Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
30V	0.95mΩ@10V	210A
	1.5mΩ@4.5V	

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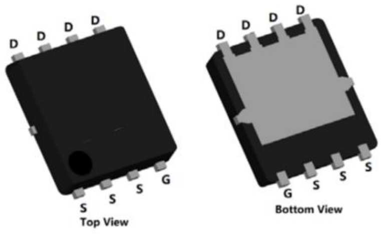
Feature

- Fast Switching
- Low Gate Charge and Rdson
- Cu-Clip Process
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test
- 175℃ Junction Temperature

Applications

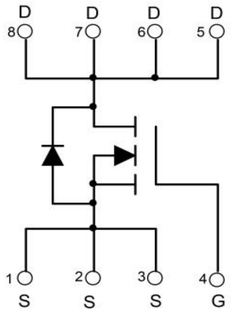
- PWM Application
- Hard switched and high frequency circuits
- Power Management

Package



PDFN5X6-8L

Circuit diagram



Marking

SP30N01LGNP	**:Device Code**
**	**:Week Code**

Order Information

Device	Package	Unit/Tape
SP30N01LGNP	PDFN5X6-8L	5000

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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (Tc=25℃)	I_D	210	A
Continuous Drain Current (Tc=100℃)	I_D	161	A
Pulsed Drain Current	I_{DM}	840	A
Single Pulse Avalanche Energy[1]	E_{AS}	226	mJ
Power Dissipation (Tc=25℃)	P_D	130	W
Power Dissipation (Tc=25℃)	P_D	65	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	1.15	℃/W
Storage Temperature Range	T_{STG}	-55 to 175	℃
Operating Junction Temperature Range	T_J	-55 to 175	℃

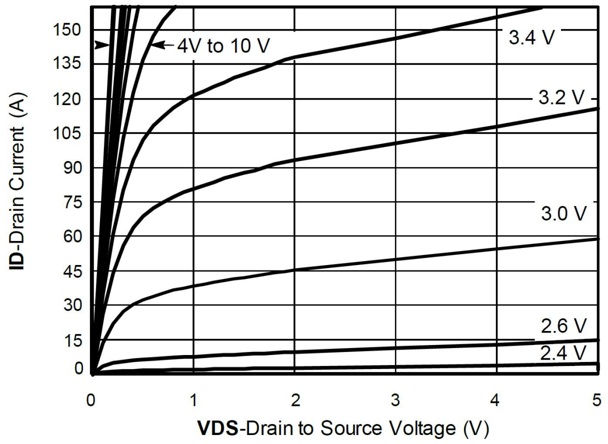
Electrical characteristics (Ta=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V , ID=250uA	30	-	-	V
Drain-Source Leakage Current	I_{DSS}	VDS=24V , VGS=0V , TJ=25℃	-	-	1	uA
Gate-Source Leakage Current	I_{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS , ID =250uA	1.3	1.7	2.3	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	VGS=10V , ID=30A	-	0.95	1.2	mΩ
		VGS=4.5V , ID=20A	-	1.5	2.0	
Gate Resistance	R_G	VDS=15V , VGS=0V , f=1MHz	-	2.2	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	VDS=15V , VGS=0V , f=1MHz	-	3062	-	pF
Output Capacitance	C_{oss}		-	1537	-	
Reverse Transfer Capacitance	C_{rss}		-	45	-	
Total Gate Charge	Q_g	VDS=15V , VGS=10V , ID=30A	-	52	-	nC
Gate-Source Charge	Q_{gs}		-	11	-	
Gate-Drain Charge	Q_{gd}		-	7	-	
Gate Pleteau Vlotage	$V_{pleteau}$		-	3	-	V
Switching Characteristics						
Turn-On Delay Time	$T_{d(on)}$	VDD=15V , VGS=10V , RG=1.6Ω ID=30A	-	17.3	-	nS
Rise Time	T_r		-	4.2	-	
Turn-Off Delay Time	$T_{d(off)}$		-	53	-	
Fall Time	T_f		-	11	-	
Diode Characteristics						
Diode Forward Voltage	V_{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	210	A
Reverse Recovery Time	T_{rr}	IS=30A , di/dt=100A/us , TJ=25℃	-	86	-	nS
Reverse Recovery Charge	Q_{rr}		-	33	-	nC

