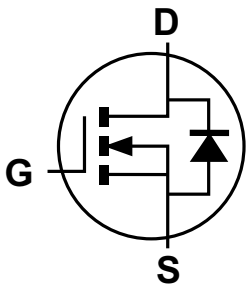
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM10N30D2

N -Channel Enhancement Mode Power MOSFET

Description

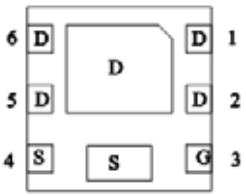
The RM10N30D2 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. This device is suitable for use as a Battery protection or in other Switching application.



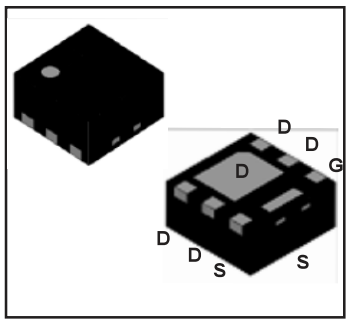
Equivalent Circuit

General Features

- **N-Channel**
- V_{DS} = 30V,I_D = 10A
  $R_{DS(ON)}$ <12mΩ @ V_{GS}=10V
  $R_{DS(ON)}$ <16mΩ @ V_{GS}=4.5V
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Halogen-free



Pin Out
Bottom View



2mmX2mm PQFN

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
10N30	RM10N30D2	PQFN 2mm x 2mm	-	-	3000units

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	10 8	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	12 9	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	2.5	A
Pulsed Drain Current (10us Pulse, Duty Cycle = 1%)			I_{DM}	50	A
Avalanche Current (Note 7) L = 0.1mH			I_{AR}	22	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AR}	24	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.73	W
	T_A = +70°C		0.47	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	174	°C/W
	t<10s		121	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.02	W
	T_A = +70°C		1.30	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	66	°C/W
	t<10s		42	
Thermal Resistance, Junction to Case (Note 6)	Steady State	$R_{\theta JC}$	11.6	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	-	2.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	9.5	12	mΩ	V_{GS} = 10V, I_D = 11A
		-	12	16		V_{GS} = 4.5V, I_D = 9A
Diode Forward Voltage	V_{SD}	-	0.70	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	1415	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	119	-		
Reverse Transfer Capacitance	C_{rss}	-	82	-		
Gate Resistance	R_g	-	2.6	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	-	11.3	-	nC	V_{DS} = 15V, I_D = 12A
Total Gate Charge (V_{GS} = 10V)	Q_g	-	25.1	-		
Gate-Source Charge	Q_{gs}	-	3.5	-		
Gate-Drain Charge	Q_{gd}	-	3.6	-		
Turn-On Delay Time	$t_{D(ON)}$	-	4.8	-	ns	V_{DD} = 15V, V_{GS} = 10V, R_L = 1.25Ω, R_g = 3Ω
Turn-On Rise Time	t_R	-	16.5	-		
Turn-Off Delay Time	$t_{D(OFF)}$	-	26.1	-		
Turn-Off Fall Time	t_F	-	5.6	-		
Reverse Recovery Time	t_{RR}	-	12.3	-	ns	I_F = 12A, di/dt = 500A/μs
Reverse Recovery Charge	Q_{RR}	-	10.4	-	nC	

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

RATING AND CHARACTERISTICS CURVES (RM10N30D2)

