HSBE2730

N-Ch 20V Fast Switching MOSFETs

Description

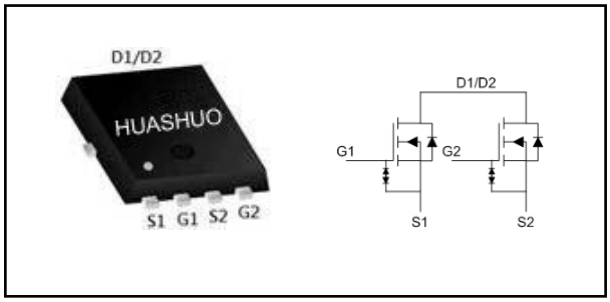
The HSBE2730 is the low RDSON trenched N-CH MOSFETs with robust ESD protection. This product is suitable for Lithium-ion battery pack applications.
The HSBE2730 meet the RoHS and Green Product requirement with full function reliability approved.

Product Summary

V_{DS}	20	V
$R_{DS(ON),max}$	17	mΩ
I_D	7	A

- Low drain-source ON resistance
- Green Device Available
- ESD Protected Embedded

PRPAK3X3 NEP Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_A=25°C	Continuous Drain Current[1]	7	A
I_D@T_A=70°C	Continuous Drain Current[1]	5.8	A
I_{DM}	Pulsed Drain Current[2]	43	A
P_D@T_A=25°C	Total Power Dissipation[3]	1.47	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	85	°C/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.014	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=3A	12	14.5	17	mΩ
		V_{GS}=4.0V , I_D=3A	12.5	15	18.5	mΩ
		V_{GS}=3.1V , I_D=3A	13	16.5	22	mΩ
		V_{GS}=2.5V , I_D=3A	14.5	18.5	24.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	---	1.2	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-2.09	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=16V , V_{GS}=0V , T_J=25℃	---	---	25	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±8V , V_{DS}=0V	---	---	±10	uA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.83	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=16V , V_{GS}=4.5V , I_D=3A	---	9.86	---	nC
Q_{gs}	Gate-Source Charge		---	1.41	---	
Q_{gd}	Gate-Drain Charge		---	2.48		
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=10V , V_{GS}=4.5V , R_G=3.3Ω, I_D=3A	---	7	---	ns
T_r	Rise Time		---	36	---	
$T_{d(off)}$	Turn-Off Delay Time		---	46.5	---	
T_f	Fall Time		---	15	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	---	735	---	pF
C_{oss}	Output Capacitance		---	83	---	
C_{rss}	Reverse Transfer Capacitance		---	81	---	

Diode Characteristics

Symbol	Parameter	Conditions	Max.	Unit
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	7	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=7A , T_J=25℃	1.2	V

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature.
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

