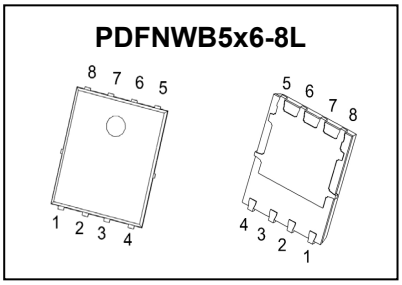
SZCJ

PDFNWB5x6-8L Plastic-Encapsulate MOSFET

1R9SN04AL N-Channel Power MOSFET



Key Performance Parameters

$V_{BR(DSS)}$	$R_{DS(on)}$TYP	I_D
40V	1.5mΩ@10V	200A
	2.4mΩ@4.5V	

DESCRIPTION

The N-Channel enhancement mode power field effect transistors is using SGT technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance. These devices are well suited for high efficiency fast switching applications.

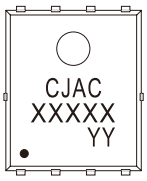
FEATURES

- 100% Avalanche Tested
- Low drain-source on-resistance:
  $R_{DS(ON)}$ = 1.5 mΩ (typ.) (V_{GS} = 10V)
- Excellent package for good heat dissipation

APPLICATIONS

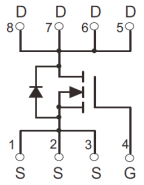
- High-Efficiency DC-DC Converters
- Switching Voltage Regulators
- Motor Drivers

MARKING



XXXXX = 1R9SN04AL
Solid dot = Pin1 indicator.
YY = Code.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS (T_J=25℃ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C =25℃	I_D	200	A
	T_C =100℃		130	
Pulsed Drain Current		I_{DM}①②	700	A
Continuous Drain Current	T_A =25℃	I_D	25.1	A
	T_A =75℃		19.5	
Avalanche Current		I_{AS}③	33	A
Single Pulsed Avalanche Energy		E_{AS}③	272	mJ
Power Dissipation		P_D①	208	W
Operating Junction and Storage Temperature Range		T_J,T_{stg}	-55~+150	℃

Thermal Characteristics

Parameter	Symbol	Value		Unit
		Typ	Max	
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.4	0.6	℃/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$⑥	41	62.5	℃/W

Typical Characteristics

ELECTRICAL CHARACTERISTICS (T_J=25℃ unless otherwise specified)

Static Characteristics

Parameter	Symbol	Test Condition		Value			Unit
				Min	Typ	Max	
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA		40	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =40V,V_{GS} =0V	T_J =25℃	-	-	1.0	μA
			T_J =125℃	-	-	100	
Gate-body leakage current	I_{GSS}	V_{GS} =±20V,V_{DS} =0V		-	-	±100	nA
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA		1.3	1.8	2.5	V
Static drain-source on-sate resistance	$R_{DS(on)}$④	V_{GS} =10V,I_D =30A	T_J =25℃	-	1.5	1.9	mΩ
			T_J =125℃	-	2.3	3.0	
		V_{GS} =4.5V, I_D =30A		-	2.4	3.5	
Forward transconductance	g_{FS}	V_{DS} =5V,I_D =30A		-	132	-	S

Dynamic Characteristics⑤

Input capacitance	C_{iss}	V_{GS}=0V,V_{DS}=20V, f =100kHz	-	3977	-	pF
Output capacitance	C_{oss}		-	974	-	
Reverse transfer capacitance	C_{rss}		-	34	-	
Gate resistance	R_g	f =1MHz	-	2.1	-	Ω
Total gate charge	Q_g	V_{GS} =4.5V,V_{DS} =20V,I_D =30A	-	25	-	nC
Total gate charge	Q_g	V_{GS}=10V,V_{DS}=20V, I_D=30A	-	55	-	
Gate charge at threshold	$Q_{G(th)}$		-	6.9	-	
Gate-source charge	Q_{gs}		-	12	-	
Gate-drain charge	Q_{gd}		-	7.2	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V,V_{GS}=10V, I_D=30A, R_g=3Ω	-	6.6	-	ns
Turn-on rise time	t_r		-	3.9	-	
Turn-off delay time	$t_{d(off)}$		-	37.5	-	
Turn-off fall time	t_f		-	17.6	-	

Reverse Diode Characteristics

Drain-source diode forward voltage	V_{SD}④	V_{GS} =0V, I_S=30A	-	-	1.0	V
Continuous drain-source diode forward current	I_S①		-	-	200	A
Pulsed drain-source diode forward current	I_{SM}①②		-	-	700	A
Reverse recovery time	t_{rr}	V_{DD} = 30V,I_S = 30A, di/dt = 100A/μs	-	63	-	ns
Reverse recovery charge	Q_{rr}		-	55	-	nC

Notes:

①.T_C=25℃ Limited only by maximum temperature allowed.

