

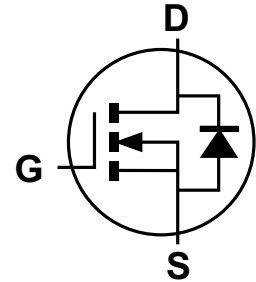
N -Channel Enhancement Mode Power MOSFET

Description

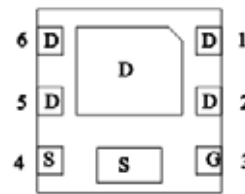
The RM10N30D2 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. This device is suitable for use as a Battery protection or in other Switching application.

General Features

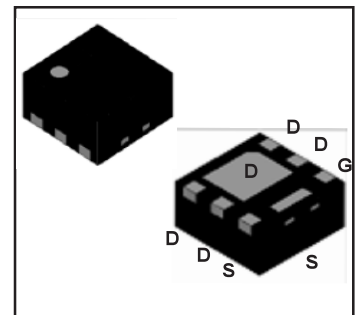
- N-Channel
- $V_{DS} = 30V, I_D = 10A$
 $R_{DS(ON)} < 12m\Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 16m\Omega @ V_{GS}=4.5V$
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Halogen-free



Equivalent Circuit



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	$T_A = +25^\circ C$	I_D	10	A
		$T_A = +70^\circ C$		8	
Continuous Drain Current (Note 6) $V_{GS} = 10V$	$t < 10s$	$T_A = +25^\circ C$	I_D	12	A
		$T_A = +70^\circ C$		9	
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 _{θJA}	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 _{θJA}	66	°C/W
	t < 10s		42	
Thermal Resistance, Junction to Case (Note 6)	Steady State	R _{θJC}	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:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

RATING AND CHARACTERISTICS CURVES (RM10N30D2)

