UDS120N03F

N-Ch 30V Fast Switching MOSFETs

Features

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

Product Summary

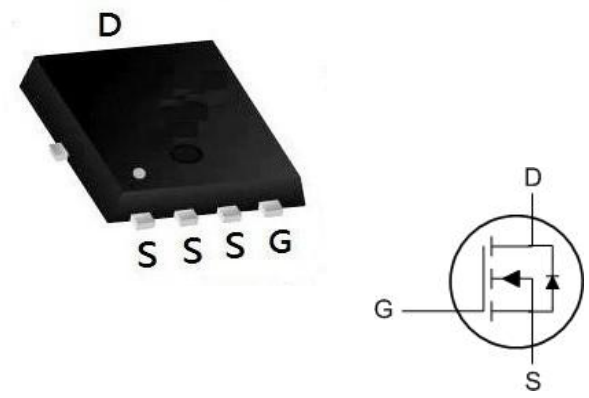
Green

BVDSS	RDSON	ID
30V	2.0mΩ	120A

Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

PDFN5060-8L(CLIP) Pin Configuration



Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	120	A
	T_C=100°C		75	
Pulsed Drain Current[1]		I_{DM}	380	A
Single Pulse Avalanche Energy[2]		EAS	101	mJ
Total Power Dissipation	T_C=25°C	P_D	69	W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient[3]	$R_{\theta JA}$	50	°C/W
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	1.8	°C/W

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	30	-	-	V
Gate-body Leakage Current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μA
	T_J=125°C			-	2	-	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.3	-	2.3	V
Drain-Source On-Resistance[4]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 22.5A	-	2.0	2.4	mΩ
			V_{GS} = 4.5V, I_D =22.5A	-	3.0	3.8	
Forward Transconductance[4]		g_{fs}	V_{DS} = 10V, I_D = 20A	-	130	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = 15V, V_{GS} =0V, f =1MHz	-	2566	-	pF
Output Capacitance		C_{oss}		-	1419	-	
Reverse Transfer Capacitance		C_{rss}		-	111	-	
Gate Resistance		R_g	f = 1MHz	-	2.5	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = 10V, V_{DS} = 15V, I_D= 20A	-	39	-	nC
Gate-Source Charge		Q_{gs}		-	11	-	
Gate-Drain Charge		Q_{gd}		-	4.5	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD} = 20V, R_G = 3Ω, I_D= 20A	-	10	-	ns
Rise Time		t_r		-	37	-	
Turn-Off Delay Time		$t_{d(off)}$		-	45	-	
Fall Time		t_f		-	16	-	
Body Diode Reverse Recovery Time		t_{rr}	I_F=20A, dI/dt=100A/μs	-	49	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	35	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = 45, V_{GS} = 0V	-	-	1.4	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	120	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}=24,V_{GS}=10V,L=0.1mH,Rg=25Ω
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

