

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
80V	9mΩ@10V	60A



合肥矽普半导体

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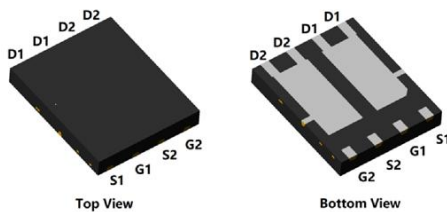
Feature

- Fast Switching
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

Applications

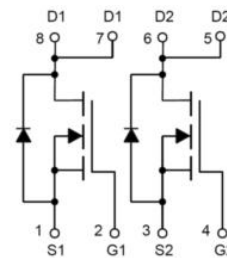
- Power switching application
- DC-DC Converter
- Uninterruptible power supply

Package



PDFN5X6-8L

Circuit diagram



Marking



SP80N09GDHNK :Device Code
** :Week Code

Order Information

Device	Package	Unit/Tape
SP80N09GDHNK	PDFN5X6-8L	5000

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current (Tc=25°C)	I_D	60	A
Continuous Drain Current (Tc=100°C)	I_D	40	A
Pulse Drain Current Tested	I_{DM}	240	A
Single Pulse Avalanche Energy ¹	E_{AS}	169	mJ
Power Dissipation (Tc=25°C)	P_D	71.4	W
Power Dissipation (Tc=100°C)	P_D	23.8	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.75	°C/W
Maximum Junction Temperature	T_J	-55 to 150	°C
Storage Temperature Range	T_{STG}	-55 to 150	°C

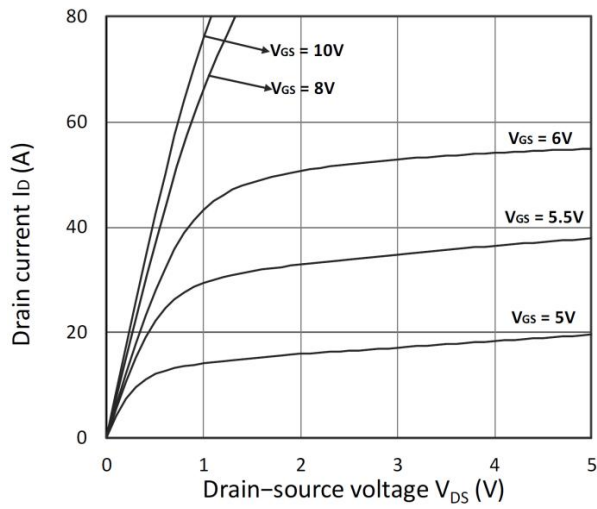
Electrical characteristics (Ta=25°C, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	ID=250μA , VGS=0V	80	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	VDS=64V , VGS=0V	-	-	1	uA
Gate Leakage Current	I _{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	VDS=VGS , ID=250μA	2.6	3.0	3.4	V
Drain-Source On-state Resistance	R _{DS(ON)}	VGS=10V , ID=20A	-	9.0	15	mΩ
Gate Resistance	R _G	f=1MHz	-	1.9	-	Ω
Dynamic Characteristics						
Input Capacitance	C _{iss}	VGS=0V , VDS=40V , f=1MHz	-	1001	-	pF
Output Capacitance	C _{oss}		-	244	-	
Reverse Transfer Capacitance	C _{rss}		-	16	-	
Total Gate Charge	Q _g	VDS=40V , VGS=10V , ID=20A	-	16	-	nC
Gate-Source Charge	Q _{gs}		-	4.8	-	
Gate-Drain Charge	Q _{gd}		-	4.4	-	
Gate Plateau Voltage	V _{plateau}		-	4.5	-	V
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	VDD=40V , ID=20A , VGS=10V , RG=3Ω	-	8.0	-	nS
Rise Time	t _r		-	5.6	-	
Turn-Off Delay Time	t _{d(off)}		-	14	-	
Fall Time	t _f		-	4.8	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	60	A
Reverse Recovery Time	Trr	IS=20A , di/dt=100A/μs , TJ=25℃	-	35	-	nS
Reverse Recovery Charge	Qrr		-	27.8	-	nC