②.P_W≤10μs, Duty cycle≤1%.

③.EAS condition: V_{DD}=20V,V_{GS}=10V, L=0.5mH, R_g=25Ω Starting T_J= 25℃.

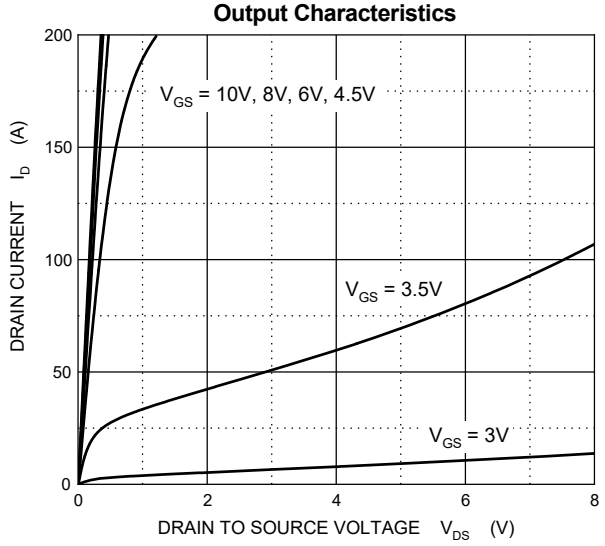
④.Pulse Test : Pulse Width≤380μs, duty cycle ≤2%.

⑤.Guaranteed by design, not subject to production.

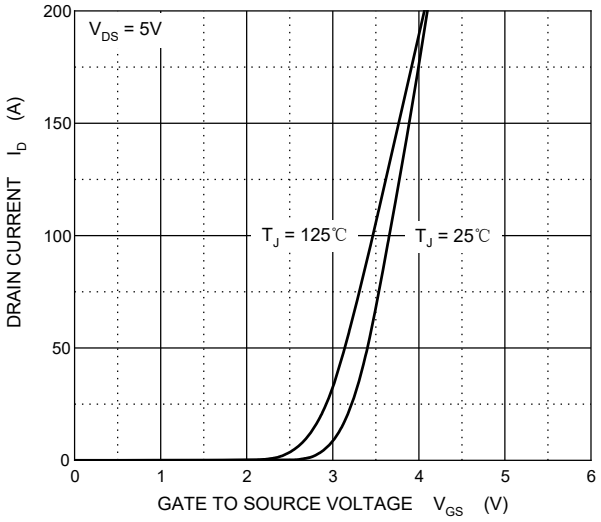
⑥.Device mounted on 1 in^2 FR-4 board with 2oz. double-sided Copper, in a still air environment with T_A=25℃.