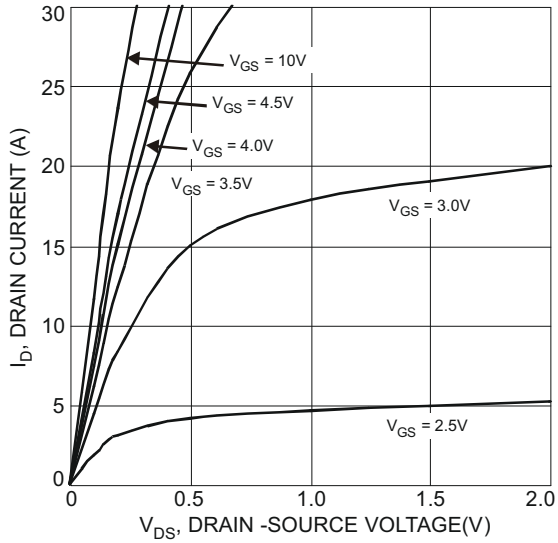


Fig. 1 Typical Output Characteristics

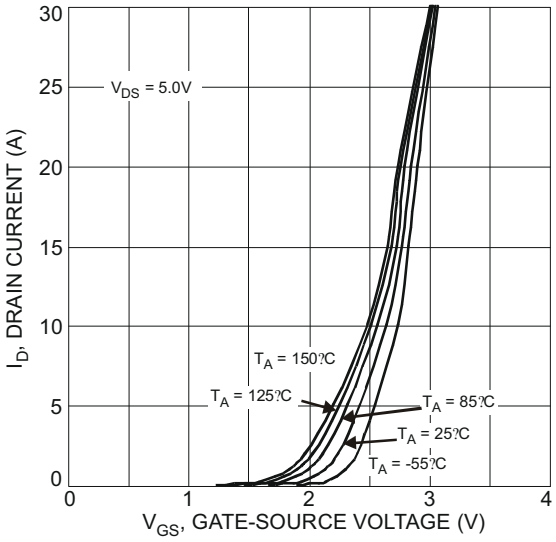


Fig. 2 Typical Transfer Characteristics

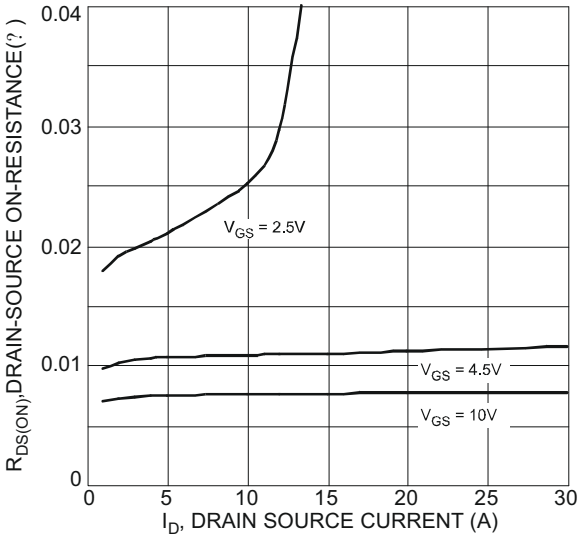


Fig. 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

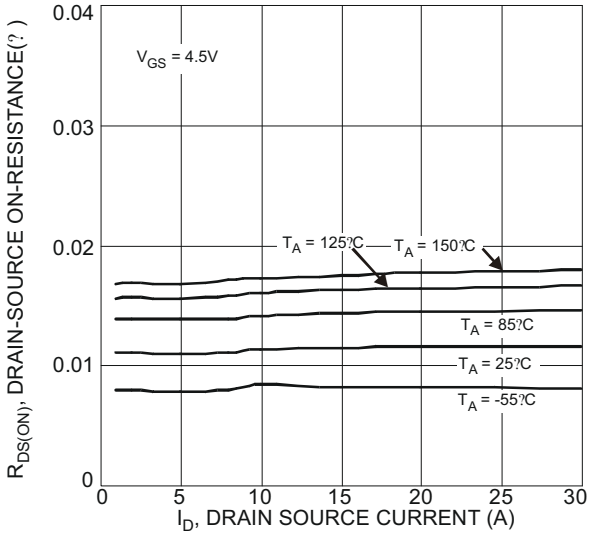


Fig. 4 Typical On-Resistance vs.
Drain Current and Temperature

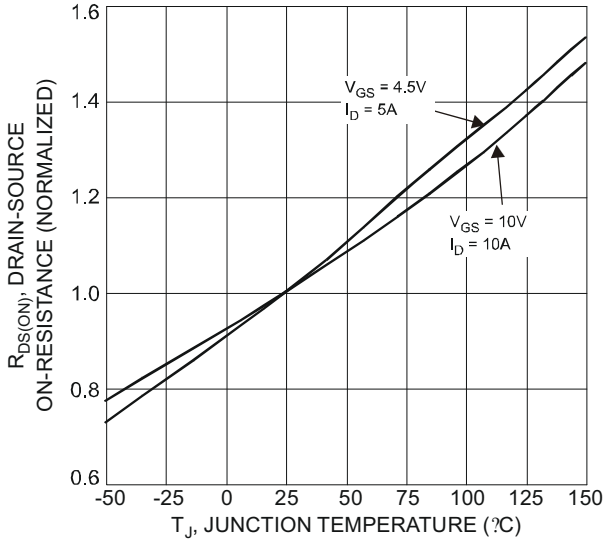


Fig. 5 On-Resistance Variation with Temperature

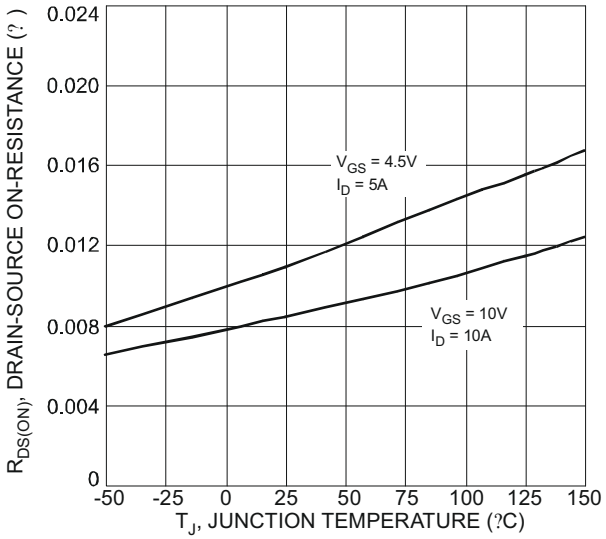


Fig. 6 On-Resistance Variation with Temperature

RATING AND CHARACTERISTICS CURVES (RM10N30D2)

