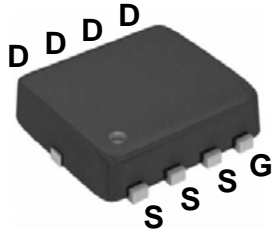




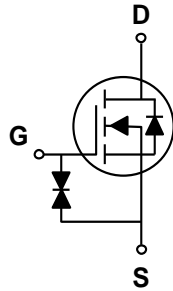
P3MNC4P8



33V N-Channel MOSFETs



PPAK3X3



BV_{DSS}	$R_{DS(ON)}$	I_D
33 V	4.8 m Ω	64 A

Features

- 33V, 64A, $R_{DS(ON)}=4.8m\Omega @V_{GS}=10V$
- $R_{DS(ON)}=6.9m\Omega @V_{GS}=4.5V$
- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- Reliable and Rugged
- ESD Protected

Applications

- Power Management in Notebook Computer
- Portable Equipment and Battery Powered systems

Ordering Information

Part No.	Remark	Package	Packing
P3MNC4P8	General	PPAK3X3	3000 / Tape & Reel
P3MNC4P8-H	Halogen Free		

Absolute Maximum Ratings $T_J=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	33	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous ($T_C=25^\circ\text{C}$)	64	A
	Drain Current - Continuous ($T_C=100^\circ\text{C}$)	40	
I_{DM}	Drain Current - Pulsed ($T_C=25^\circ\text{C}$) (NOTE 1)	71	A
I_S	Diode Continuous Forward Current ($T_C=25^\circ\text{C}$)	25	A
P_D	Maximum Power Dissipation ($T_C=25^\circ\text{C}$)	31	W
	Maximum Power Dissipation ($T_C=100^\circ\text{C}$)	12.5	
IAS	Avalanche Current, Single pulse ($L=0.1\text{mH}$)	28	A
EAS	Avalanche Energy, Single pulse ($L=0.1\text{mH}$)	39	mJ
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
Marking Code		NC4P8	

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (Steady State)	---	60	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case (Steady State)	---	4.6	$^\circ\text{C/W}$

NOTE :

1. Max. current is limited by bonding wire.



Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	33	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 10	μA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance (NOTE 2)	$V_{GS}=10V, I_D=20A$	---	4.1	4.8	m Ω
		$V_{GS}=4.5V, I_D=18A$	---	5.3	6.9	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.6	2.1	V
gfs	Forward Transconductance	$V_{DS}=5V, I_D=20A$	---	22	---	S

Dynamic and switching Characteristics (NOTE 3)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=25V, V_{GS}=10V, I_D=14A$	---	48	---	nC
Q_{gs}	Gate-Source Charge		---	3.4	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_{GEN}=6\Omega, I_D=1A$	---	9.6	---	ns
T_r	Rise Time		---	23.4	---	
$T_{d(off)}$	Turn-Off Delay Time		---	62.8	---	
T_f	Fall Time		---	23	---	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1MHz$	---	1859	---	pF
C_{oss}	Output Capacitance		---	260	---	
C_{rss}	Reverse Transfer Capacitance		---	212	---	
Rg	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	2.2	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage (NOTE 2)	$V_{GS}=0V, I_S=2A, T_J=25^{\circ}\text{C}$	---	0.75	1.3	V
t _{rr}	Reverse Recovery Time	$I_F=2A, V_{GS}=0V, di_F/dt=100A/\mu s$	---	18.2	---	ns
Q _{rr}	Reverse Recovery Charge		---	9.2	---	nC

NOTES :

2. Pulse test (pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$).
3. Guaranteed by design, not subject to production testing.