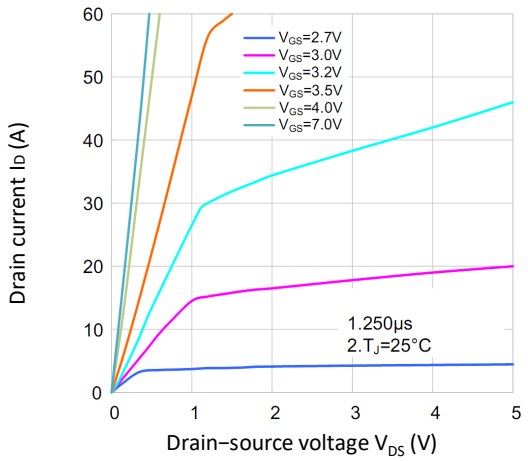


Figure 1. Output Characteristics

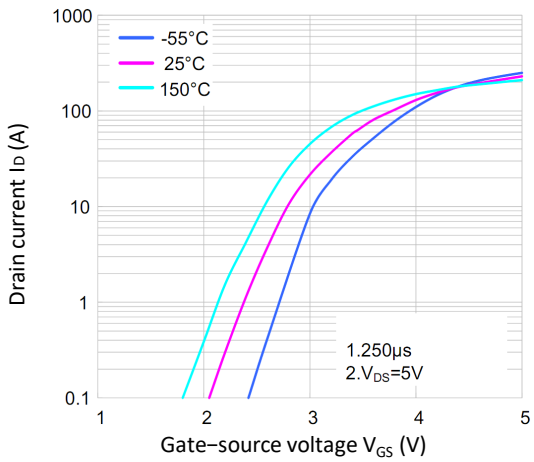


Figure 2. Transfer Characteristics

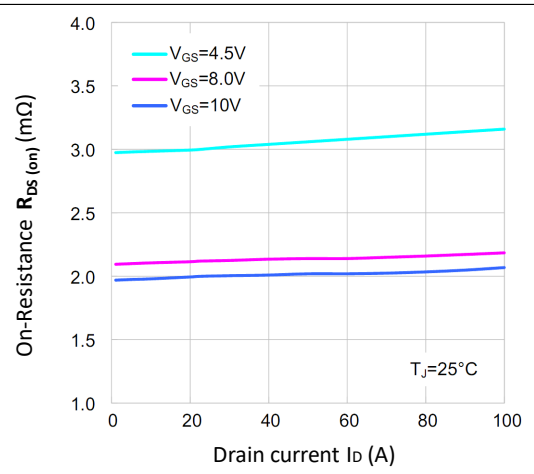


Figure 3. $R_{DS(ON)}$ vs. I_D

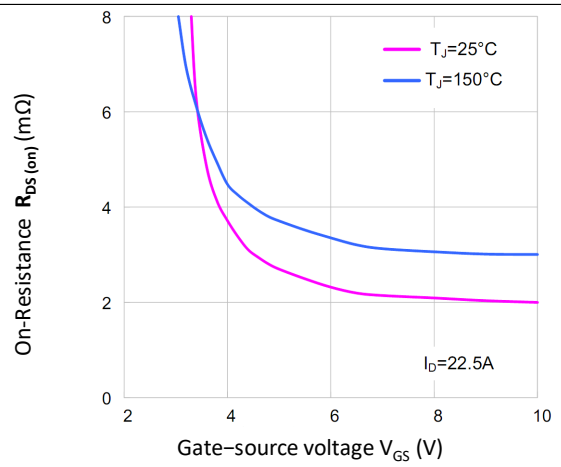


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