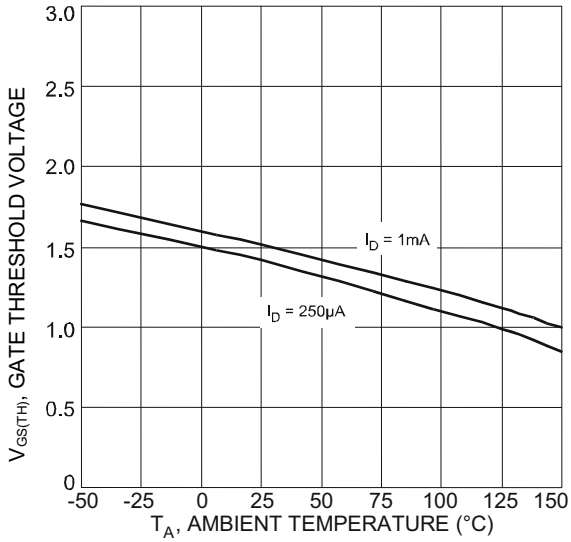


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

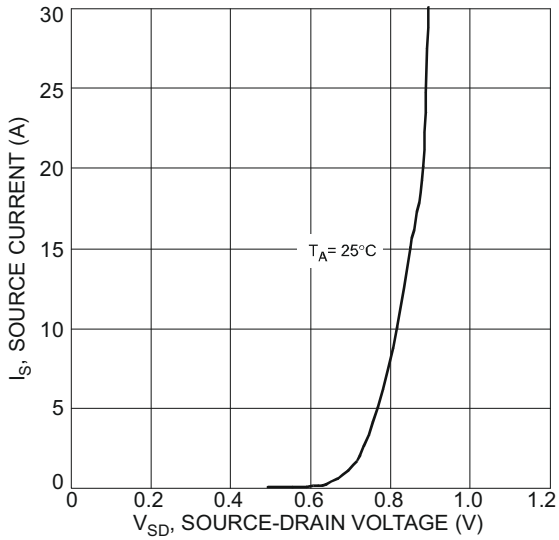


Fig. 8 Diode Forward Voltage vs. Current

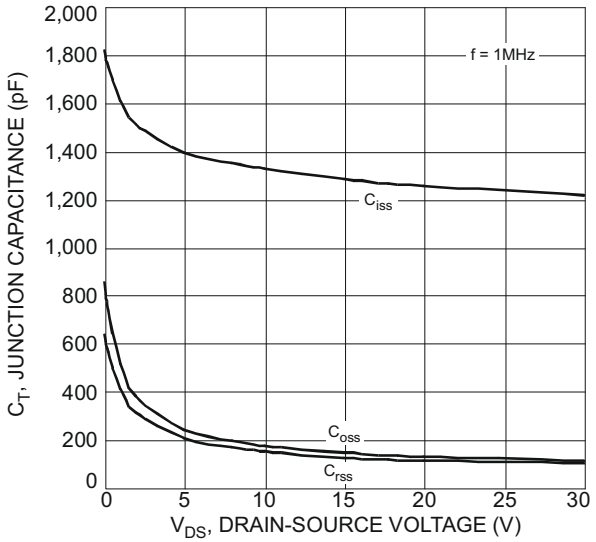