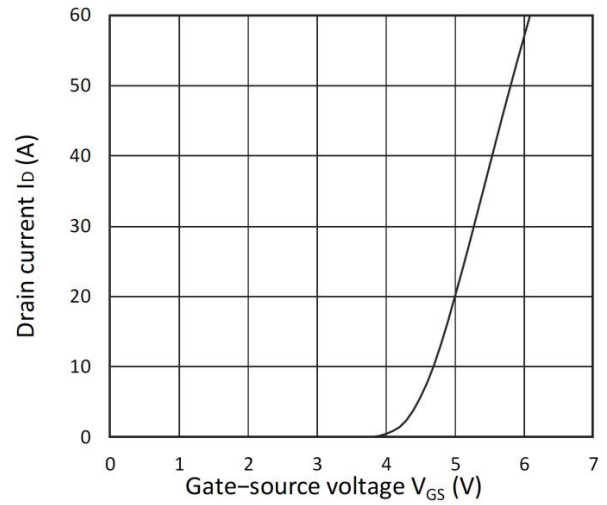
Note :

1. The test condition is $V_{DD}=40V$, $V_{GS}=10V$, $L=0.5mH$, $R_G=25\Omega$

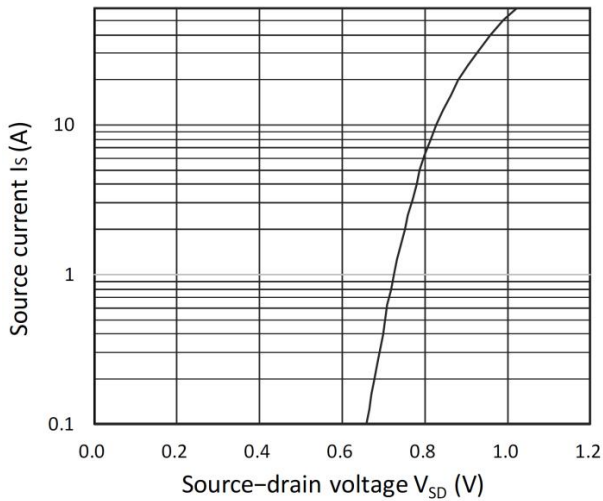
Typical Characteristics



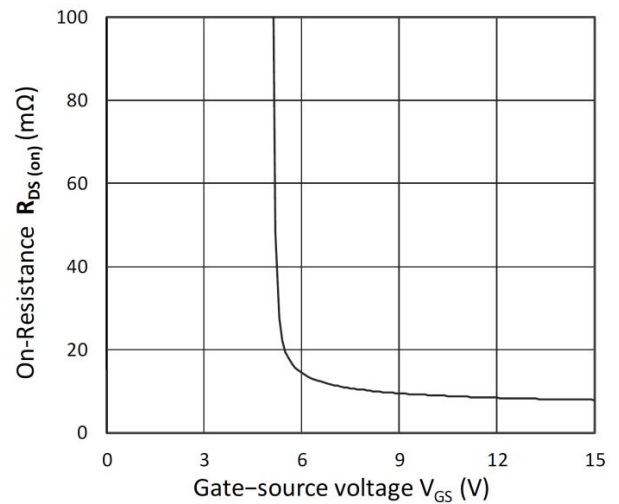
Output Characteristics



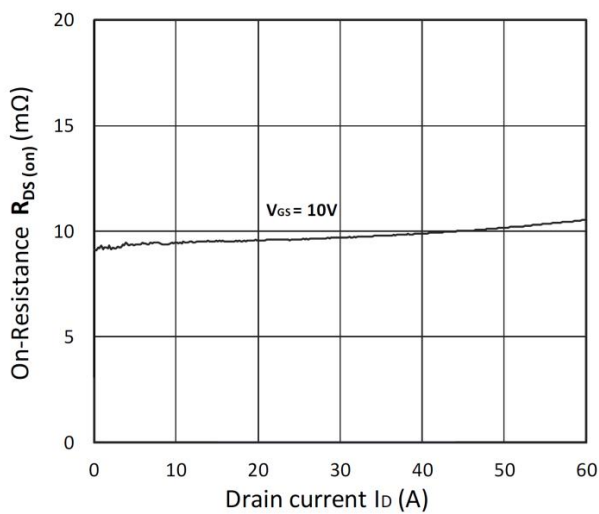