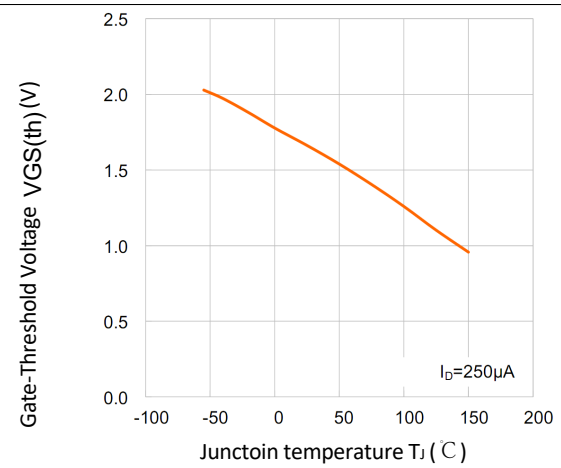


Figure 5. $V_{GS(th)}$ vs. T_J

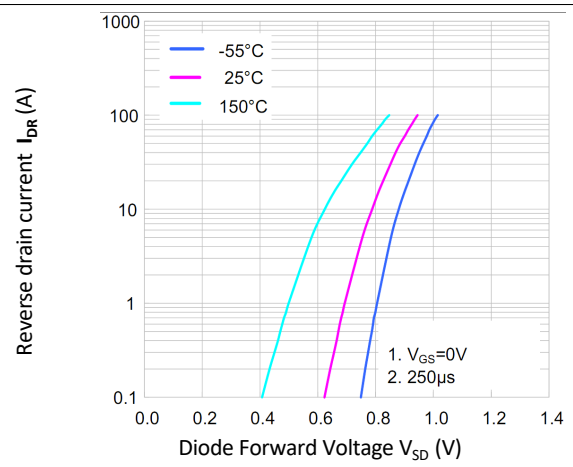


Figure 6. I_{DR} vs. V_{SD}

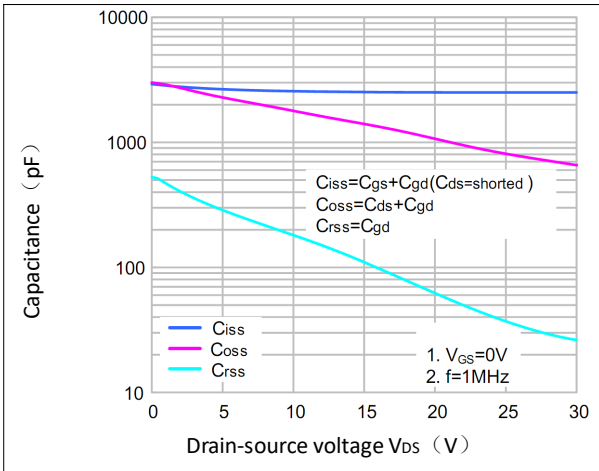


Figure 7. Capacitance Characteristics

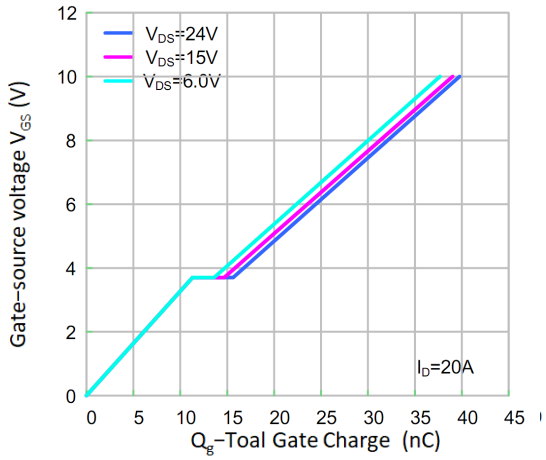


Figure 8 Gate Charge Characteristics