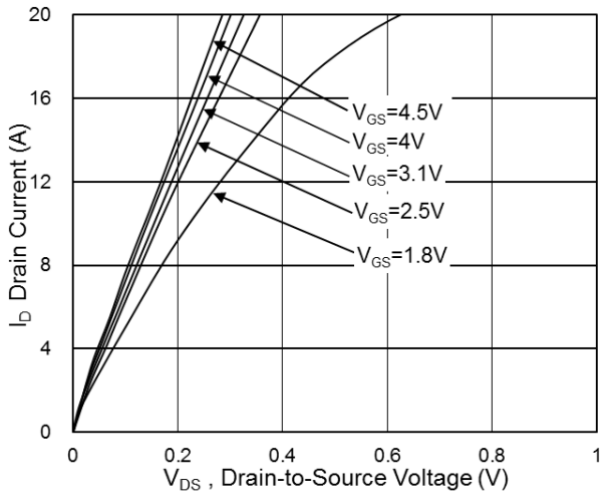


Fig.1 Typical Output Characteristics

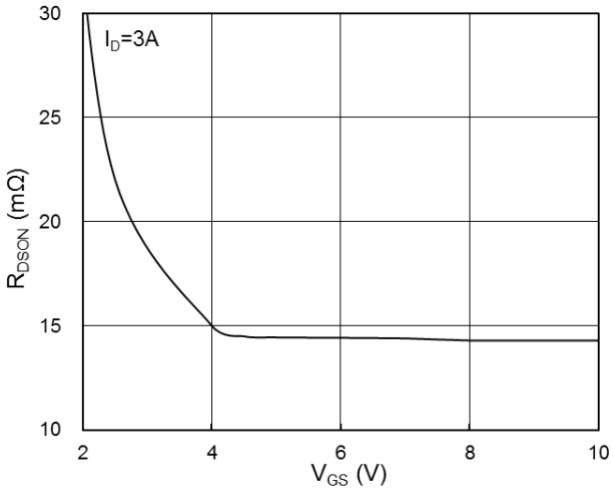


Fig.2 On-Resistance vs. Gate-Source Voltage

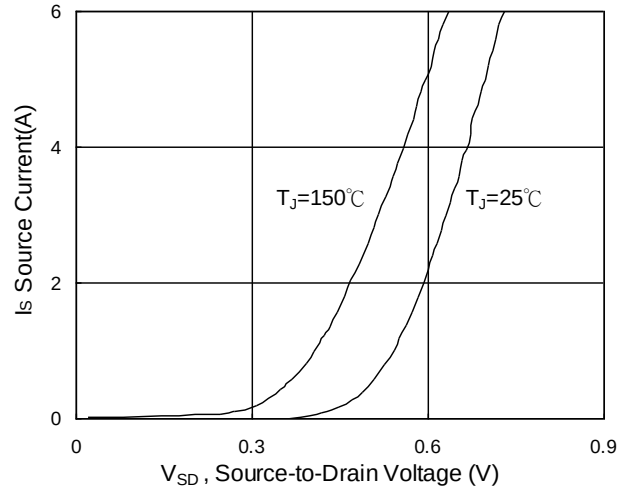


Fig.3 Forward Characteristics of Reverse

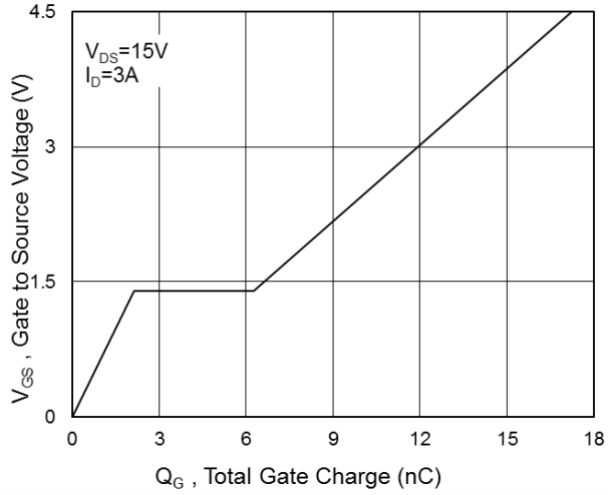