Transfer Characteristics



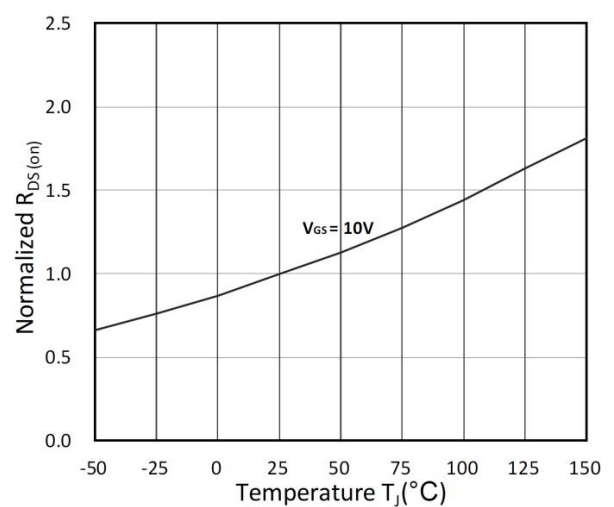
Forward Characteristics of Reverse



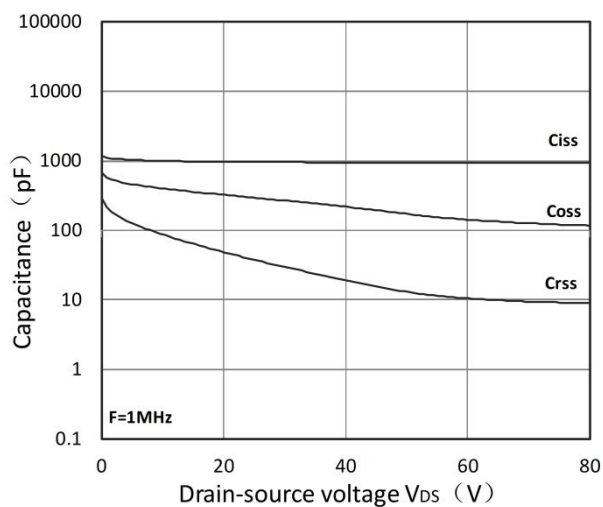
$R_{DS(on)}$ vs. V_{GS}



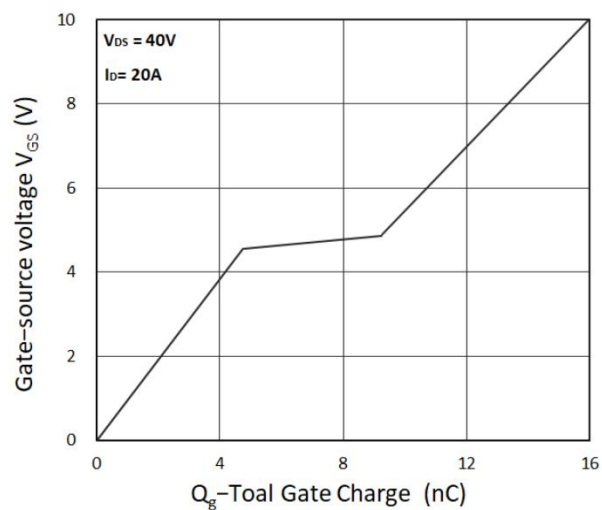
$R_{DS(on)}$ vs. I_D



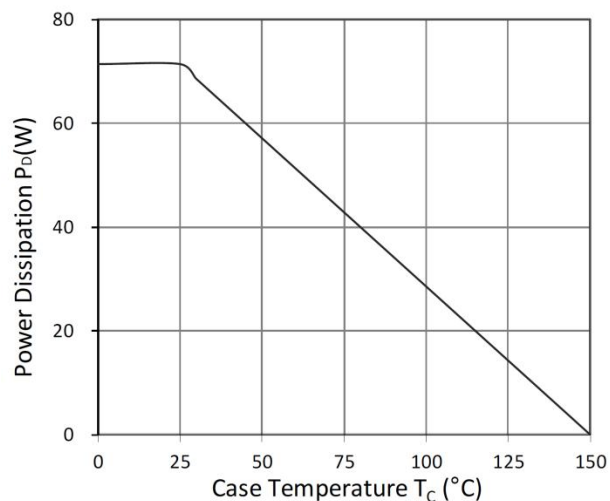