Characteristics Curves

FIG. 1-Output Characteristic

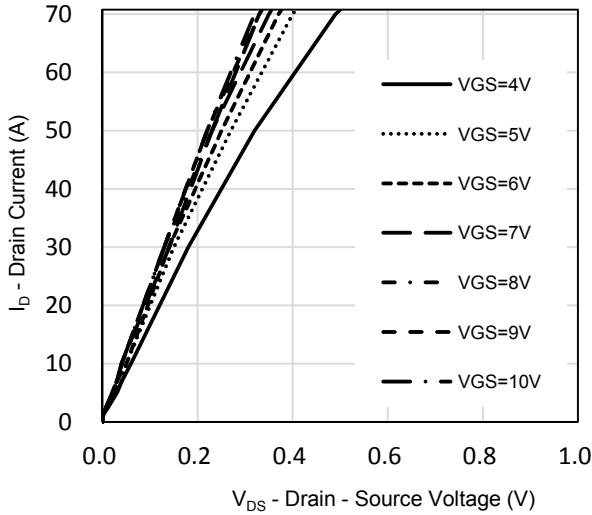


FIG. 2-On-Resistance vs. I_D

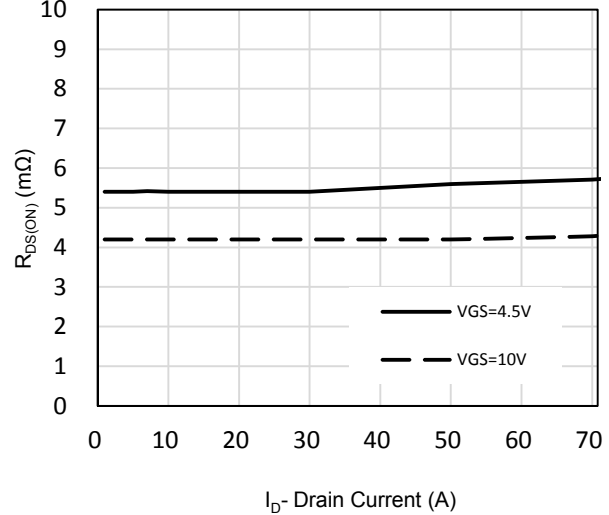


FIG. 3-On-Resistance vs. V_{GS}