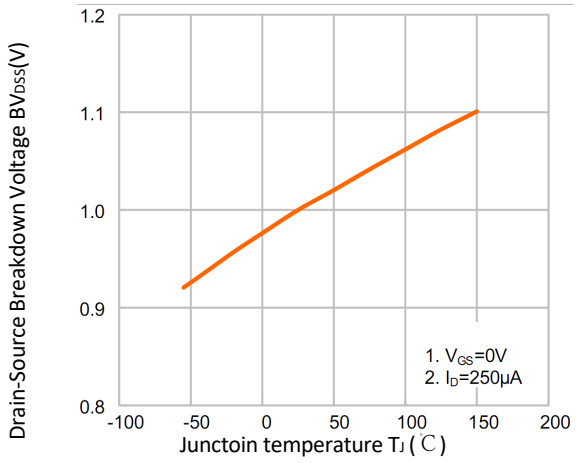


Figure 9. BV_{DSS} VS T_J

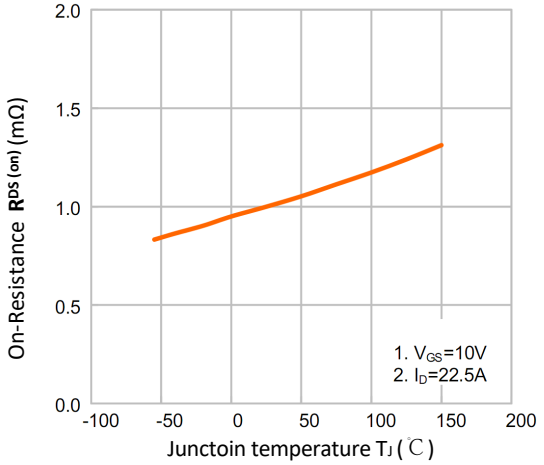


Figure 10. $R_{DS(ON)}$ VS T_J

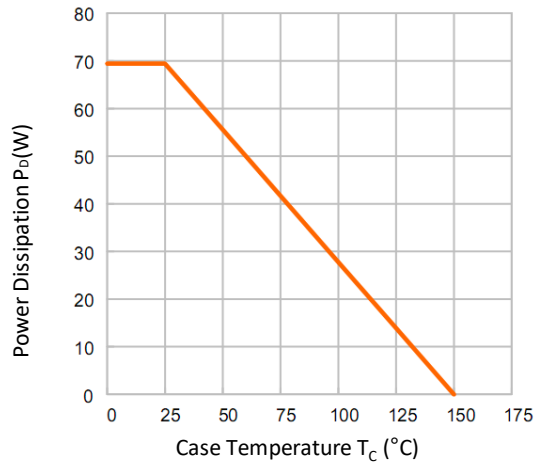


Figure 11. Power Dissipation

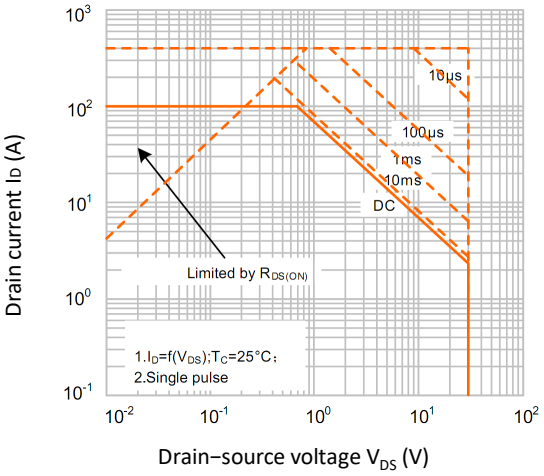


Figure 12. Safe Operating Area