Typical Characteristics

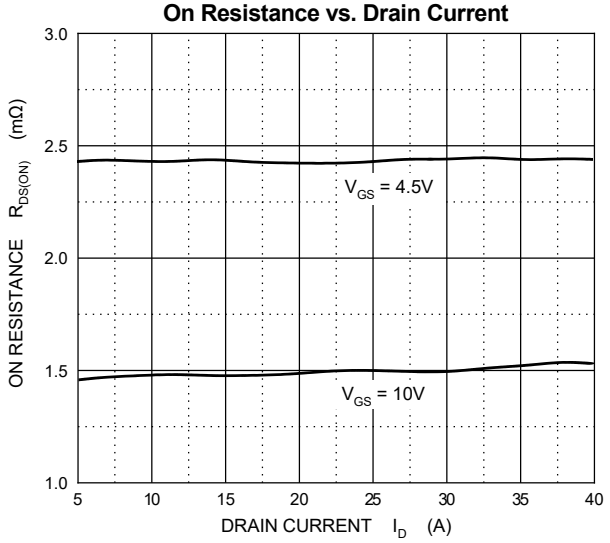
Output Characteristics



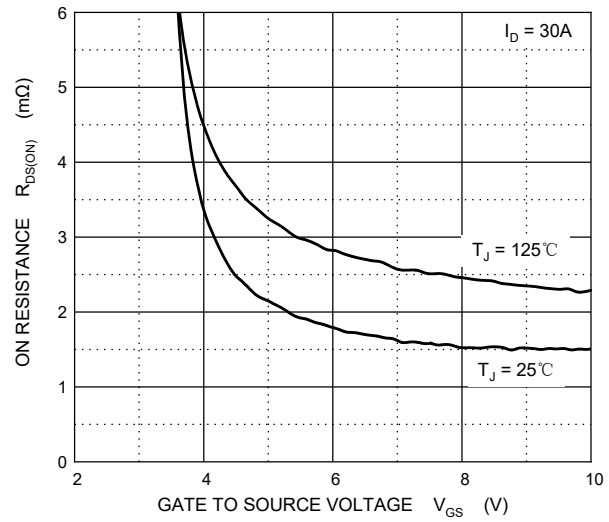
Transfer Characteristics



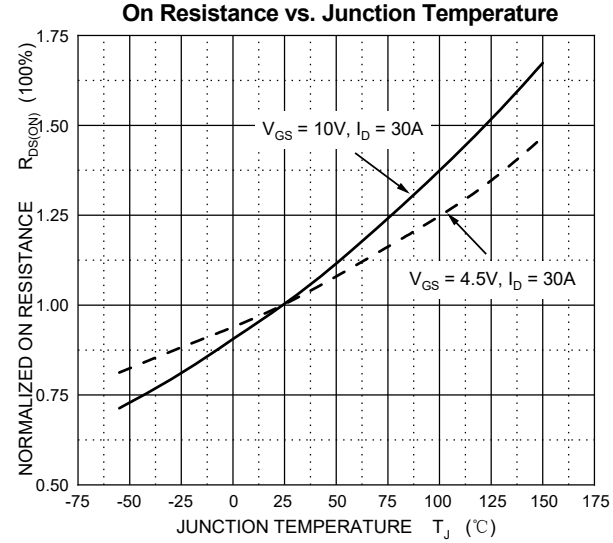
On Resistance vs. Drain Current



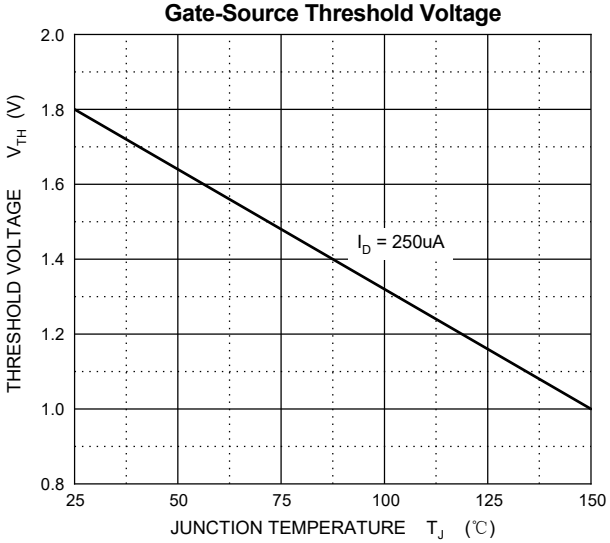
On Resistance vs. Gate-Source Bias



On Resistance vs. Junction Temperature