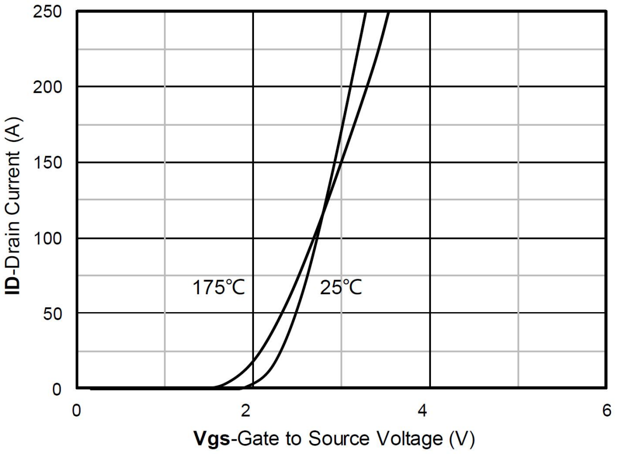
Note :

1. The test condition is VDD=15V,VGS=10V,L=0.5mH,RG=25Ω

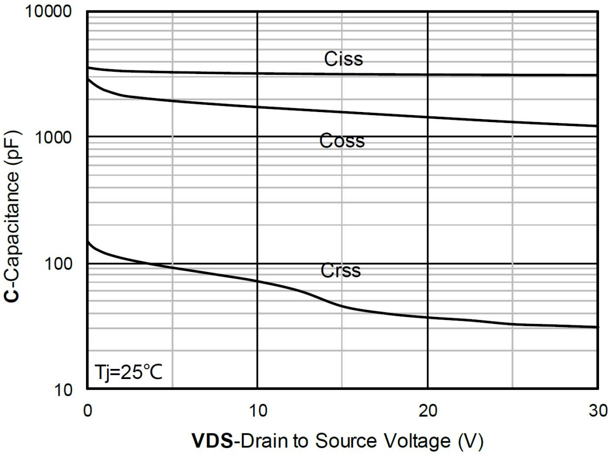
Typical Characteristics



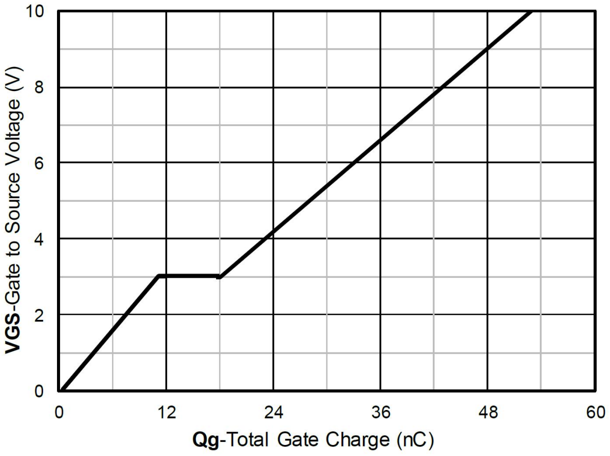
Output Characteristics



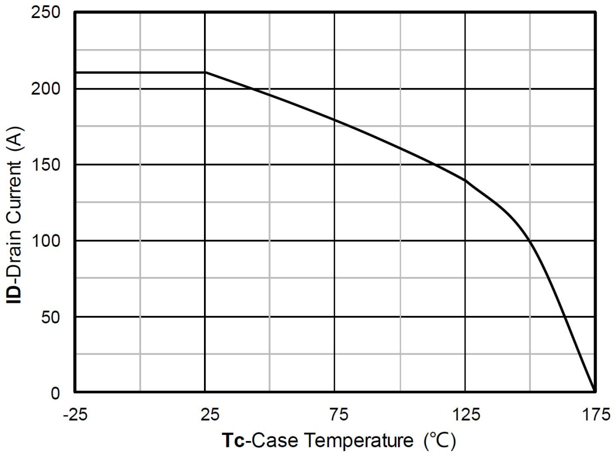
Transfer Characteristics



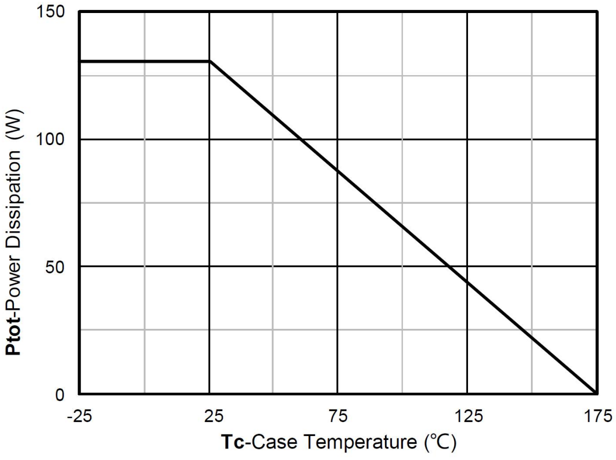