Normalized $R_{DS(on)}$ vs. Temperature



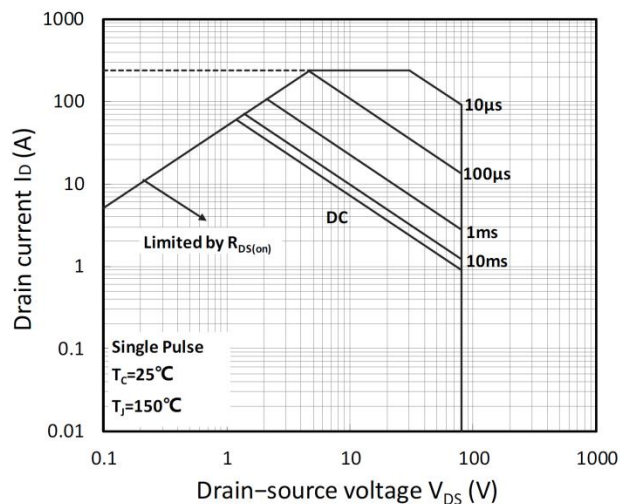
Capacitance Characteristics



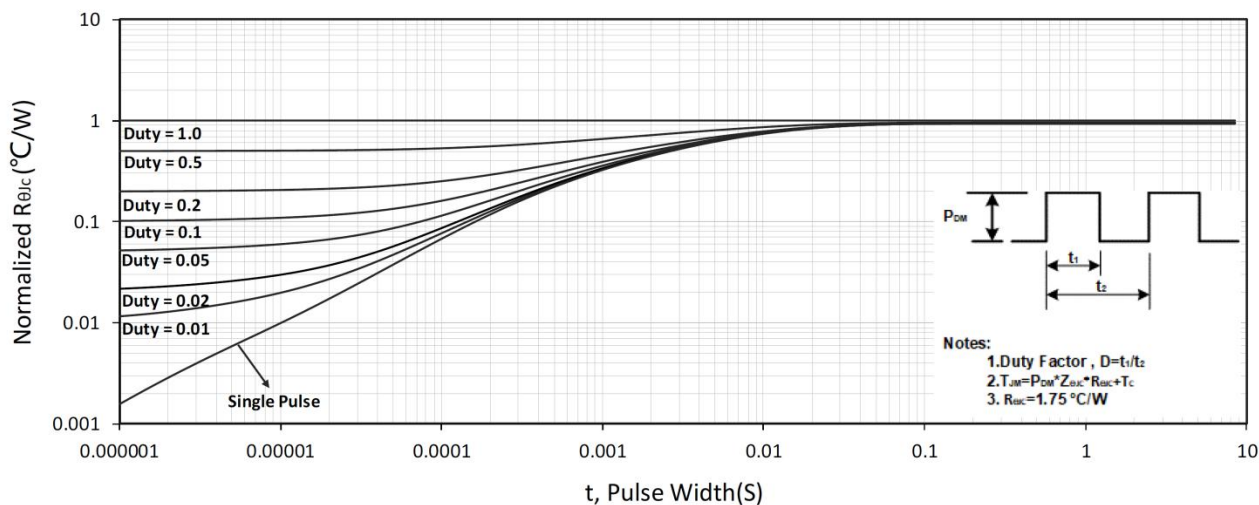
Gate Charge Characteristics



Power Dissipation



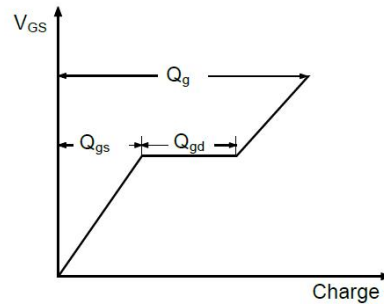