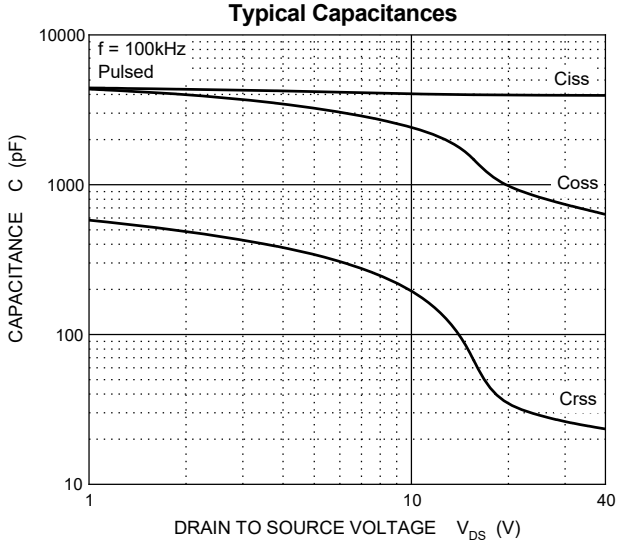


Gate-Source Threshold Voltage

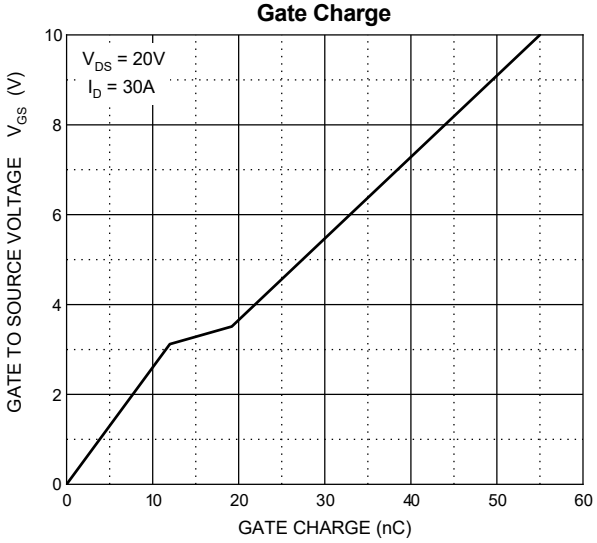


Typical Characteristics

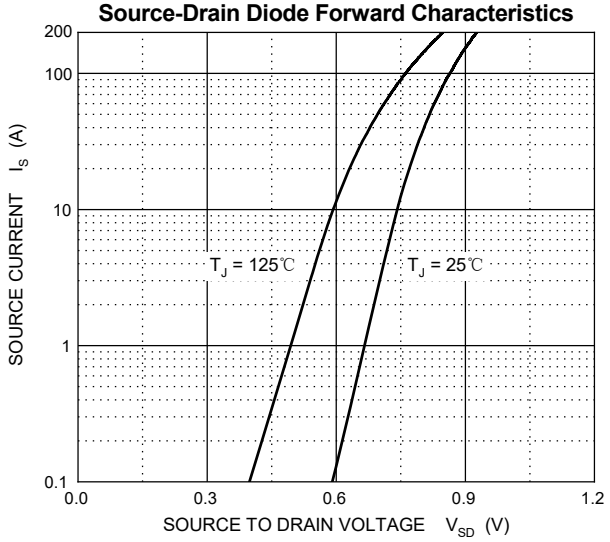
Typical Capacitances



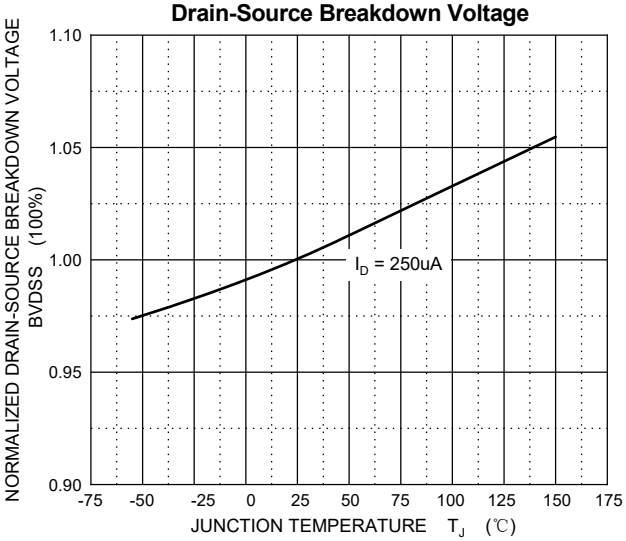
Gate Charge



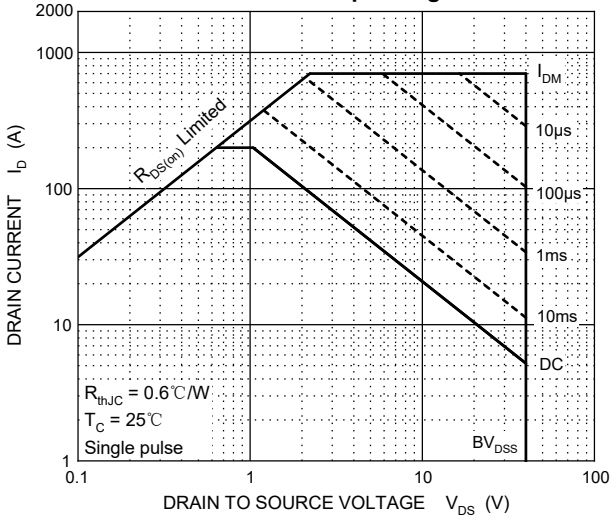
Source-Drain Diode Forward Characteristics