Capacitance Characteristics



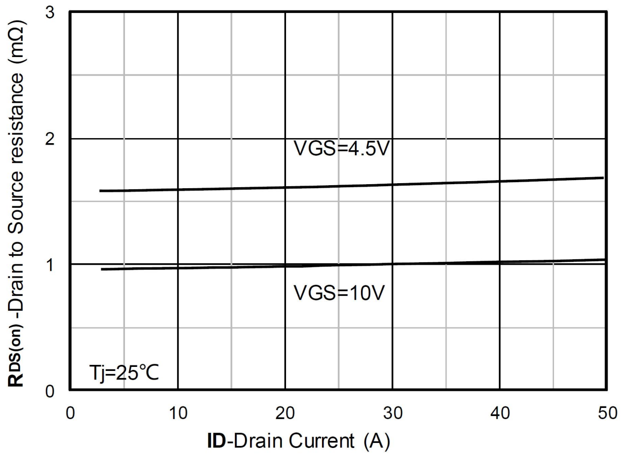
Gate Charge



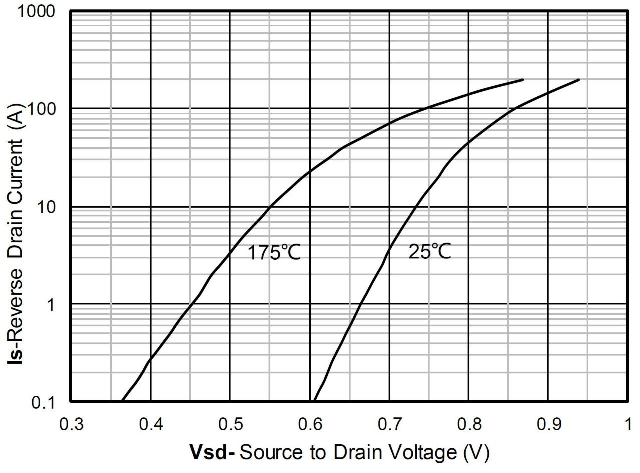
Current dissipation



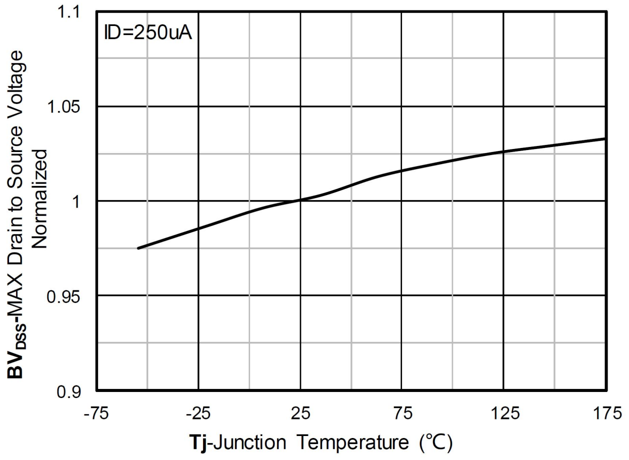
Power dissipation



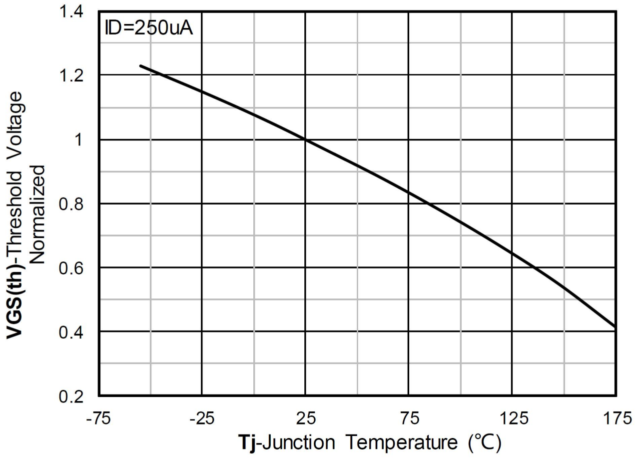
RDS(on) VS Drain Current



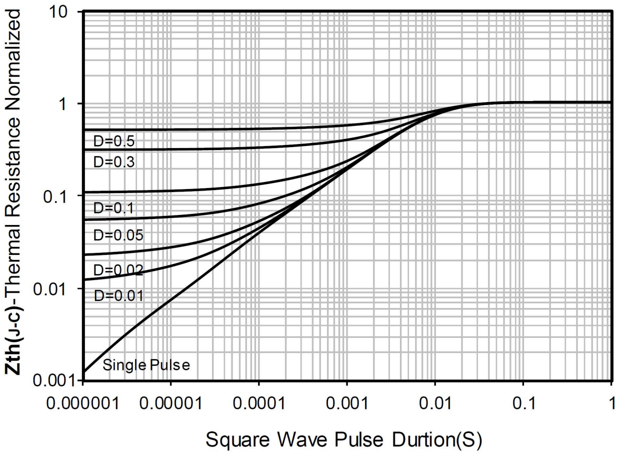
Forward characteristics of reverse diode