Fig.4 Gate-Charge Characteristics

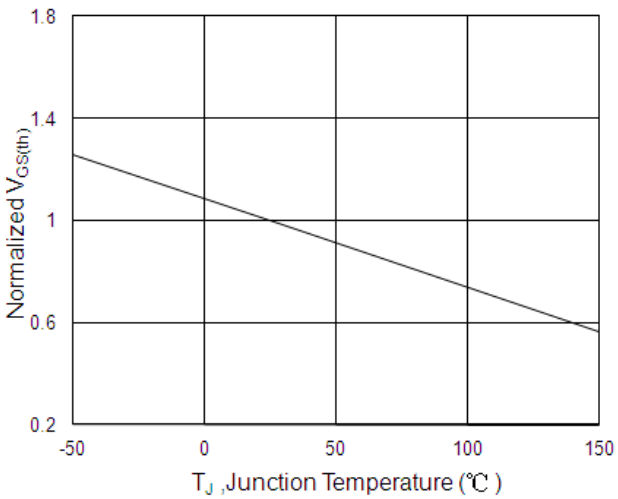


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

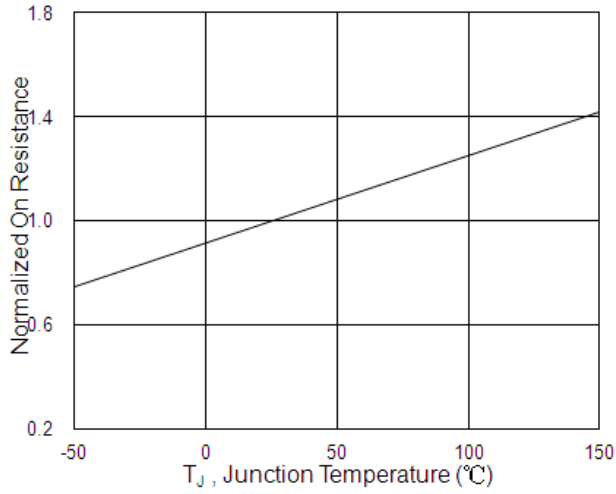


Fig.6 Normalized R_{DSON} vs. T_J

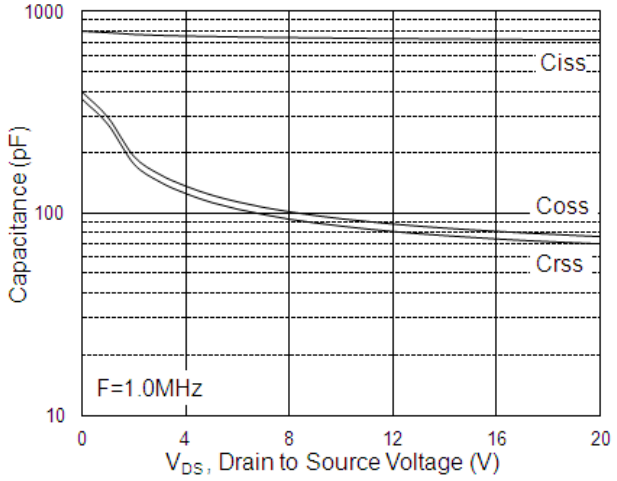


Fig.7 Capacitance

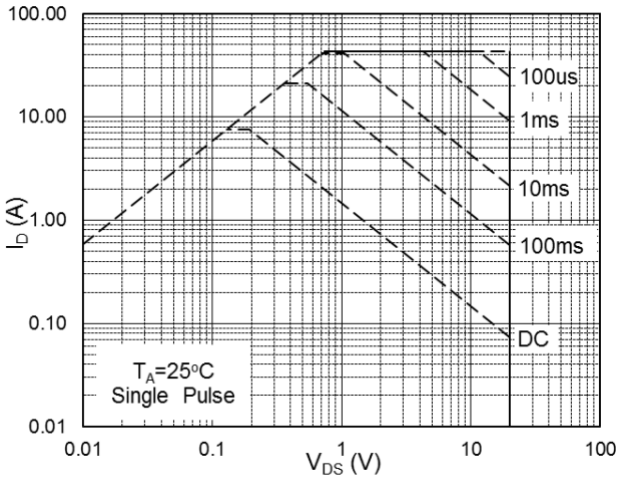