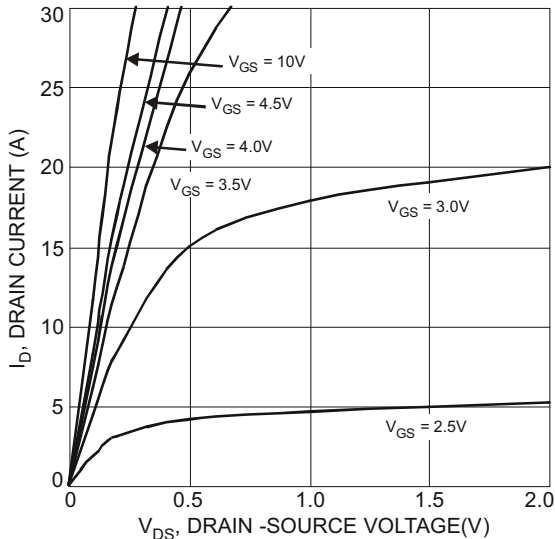


Fig. 1 Typical Output Characteristics

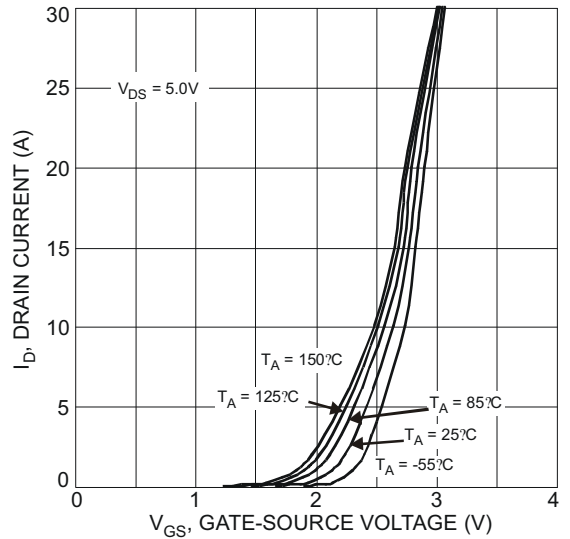


Fig. 2 Typical Transfer Characteristics

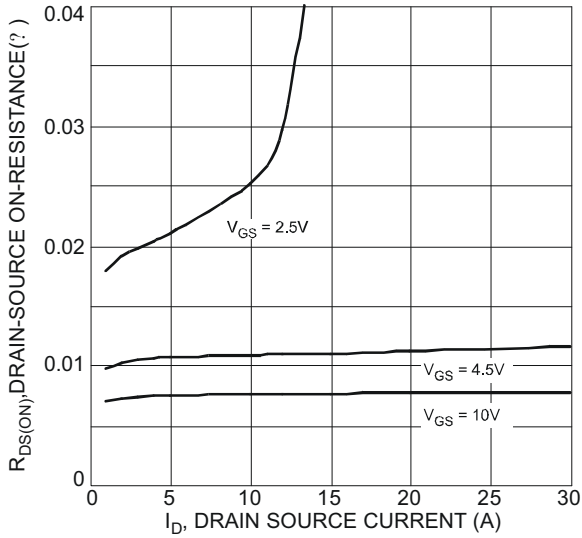


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

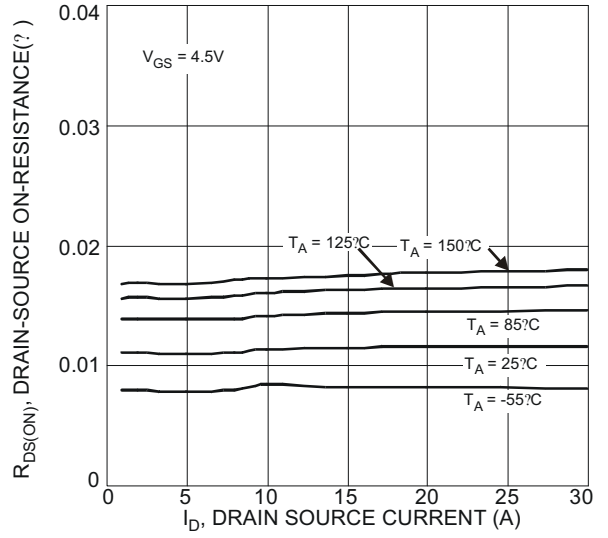


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

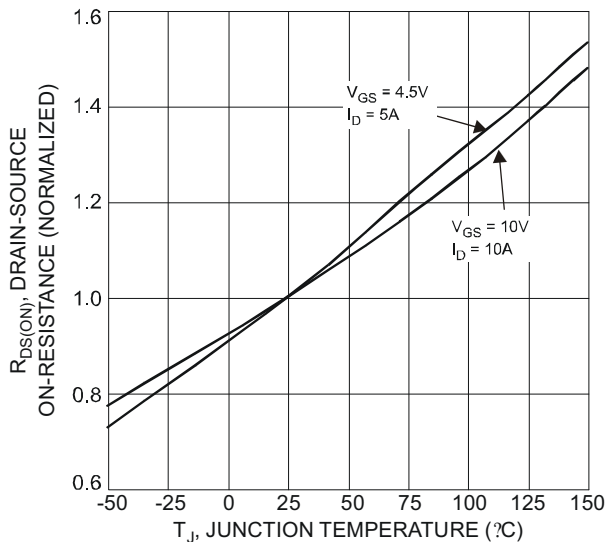


Fig. 5 On-Resistance Variation with Temperature

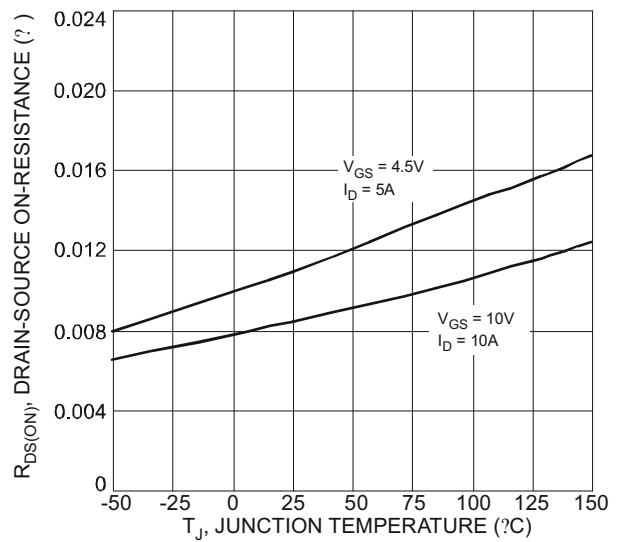


Fig. 6 On-Resistance Variation with Temperature

RATING AND CHARACTERISTICS CURVES (RM10N30D2)