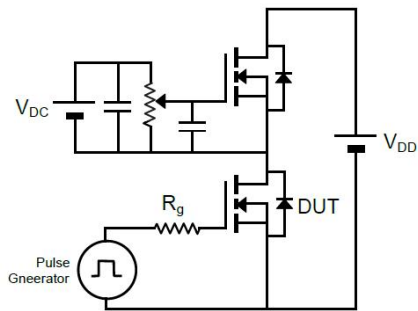
Safe Operating Area



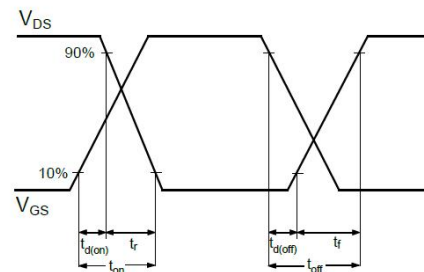
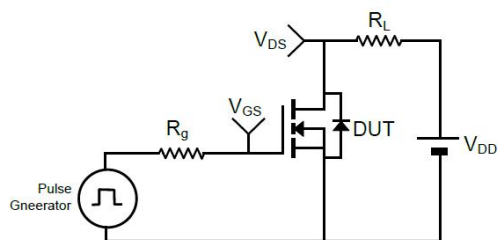
Normalized Maximum Transient Thermal Impedance

Test Circuit

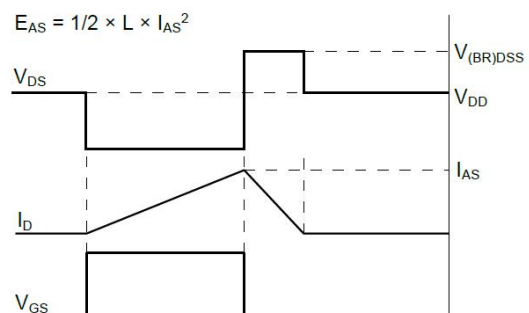
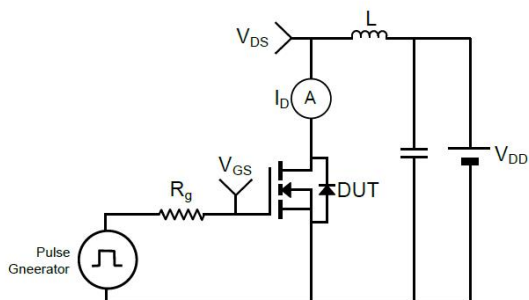
Gate Charge