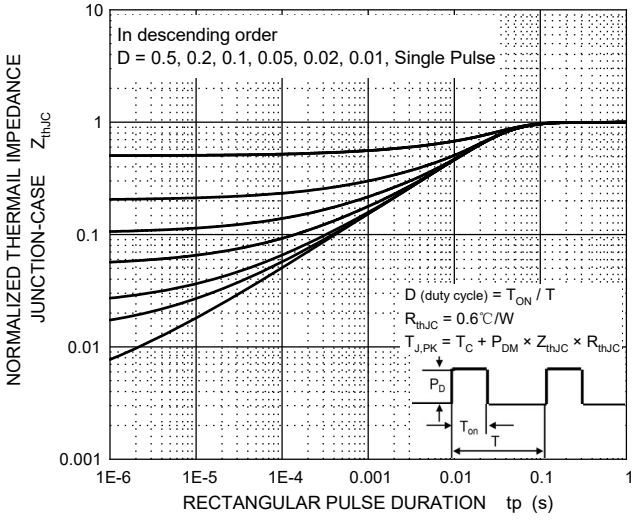
Drain-Source Breakdown Voltage



Maximum Safe Operating Area

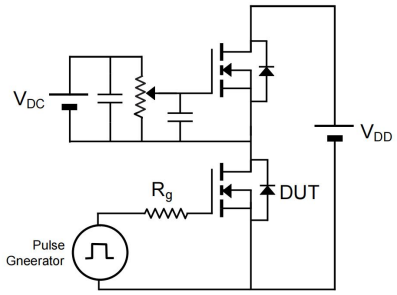


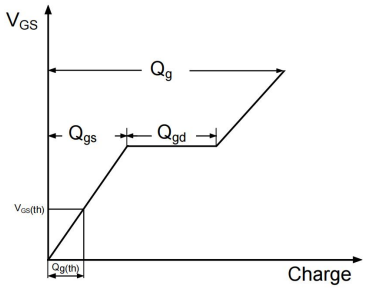
Transient Thermal Impedance, Junction-Case