Fig. 9 Typical Junction Capacitance

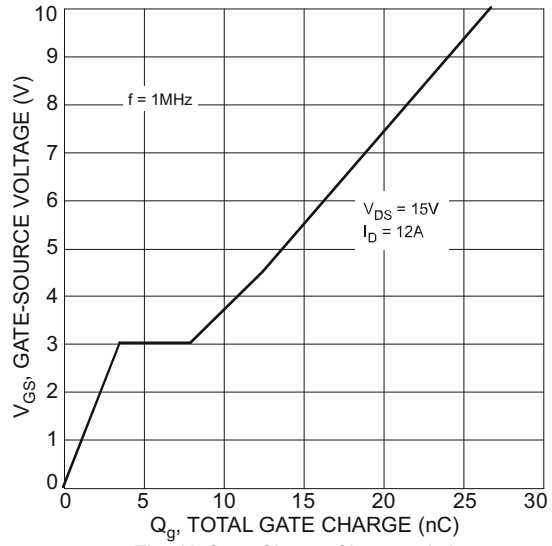


Fig. 10 Gate-Charge Characteristics

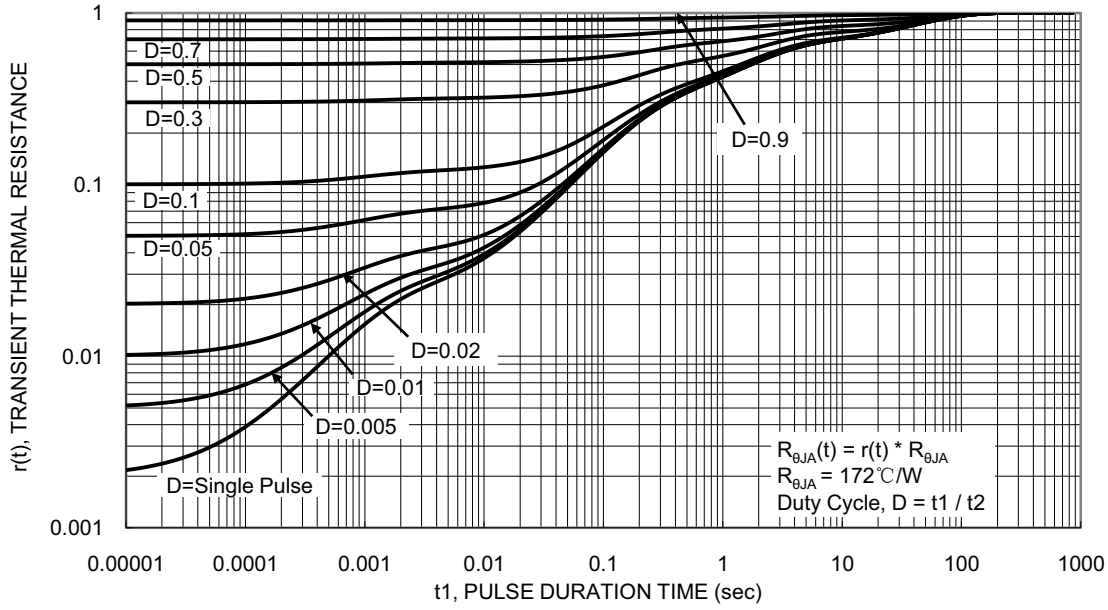
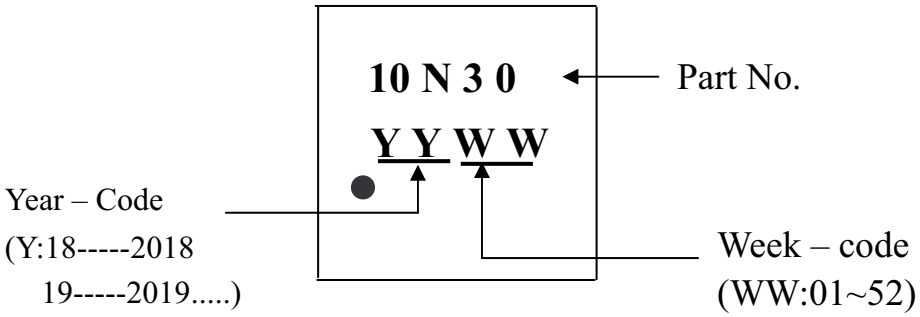