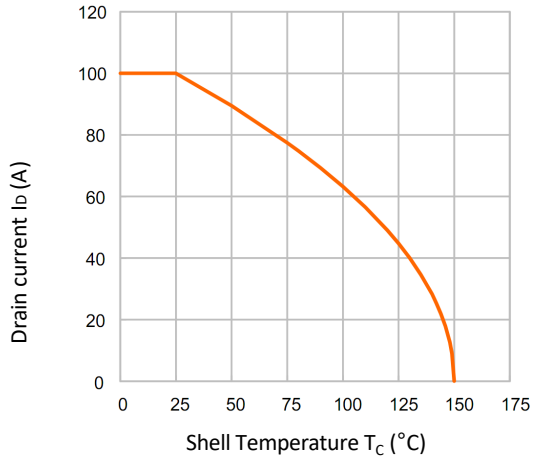


Figure 13.Drain current VS Shell Temperature

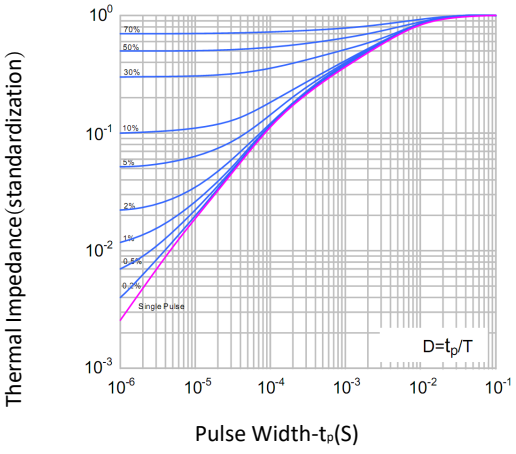


Figure 14 Transient thermal impedance VS Pulse Width

Test Circuit

PDFN5060-8L Package Information

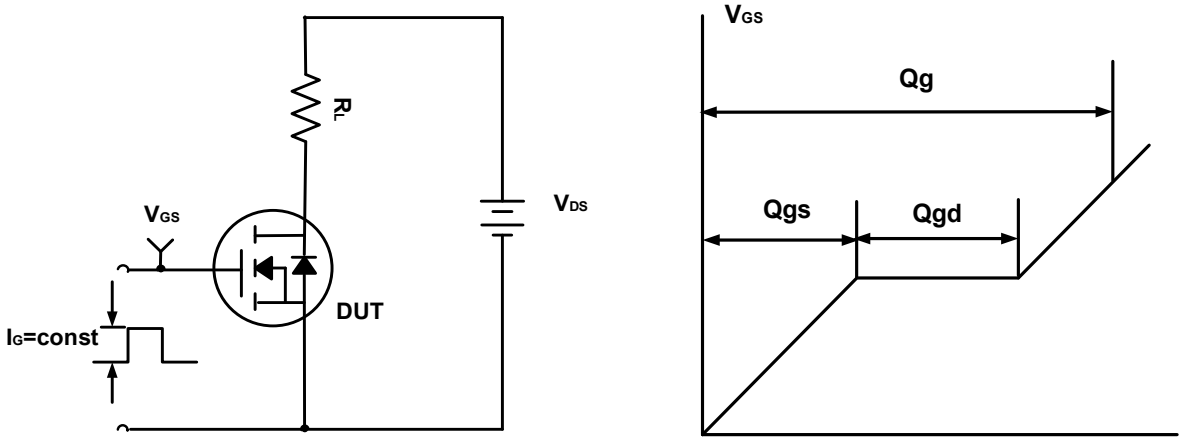


Figure A. Gate Charge Test Circuit & Waveforms