Fig.8 Safe Operating Area

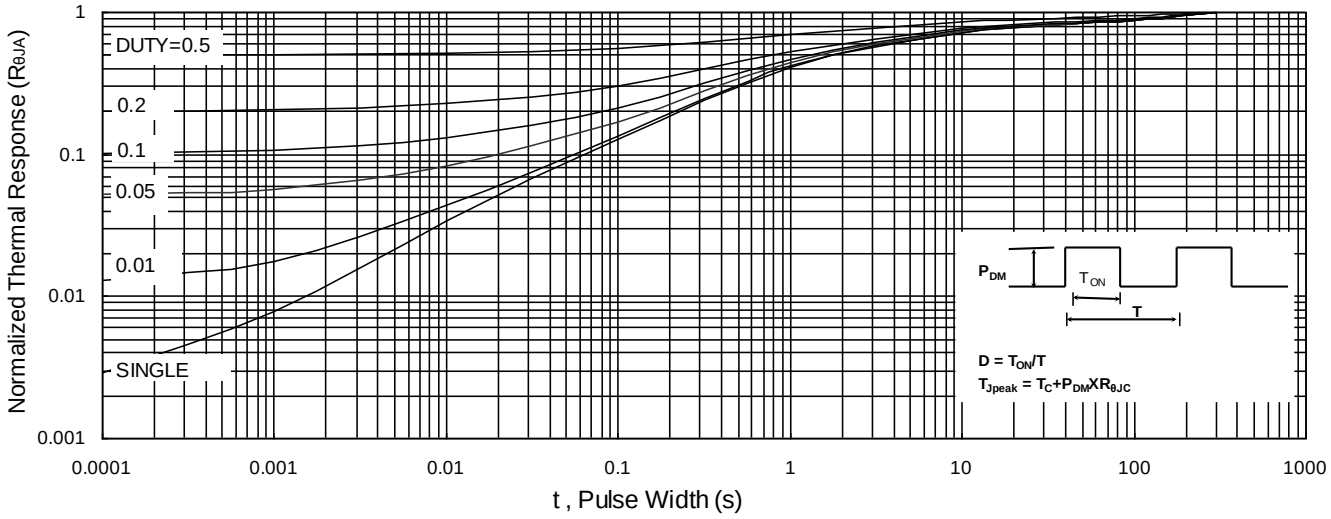


Fig.9 Normalized Maximum Transient Thermal Impedance

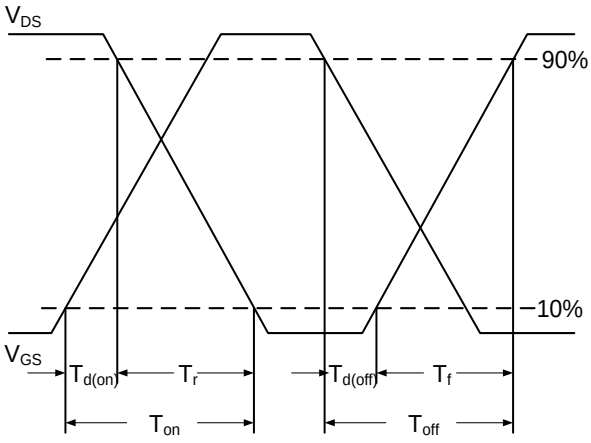


Fig.10 Switching Time Waveform

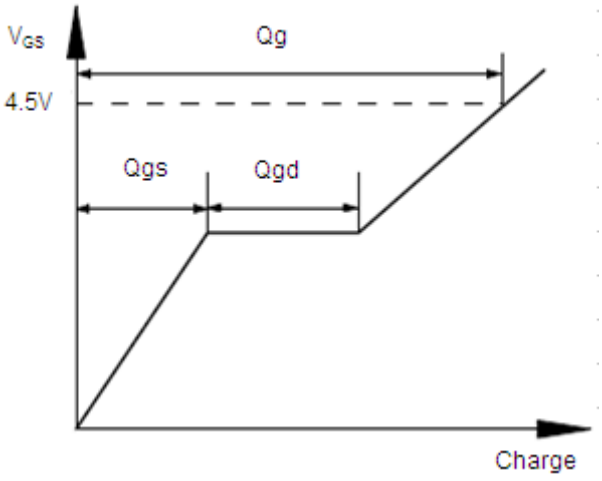
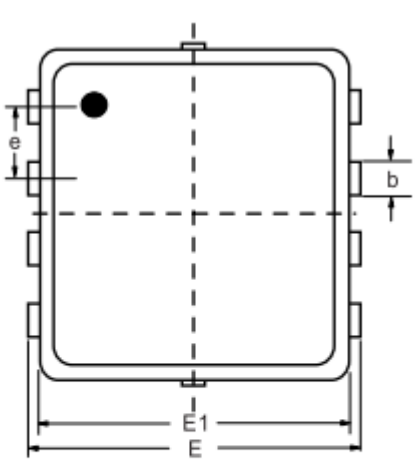
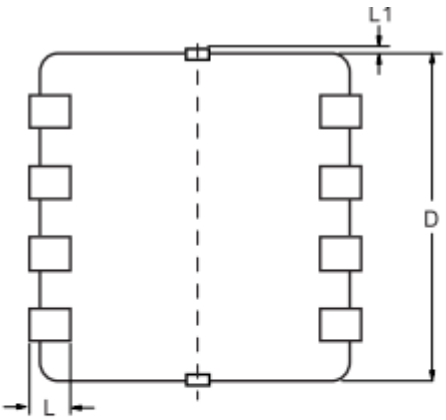