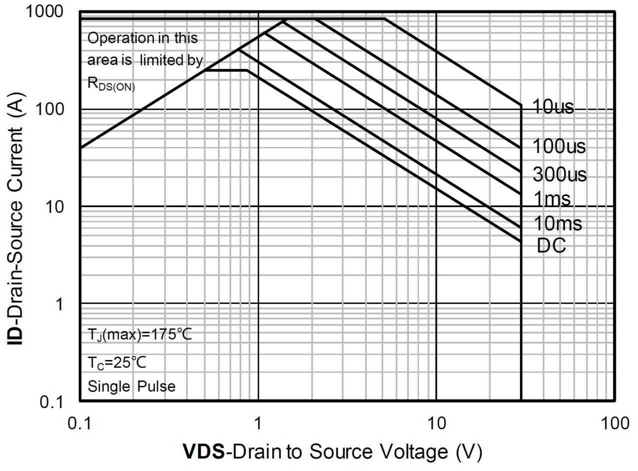
Normalized breakdown voltage



Normalized Threshold voltage



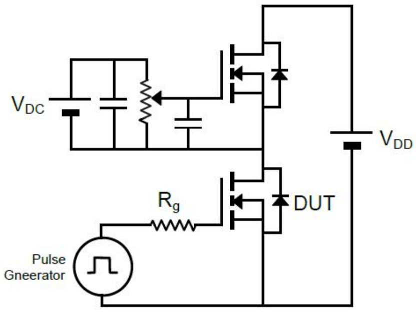
Maximum Transient Thermal Impedance

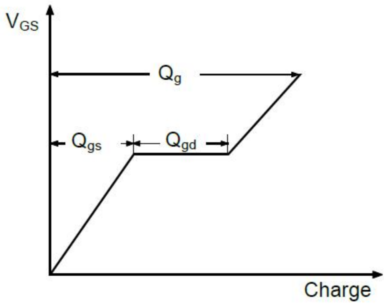


Safe Operation Area

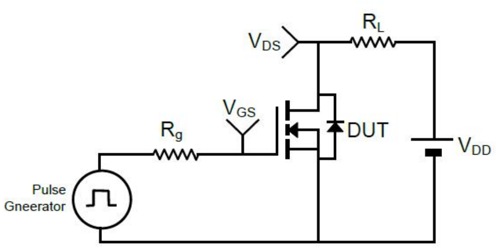
Test Circuit

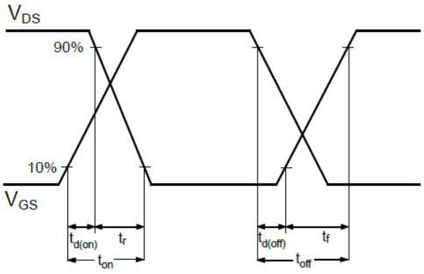
Gate Charge



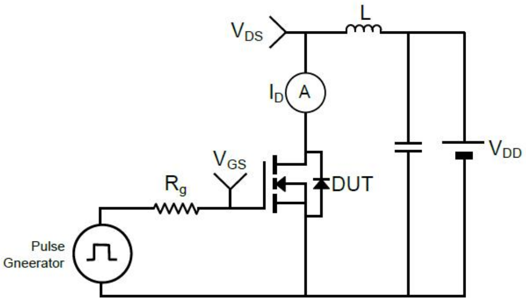


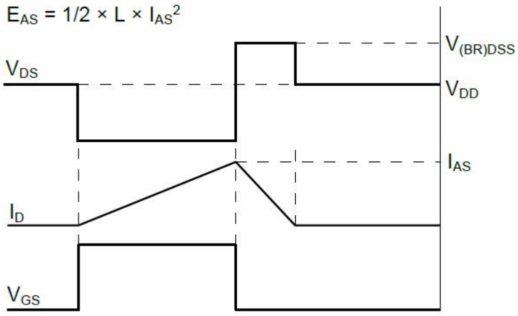
Resistive Load Switching Time



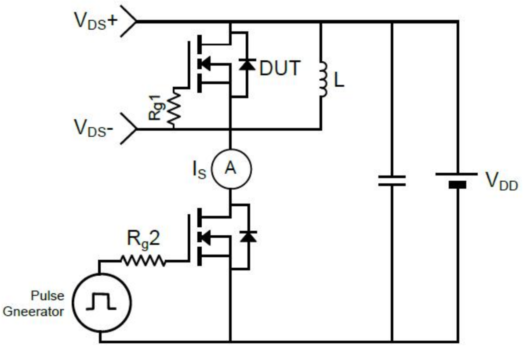


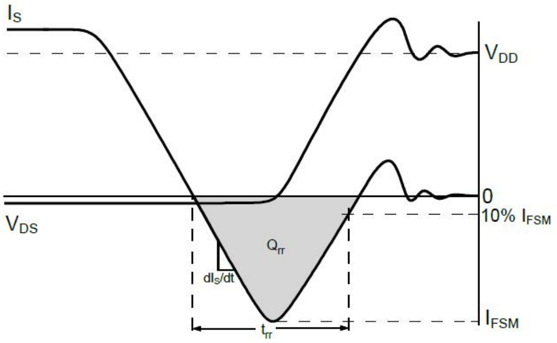
