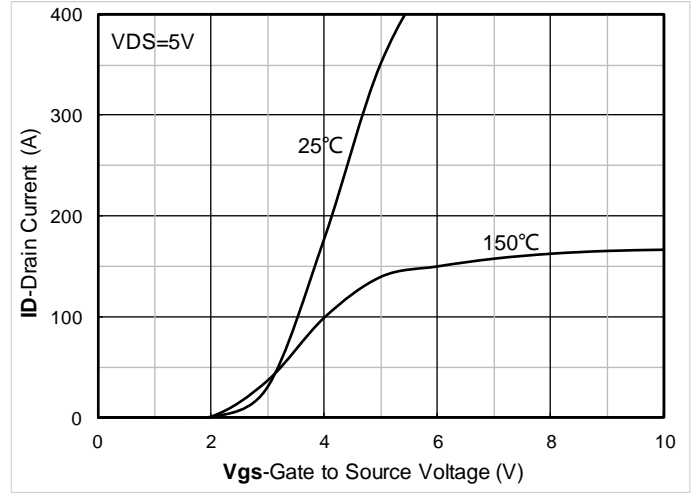


Figure2. Transfer Characteristics

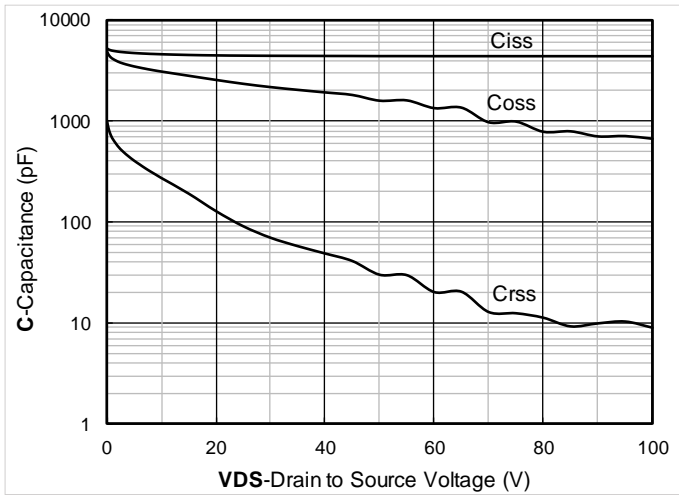


Figure3. Capacitance Characteristics

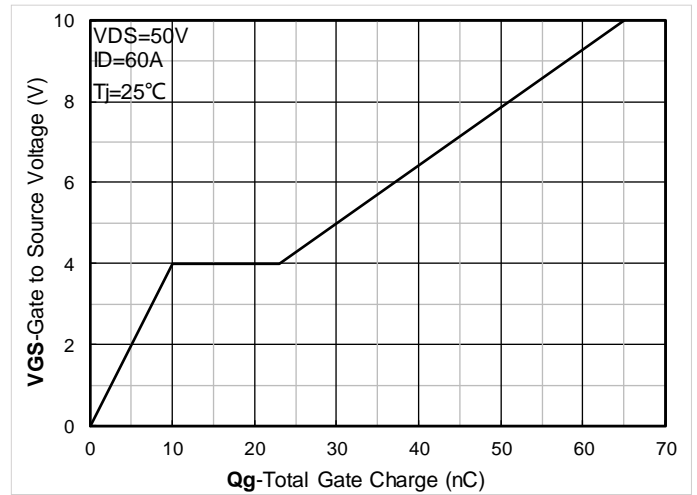


Figure4. Gate Charge

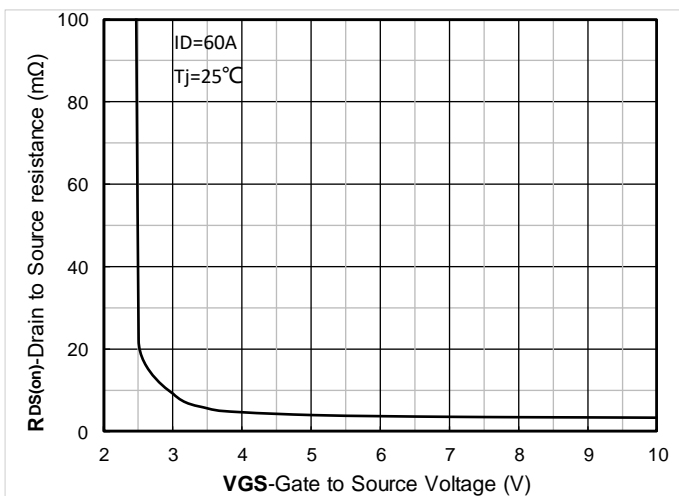