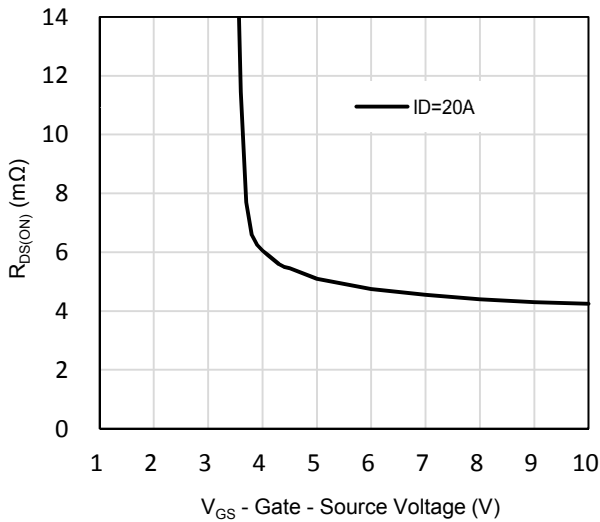


FIG. 4-Gate Threshold Voltage

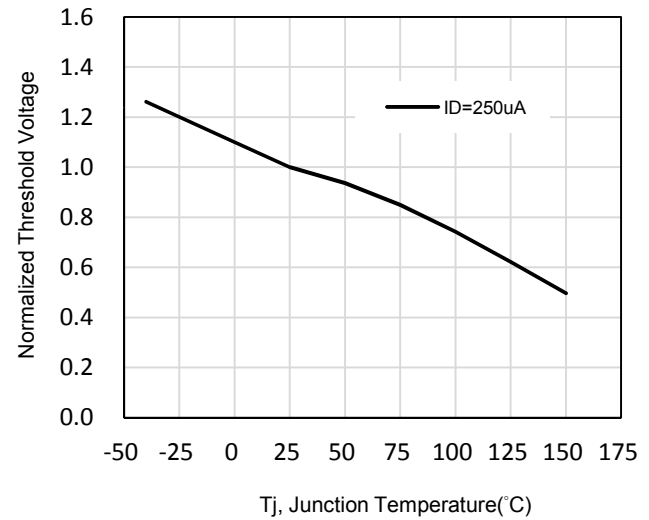


FIG. 5-Source-Drain Diode Forward

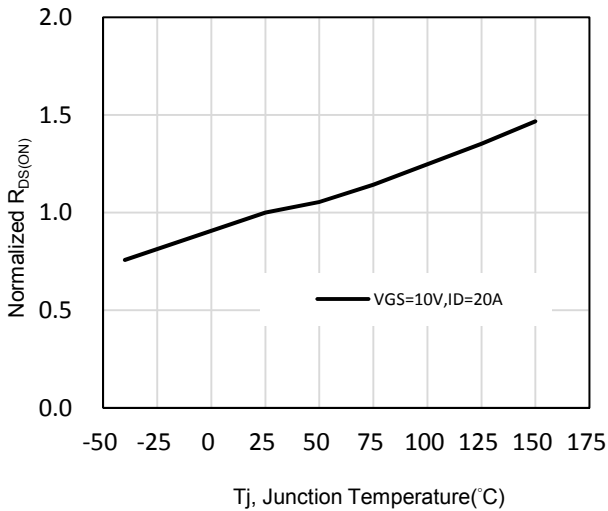
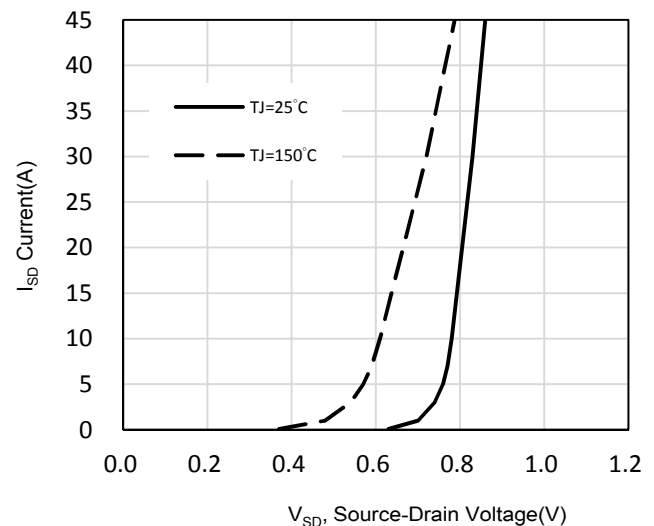