Un-clamped Inductive Load Switching



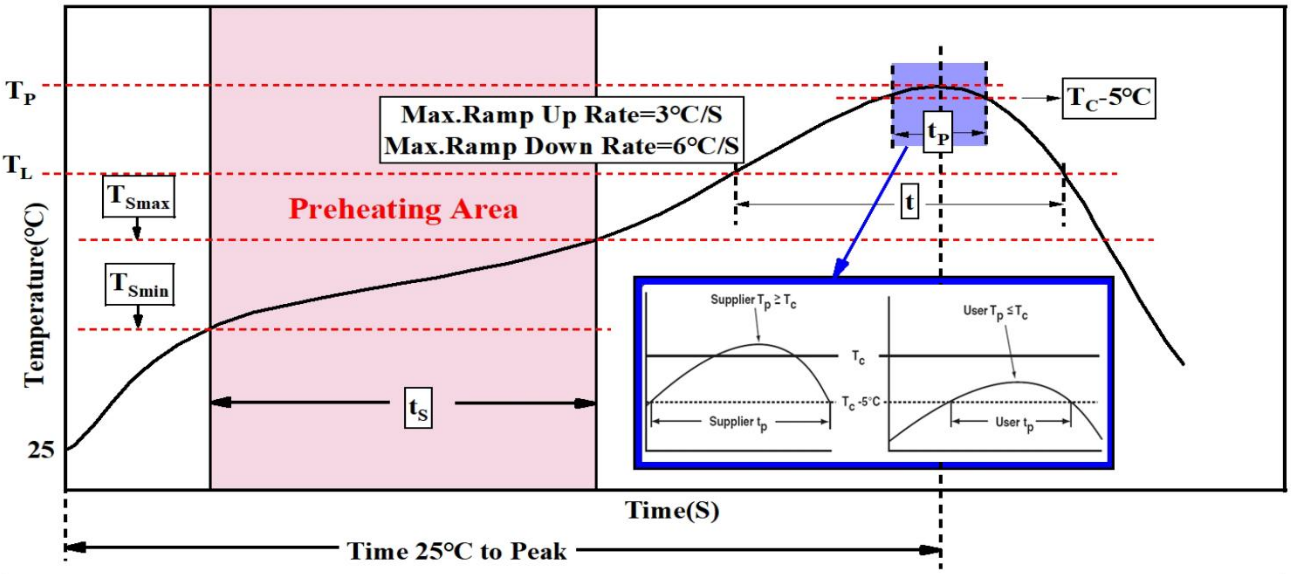


Drain-Source Body Diode Reverse Recovery





Temperature Profile for IR Reflow Soldering(Sn-Pb Eutectic&Pb-Free)



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (Tsmin) Temperature max (Tsmax) Time (Tsmin to Tsmax) (ts)	100°C 150°C 60-120 seconds	150°C 200°C 60-120 seconds
Average ramp-up rate (Tsmax to Tp)	3 °C/second max.	3°C/second max.
Liquidous temperature (TL) Time at liquidous (tL)	183 °C 60-150 seconds	217°C 60-150 seconds