Figure5. On-Resistance vs Gate to Source Voltage

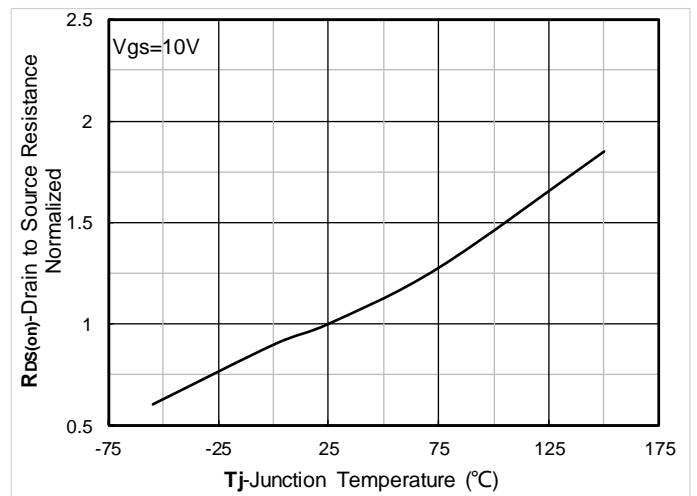


Figure6. Normalized On-Resistance



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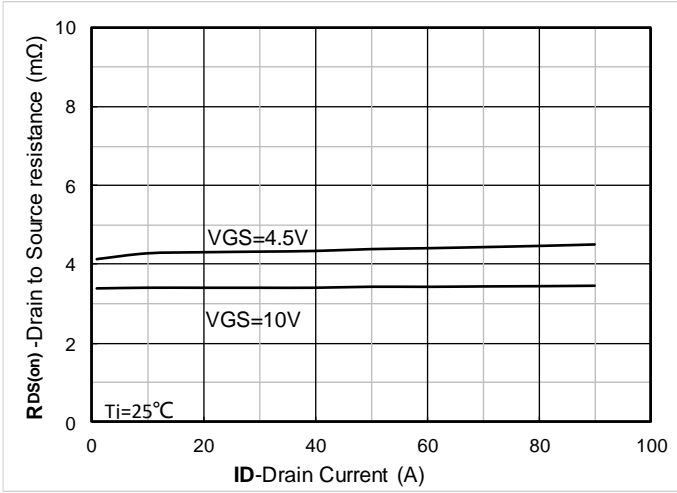