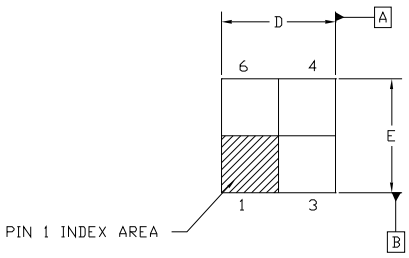
Figure 11. Transient Thermal Resistance

Marking on the body

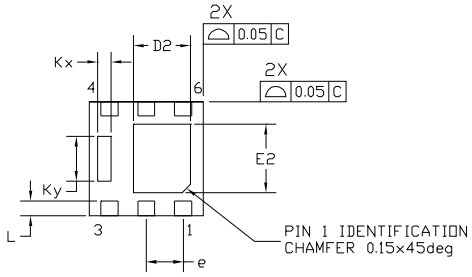


PQFN 2x2 Outline Package Details

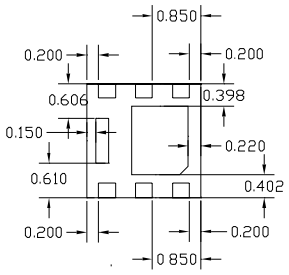
TOP VIEW

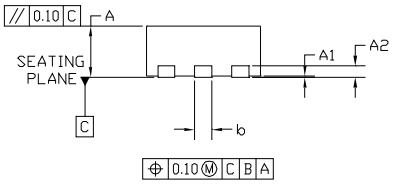


BOTTOM VIEW



BOTTOM VIEW
FOOTPRINT DIMENSION





SIDE VIEW

NOTES :

1. DIMENSION AND TOLERANCING CONFORM TO ASME Y14.5M-1994.
2. CONTROLLING DIMENSIONS : MILLIMETER
3. DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm. FROM TERMINAL TIP.

SYMBOL	COMMON		
	DIMENSIONS MILLIMETER		
	MIN.	NOM.	MAX.
A	0.30	0.50	0.70
A1	0.00	0.02	0.05
A2		0.203 REF	
b	0.25	0.30	0.35
D	1.90	2.00	2.10
D2	0.95	1.00	1.05
E	1.90	2.10	2.30
E2	1.15	1.20	1.25
e		0.65 BSC	
L	0.20	0.26	0.32
Kx		0.23 REF	
Ky		0.785 REF	