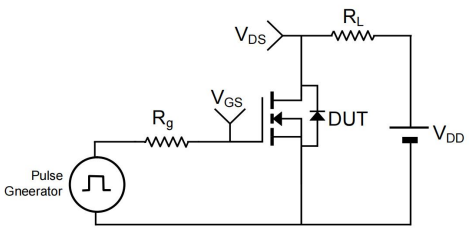
Test Circuit And Waveforms

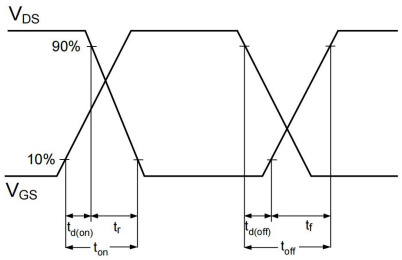
Gate Charge



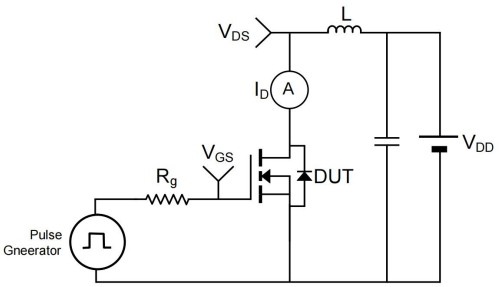


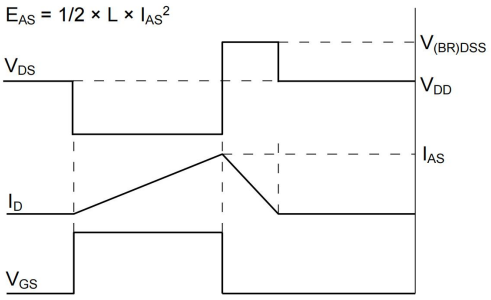
Resistive Load Switching Time



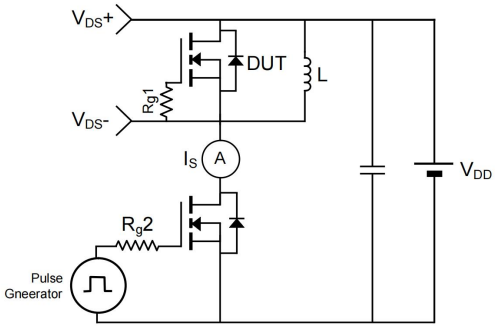


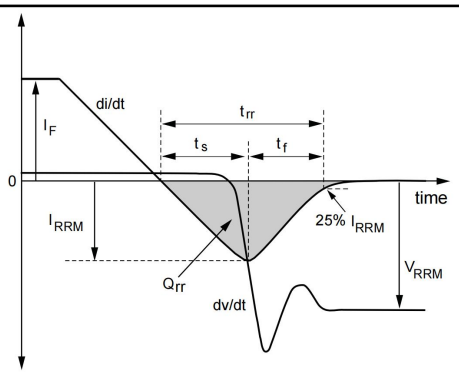
Un-clamped Inductive Load Switching



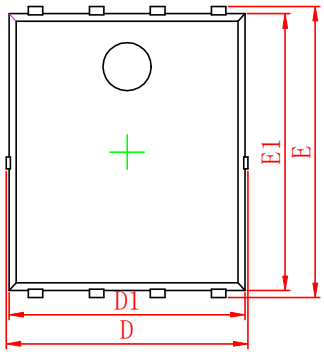


Drain-Source Body Diode Reverse Recovery

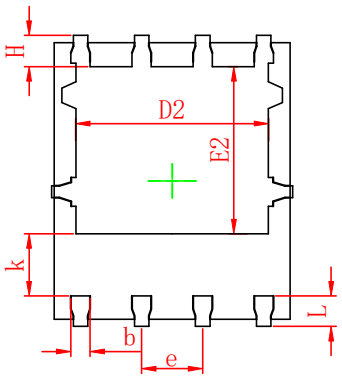




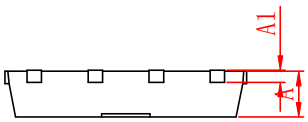
PDFNWB5x6-8L PACKAGE OUTLINE DIMENSIONS



Top View
[顶视图]



Bottom View
[背视图]

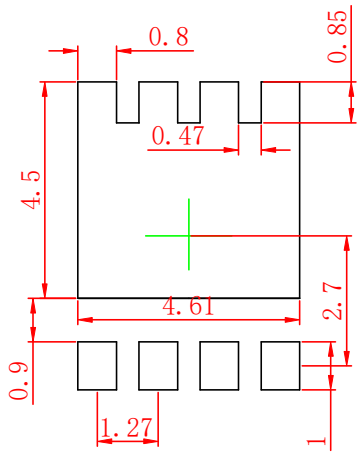


Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.10	0.035	0.043
A1	0.25 REF.		0.010 REF.	
D4.90		5.10	0.193 0.201	
D14.80		5.00	0.189 0.197	
D23.90		4.10	0.154 0.161	
E	5.90	6.10	0.232	0.240
E15.65		5.85	0.222 0.230	
E23.35		3.65	0.132 0.144	
k1.20		1.50	0.047 0.059	
b0.20		0.45	0.008 0.018	
e	1.27 BSC		0.050 BSC	
L0.55		0.75	0.022 0.030	
H0.45		0.75	0.018 0.030	

Notes：
1 Dimensions exclusive of mold gate burrs.
2 Dimensions exclusive of mold flash and cutting burrs.

PDFNWB5x6-8L Suggested Pad Layout



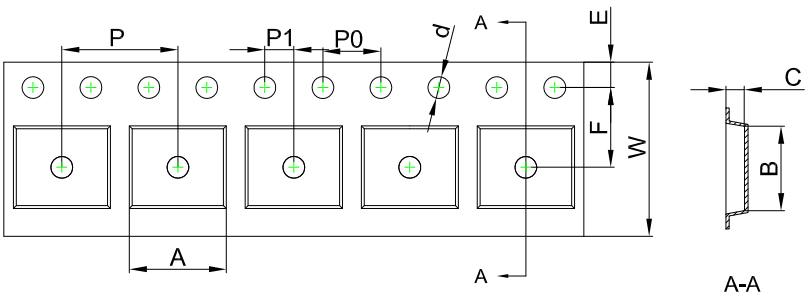
Notes：
1 Controlling dimension：in millimeters.
2 General tolerance:±0.05mm.
3 The pad layout is for referance purpose only.