Peak package body Temperature e (Tp)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (tp)** within 5°C of the specified classification temperature (Tc)	20** seconds	30** seconds
Average ramp-down rate (Tp to Tsmax)	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 (Tp) is defined as a supplier minimum and a user maximum.
** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum

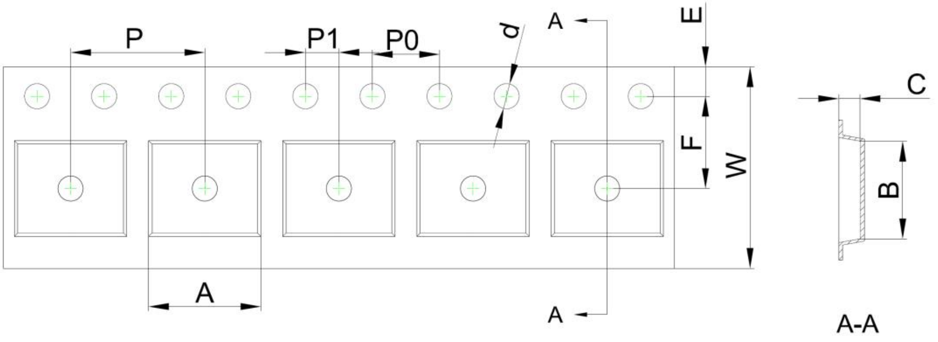
Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

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 (Tc)

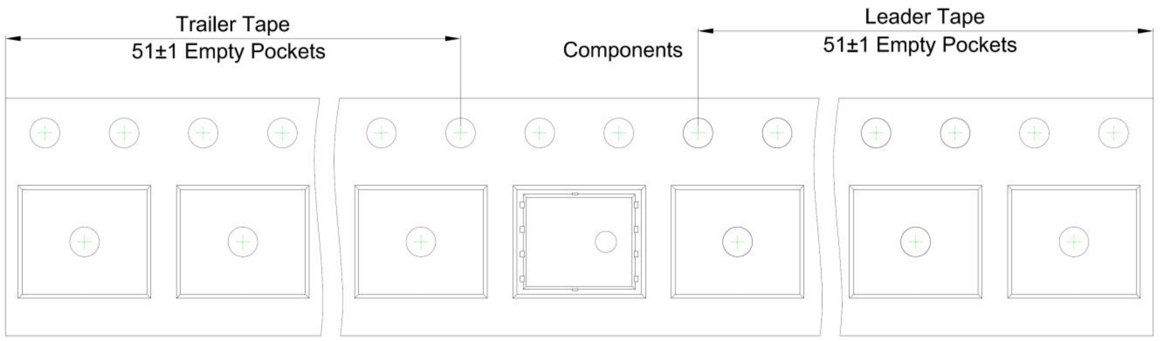
Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