PQFN 2x2 Outline Tape and Reel

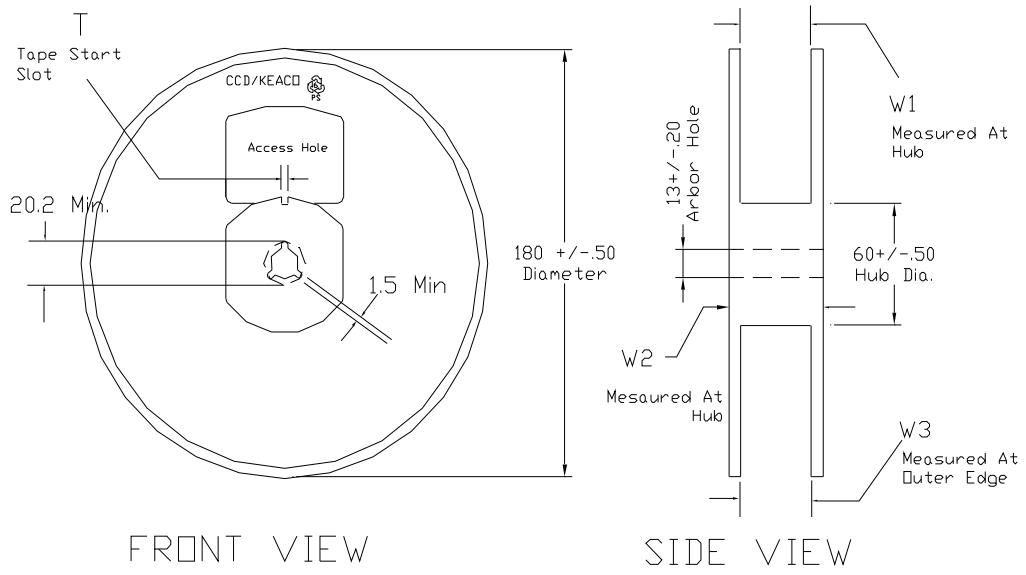
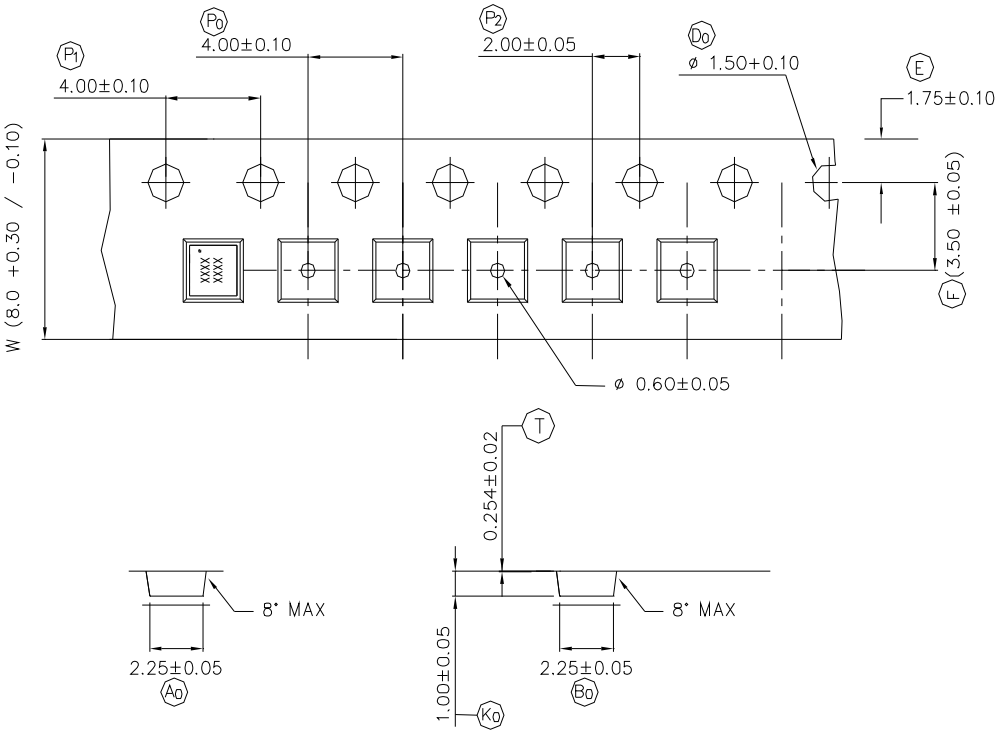


TABLE 1: REEL DETAILS

TAPE WIDTH	T	W1	W2	W3	PART NO
8 MM	3 ± 0.50	$8.4^{+1.5}_{-0.0}$	14.4 Max	7.90 Min 10.9 Max	91586-1
12 MM	5 ± 0.50	$12.4^{+2.0}_{-0.0}$	18.4 Max	11.9 Min 15.4 Max	91586-2

Note: Surface resistivity is $\geq 1x10^{5}$ but $< 1x10^{12}$ ohm/sq.



NOTE: The Surface Resistivity is $10^{4} - 10^{8}$ OHM/SQ

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