Fig.11 Gate Charge Waveform

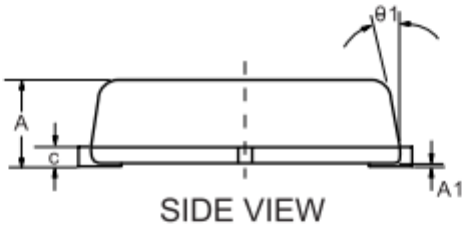
PRPAK3X3 NEP Package Outline Dimensions



TOP VIEW



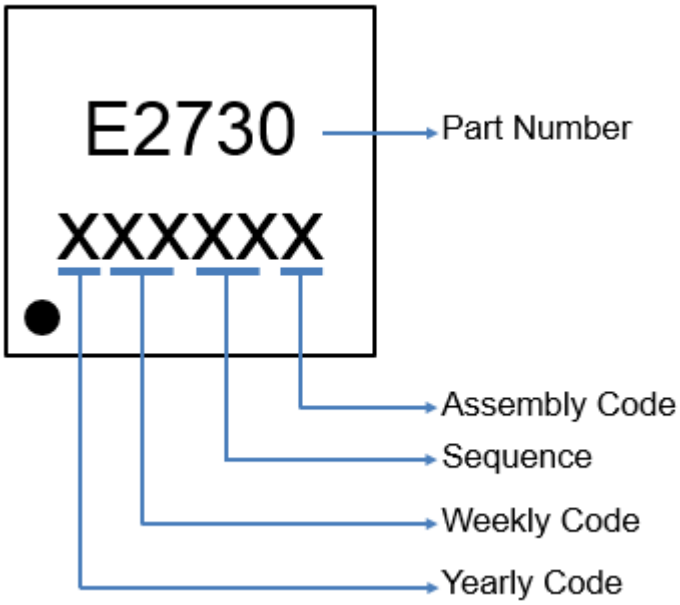
BOTTOM VIEW



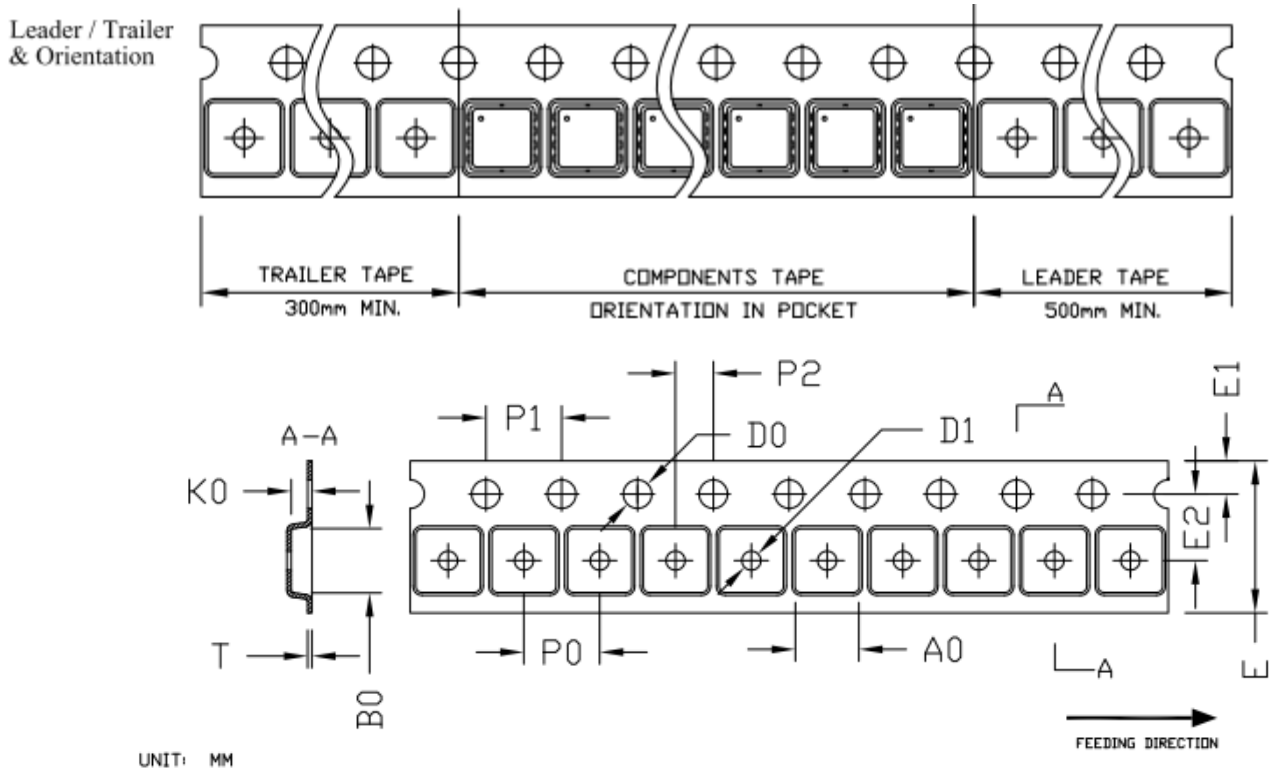
SIDE VIEW

SYMBOLS	MILLIMETERS		
	MIN	NOM	MAX
A	0.700	0.800	0.900
A1	0.000	——	0.050
b	0.240	0.300	0.350
c	0.080	0.152	0.250
D	2.800	2.900	3.000
E	2.700	2.800	2.900
E1	2.200	2.300	2.400
e	0.650 BSC		
L	0.200	0.375	0.450
L1	0.000	——	0.100
θ1	0°	10°	12°

Marking Instruction