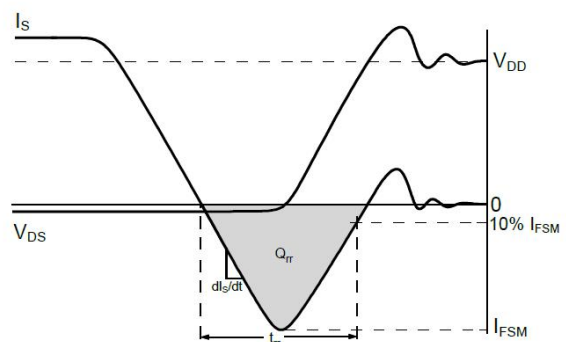
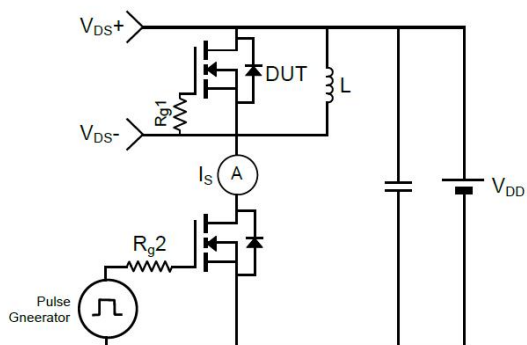
Resistive Load Switching Time



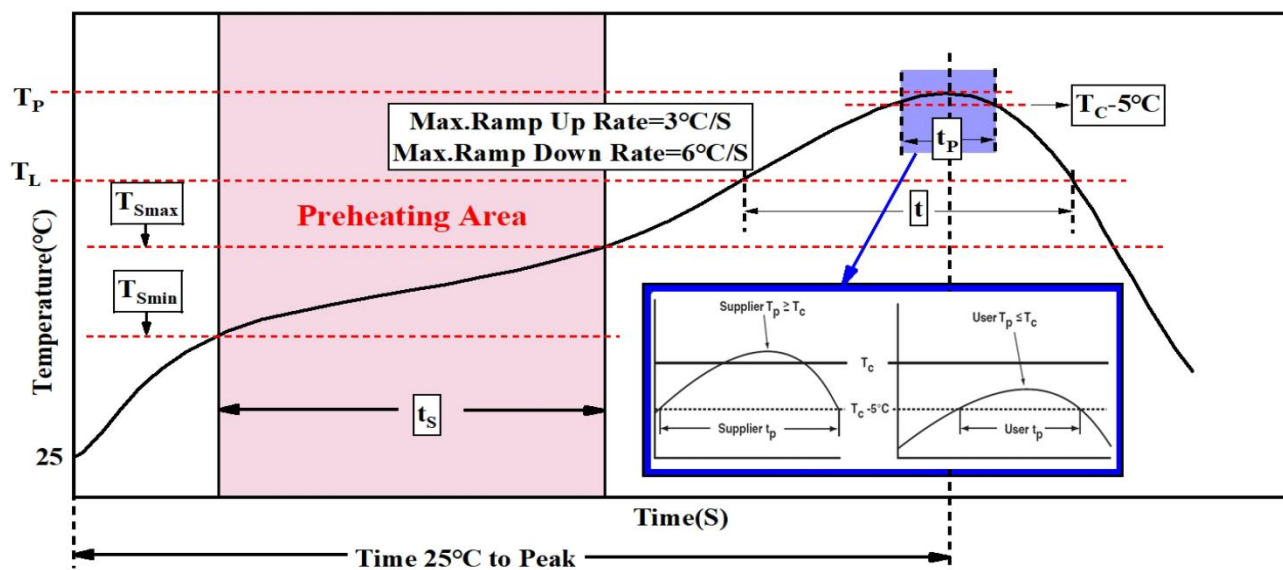
Un-clamped Inductive Load Switching



Drain-Source Body Diode Reverse Recovery



Temperature Profile for IR Reflow Soldering



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T _{Smin})	100°C	150°C
Temperature max (T _{Smax})	150°C	200°C
Time (T _{Smin} to T _{Smax}) (t _s)	60-120 seconds	60-120 seconds
Average ramp-up rate (T _{Smax} to T _P)	3 °C/second max.	3°C/second max.
Liquidous temperature (T _L)	183 °C	217°C
Time at liquidous (t _L)	60-150 seconds	60-150 seconds
Peak package body Temperature e (T _P)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t _P)** within 5°C of the specified classification temperature (T _C)	20** seconds	30** seconds
Average ramp-down rate (T _P to T _{Smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile Temperature (T _P) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (t _P) is defined as a supplier minimum and a user maximum		