FIG. 6-Source-Drain Diode Forward





Characteristics Curves

FIG. 7-Capacitance

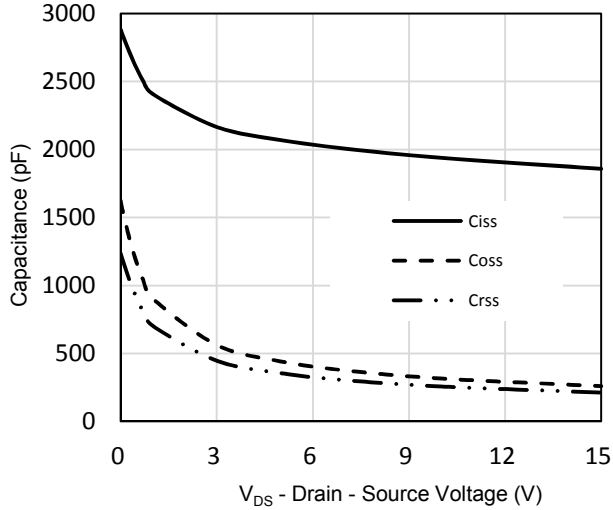


FIG. 8-Gate Charge Characteristics

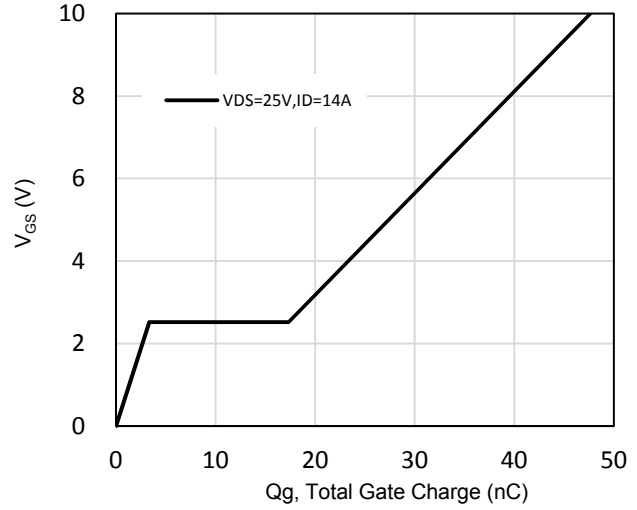


FIG. 9-Power dissipation

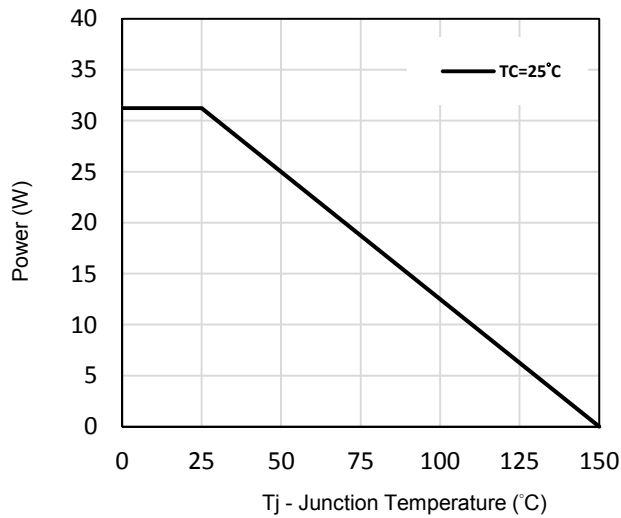


FIG. 10-Drain current

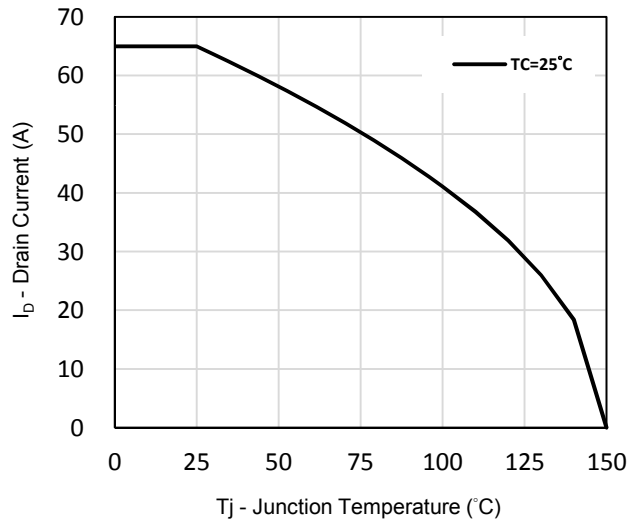
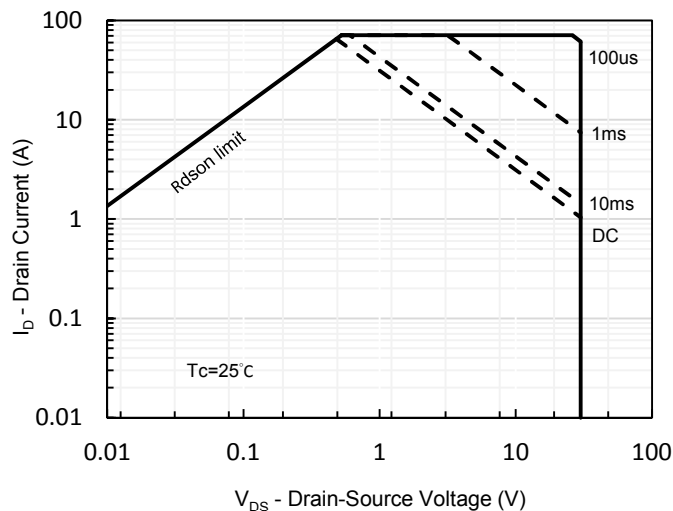