PDFN5X6-8L Embossed Carrier Tape

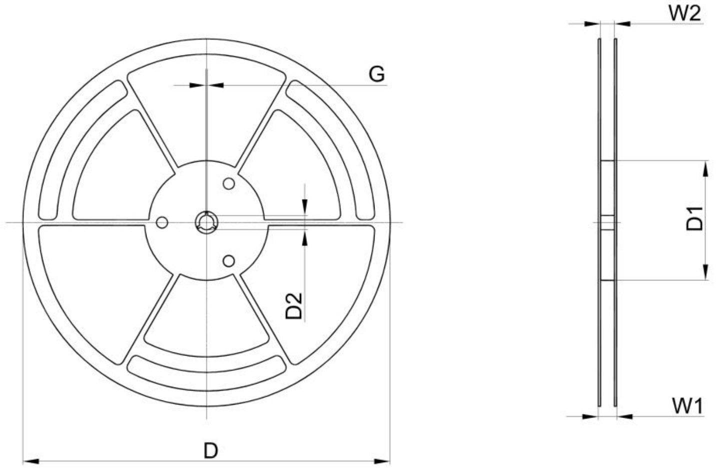


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
PDFN5X6-8L	6.30	5.30	1.10	Φ1.50	1.75	5.50	4.00	8.00	2.00	12.00

PDFN5X6-8L Tape Leader and Trailer



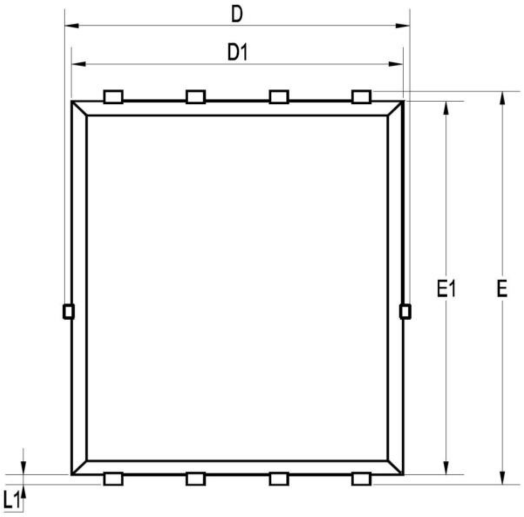
PDFN5X6-8L Reel



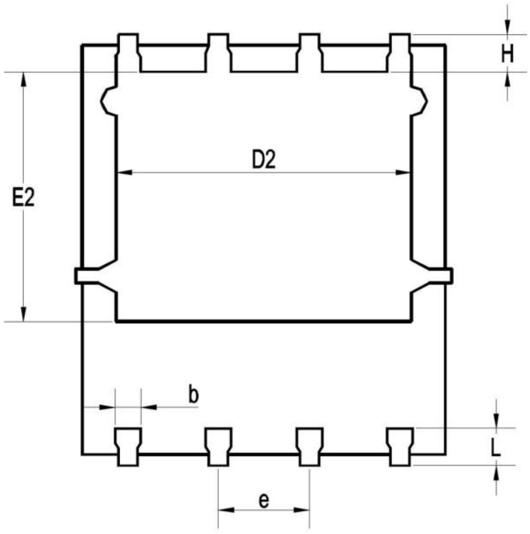
Dimensions are in millimeter						
Reel Option	D	D1	D2	G	W1	W2
13"Dia	Ø330.00	100.00	13.00	1.90	17.60	12.40

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

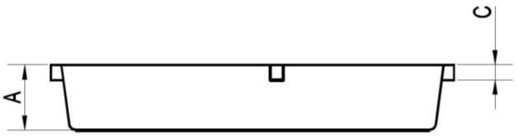
PDFN5X6-8L Package Information



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