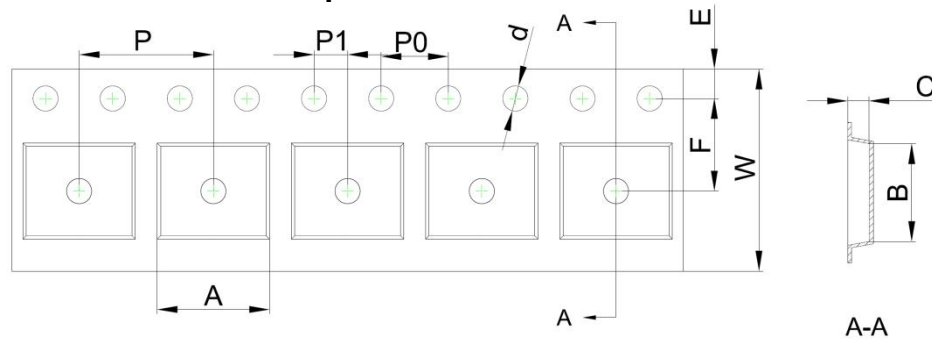
Table 1. SnPb Eutectic Process – Classification Temperatures (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

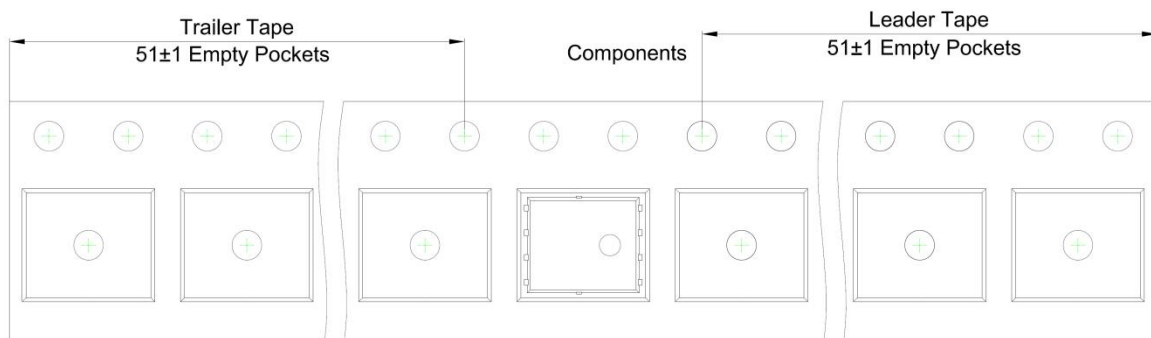
PDFN5X6-8L Embossed Carrier Tape



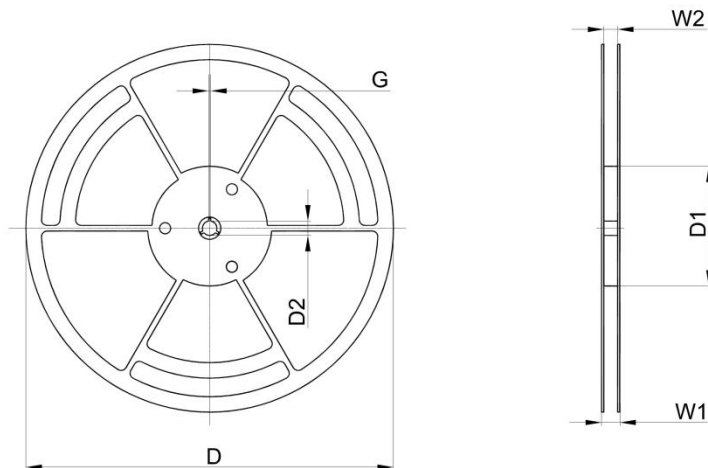
Dimensions are in millimeter

Pkg type	A	B	C	d	E	F	P0	P	P1	W
PDFN5X6-8L	6.30	5.30	1.10	Φ1.50	1.75	5.50	4.00	8.00	2.00	12.00