Figure7.  $R_{DS(on)}$  VS Drain Current

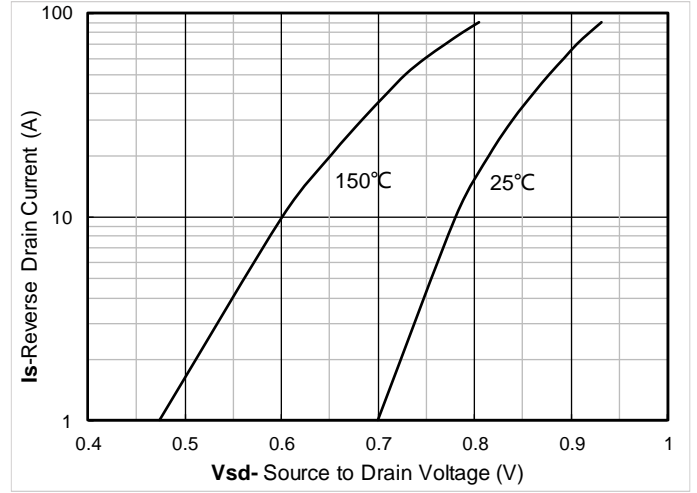


Figure8. Forward characteristics of reverse diode

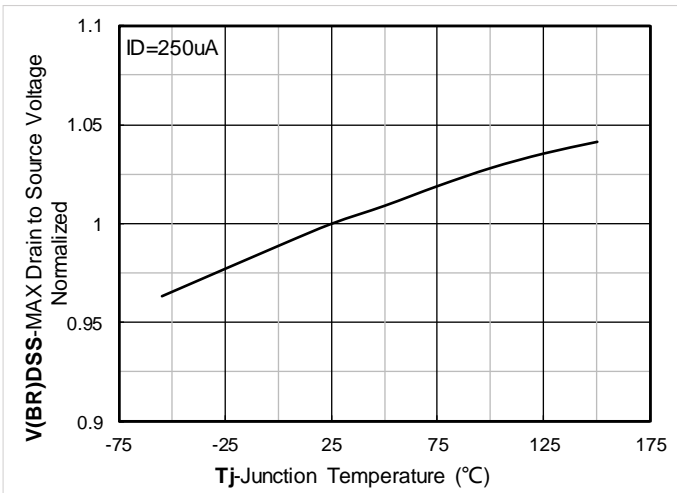


Figure9. Normalized breakdown voltage

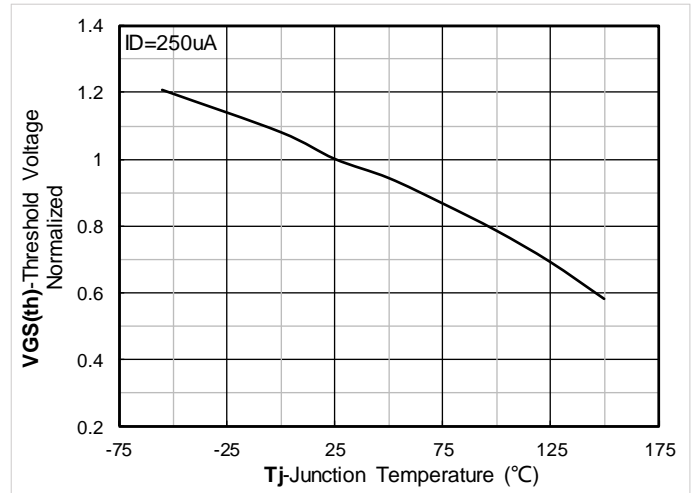


Figure10. Normalized Threshold voltage

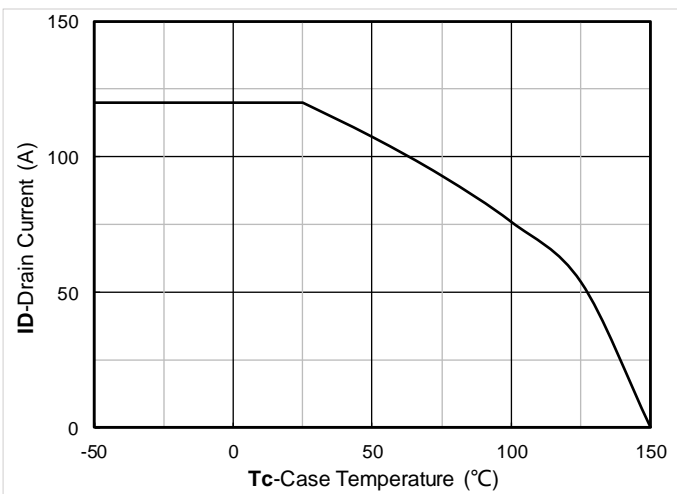


Figure11. Current dissipation

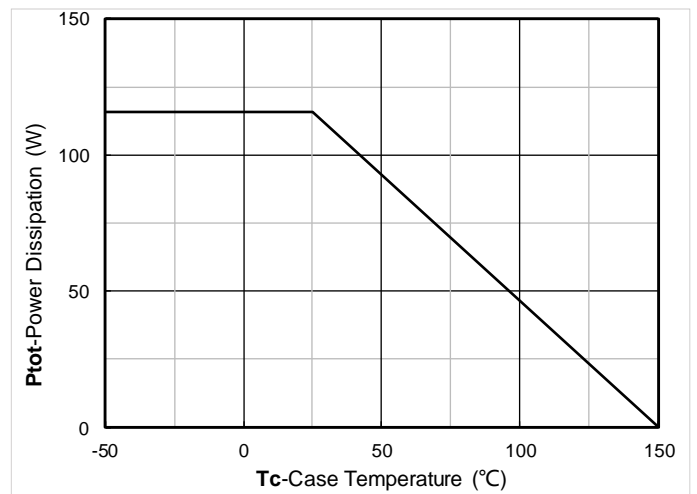


Figure12. Power dissipation



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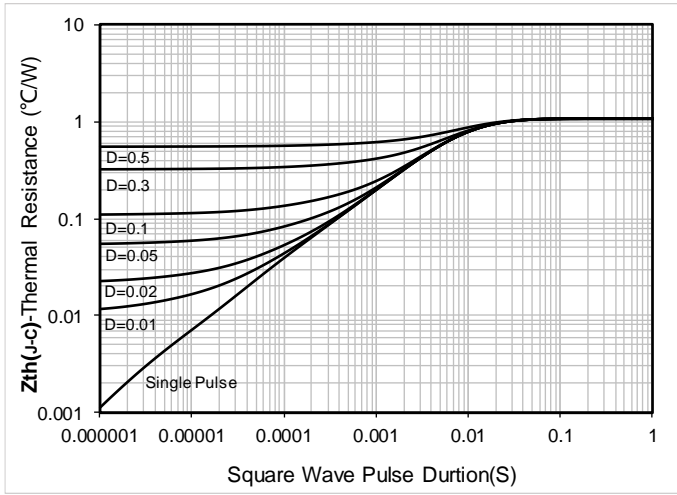


Figure13. Maximum Transient Thermal Impedance

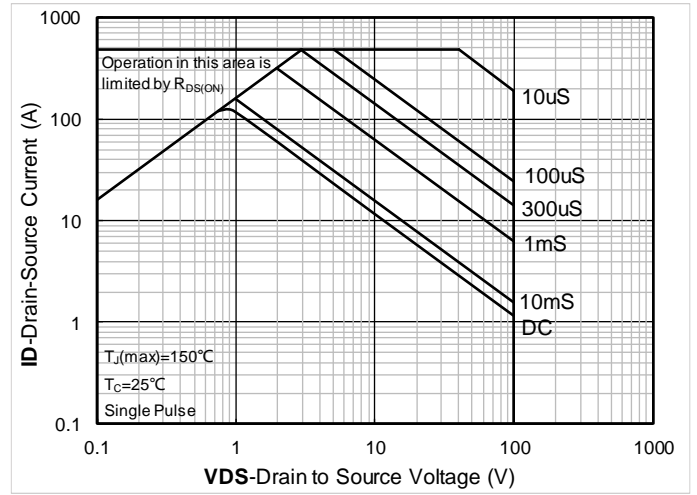