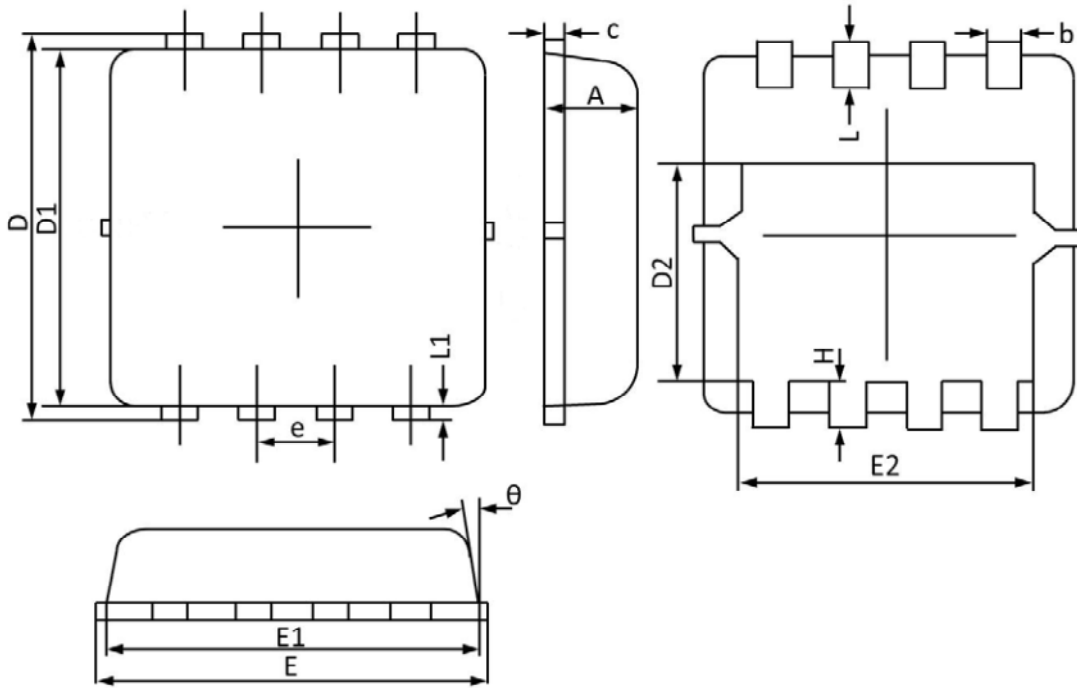
FIG. 11- Safe operating area





Package Outline Dimensions

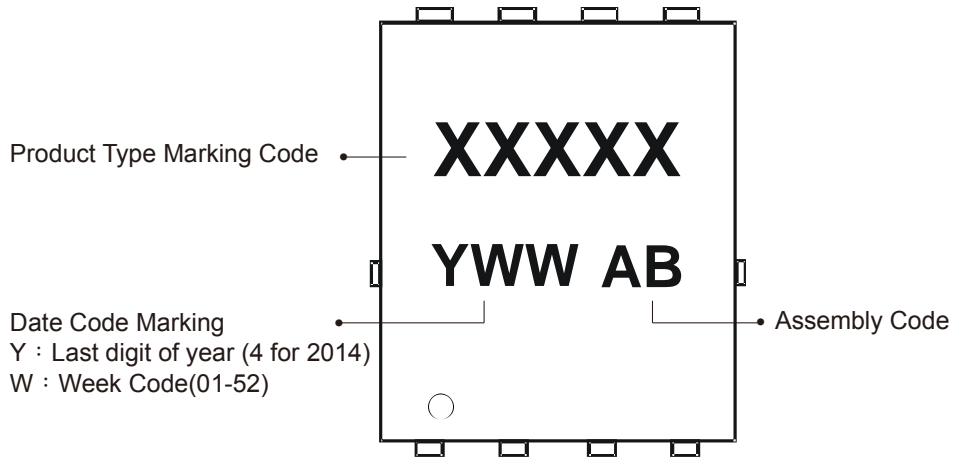
PPAK3X3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.240	0.014	0.009
c	0.250	0.100	0.010	0.004
D	3.450	3.050	0.136	0.120
D1	3.200	2.900	0.126	0.114
D2	1.850	1.350	0.073	0.053
E	3.400	3.000	0.134	0.118
E1	3.250	2.900	0.128	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.500	0.300	0.020	0.012
L	0.500	0.300	0.020	0.012
L1	0.200	0.070	0.008	0.003
θ	12°	0°	12°	0°

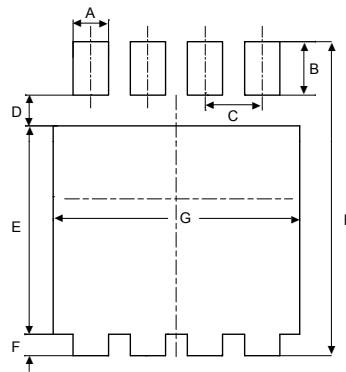


Marking Information



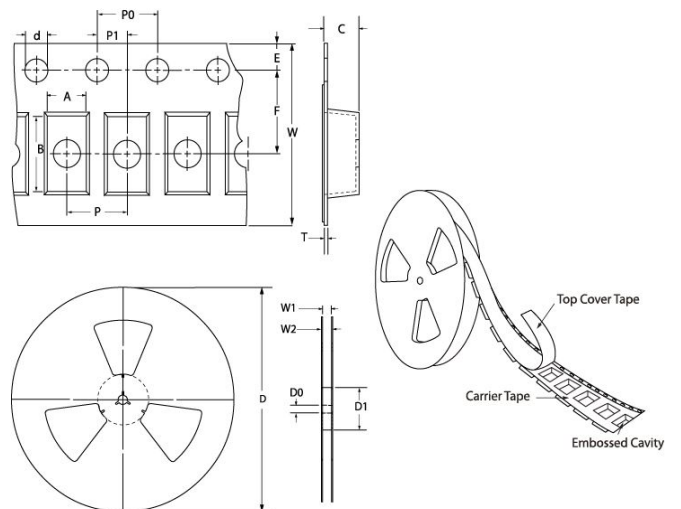
Suggested Pad Layout

Dimension	Outline	PPAK3X3 (mm)
A		0.40
B		0.60
C		0.65
D		0.35
E		2.35
F		0.25
G		2.30
H		3.55



Tape & Reel Specification

ITEM	SYMBOL	PPAK3x3 (mm)
Carrier width	A	3.55 ± 0.10
Carrier length	B	3.55 ± 0.10
Carrier depth	C	1.10 ± 0.10
Sprocket hole	d	1.50 + 0.10
Reel outside diameter	D	330 ± 2.0
Reel inner diameter	D1	23 ± 1.0
Feed hole width	D0	13.0 + 0.5
Sprocket hole position	E	1.75 ± 0.10
Punch hole position	F	5.50 ± 0.05
Punch hole pitch	P	8.00 ± 0.10
Sprocket hole pitch	P0	4.00 ± 0.10
Embossment center	P1	2.00 ± 0.05
Overall tape thickness	T	0.30 ± 0.05
Tape width	W	12.00 ± 0.30
Reel width	W2	18.4 ± 0.5
Reel width	W1	12 + 3.0





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