NOTICE

SZCJ reservesthe right to make modifications,enhancements,improvements,corrections or other changes without further notice to any product herein.SZCJ does not assume any liability arising out of the application or use of any product described herein.

PDFNWB5×6-8L Tape and Reel

PDFNWB5×6-8L Embossed Carrier Tape

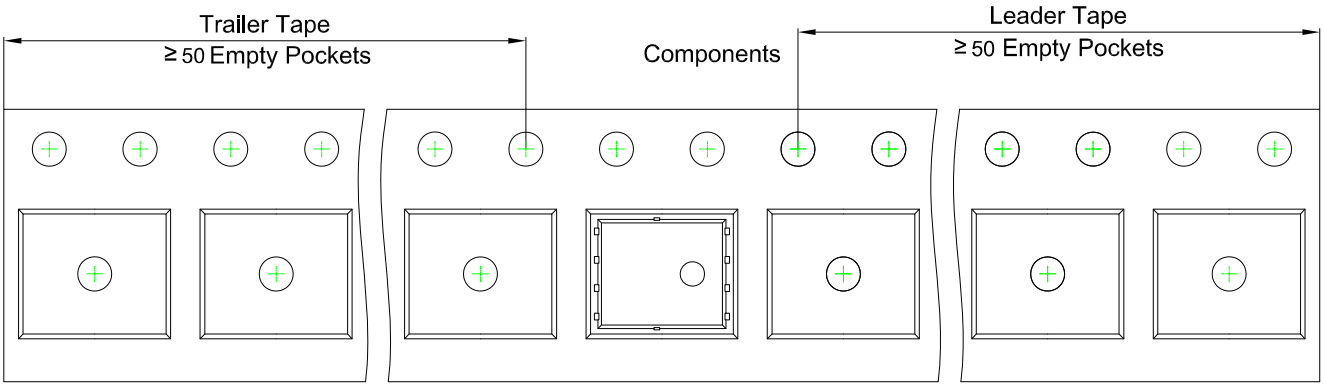


Packaging Description:

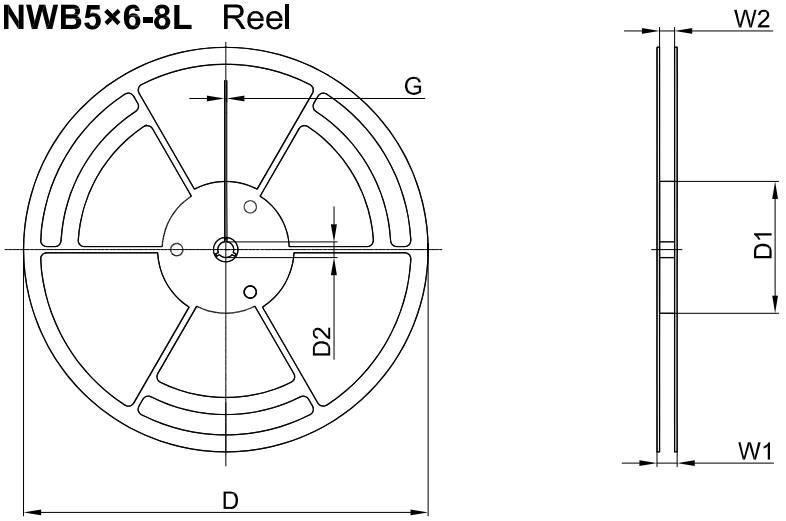
PDFNWB5×6-8L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 5,000 units per 13" or 33.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
PDFNWB5×6-8L	6.30	5.30	1.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

PDFNWB5×6-8L Tape Leader and Trailer



PDFNWB5×6-8L Reel



Dimensions are in millimeter						
Reel Option	**D**	**D1**	**D2**	**G**	**W1**	**W2**
13" Dia	φ330.00	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	10,000 pcs	360×360×65	50,000 pcs	378×358×382