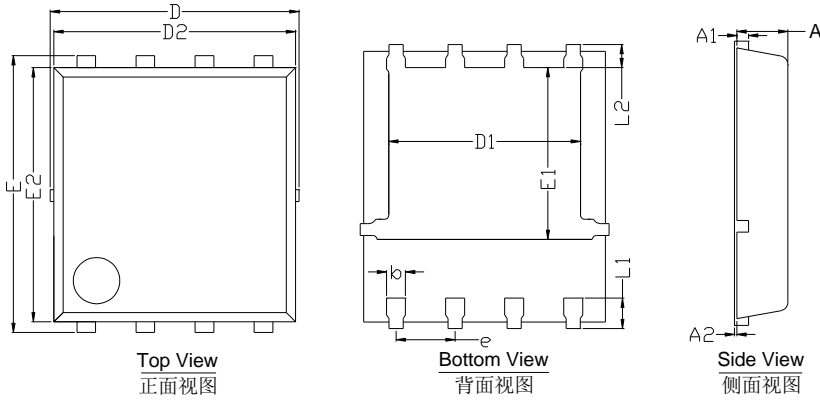


Figure14. Safe Operation Area



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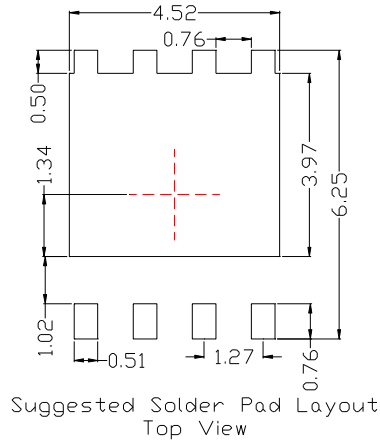
## ■ PDFN5060-8L-D-0.95MM Package information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	5.15	5.35	5.55
E	5.95	6.05	6.15
A	0.85	0.95	1.00
A1	0.203 BSC		
A2			0.08
D1	4.25	4.35	4.45
E1	3.525	3.625	3.725
D2		5.20	
E2		5.55	
L1	0.45	0.55	0.65
L2	0.68 BSC		
b	0.3	0.4	0.5
e	1.27 BSC		

Note:

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





# YJG120G10AR

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