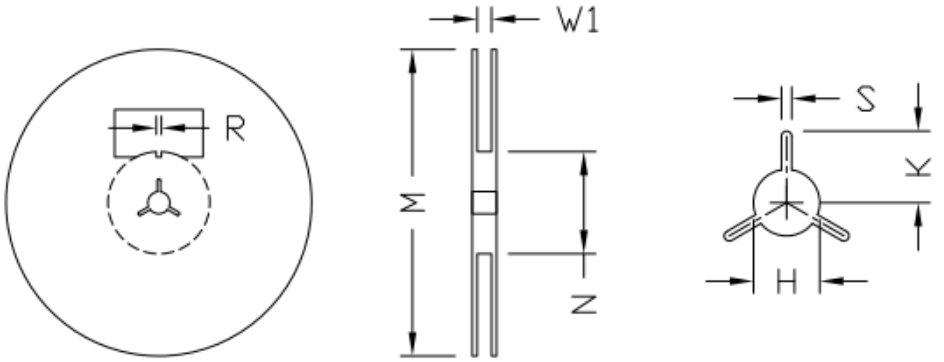


PRPAK3X3 NEP Tape and Reel Data



UNIT: MM

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
DFN3x3 DFN3x2 DFN2x3	3.35 ±0.10	3.20 ±0.10	1.10 ±0.10	1.50 +0.10 −0.00	1.00 +0.25 −0.00	8.00 +0.30 −0.10	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	0.23 ±0.020



UNIT: MM

TAPE SIZE	REEL SIZE	M	N	W1	H	S	K	R
8	ø180	ø180.0 ±0.50	60.0 ±0.50	8.4 +1.5 −0	13.0 ±0.20	1.5 MIN.	13.5 MIN.	3.0 ±0.50

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