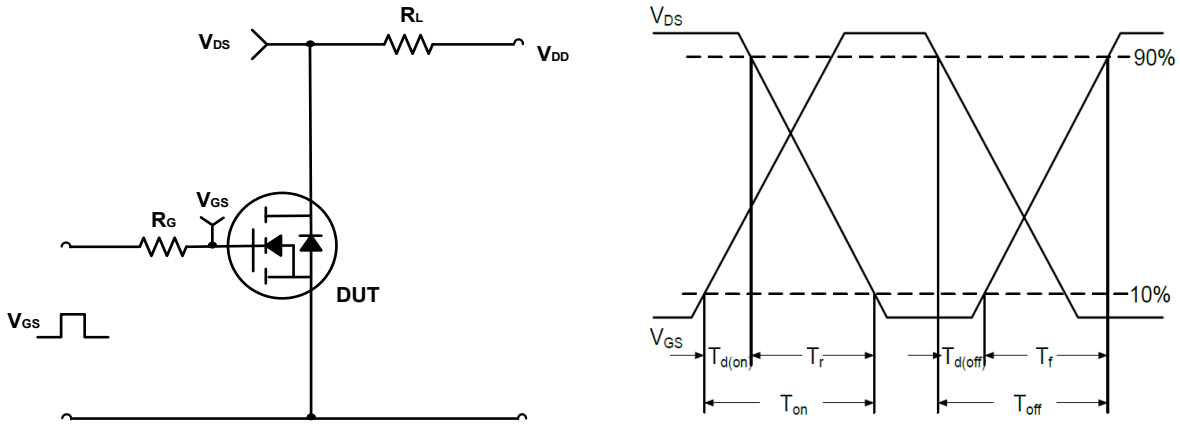


Figure B. Switching Test Circuit & Waveforms

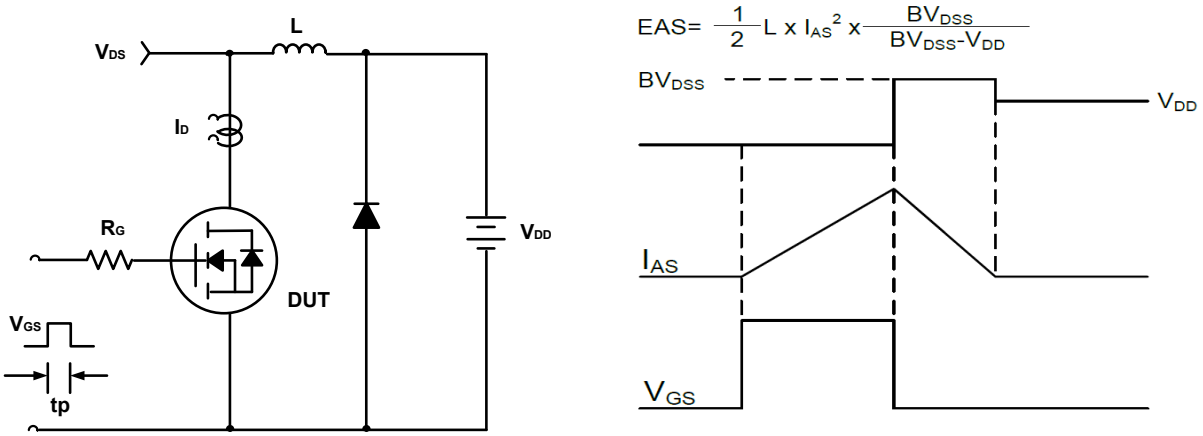
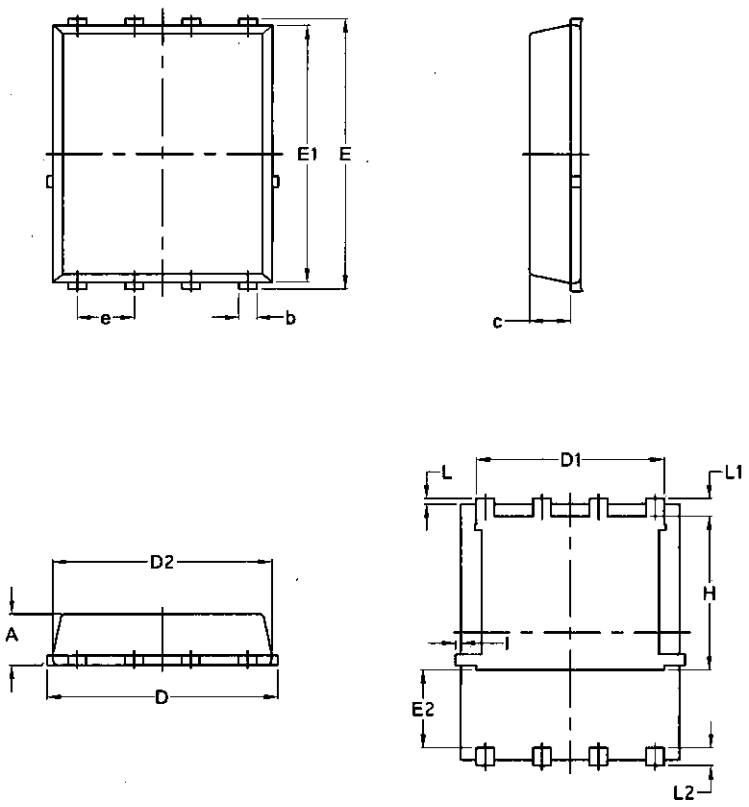


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Package Mechanical Data-PDFN5060-8L(CLIP)- Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070