PDFN5X6-8L Tape Leader and Trailer



PDFN5X6-8L Reel

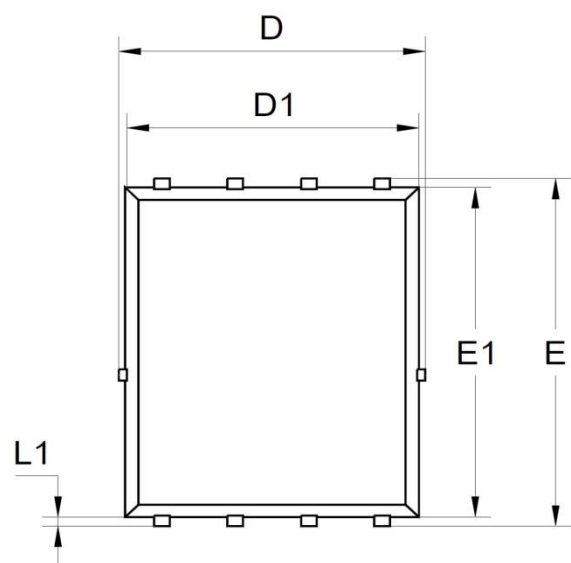


Dimensions are in millimeter

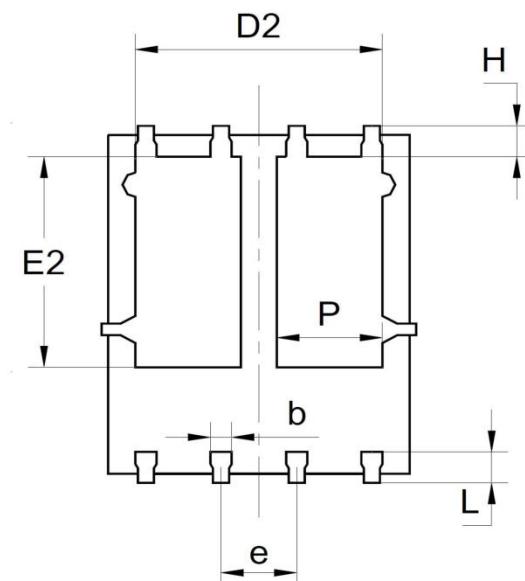
Reel Option	D	D1	D2	G	W1	W2
13"Dia	Ø330.00	100.00	13.00	1.90	17.60	12.40

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)
5,000 pcs	13 inch	5,000 pcs	340×336×29	50,000 pcs	353×346×365

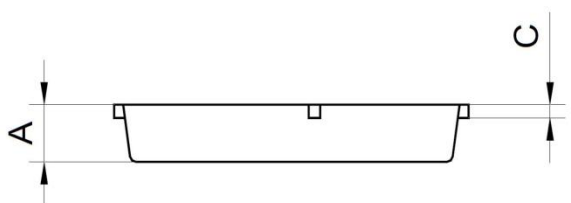
PDFN5X6-8L Package Information



Top View
[顶视图]



Bottom View
[背视图]



Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.120	0.035	0.044
b	0.330	0.510	0.013	0.020
C	0.110	0.340	0.004	0.013
D	4.700	5.260	0.185	0.207
D1	4.700	5.100	0.185	0.201
D2	3.560	4.500	0.140	0.177
E	5.750	6.250	0.226	0.246
E1	5.600	6.000	0.220	0.236
E2	3.180	3.660	0.125	0.144
e	1.170	1.370	0.046	0.054
L	0.350	0.710	0.014	0.028
L1	0.060	0.200	0.002	0.008
H	0.350	0.710	0.014	0.028
P	1.700	2.300	0.067	0.091