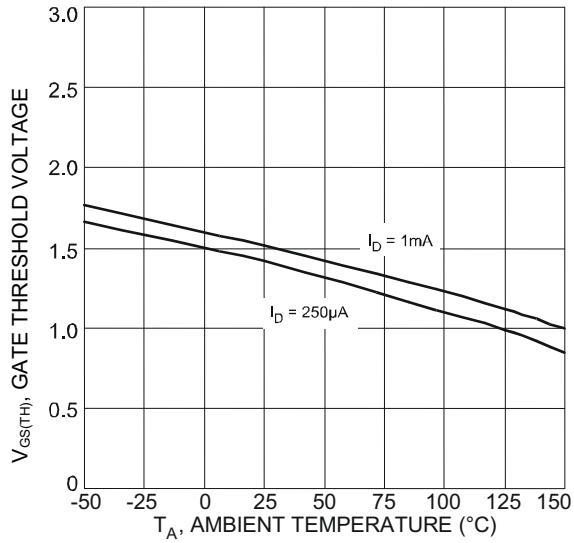


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

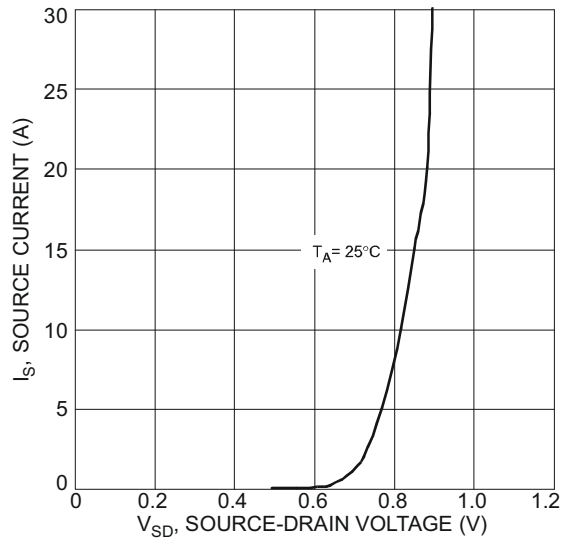


Fig. 8 Diode Forward Voltage vs. Current

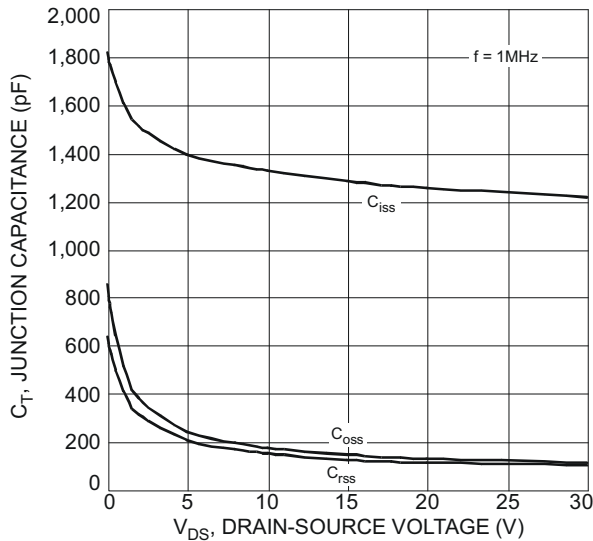


Fig. 9 Typical Junction Capacitance

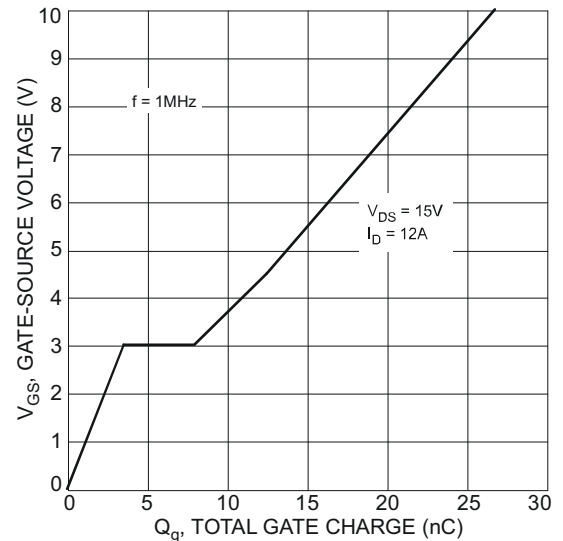


Fig. 10 Gate-Charge Characteristics

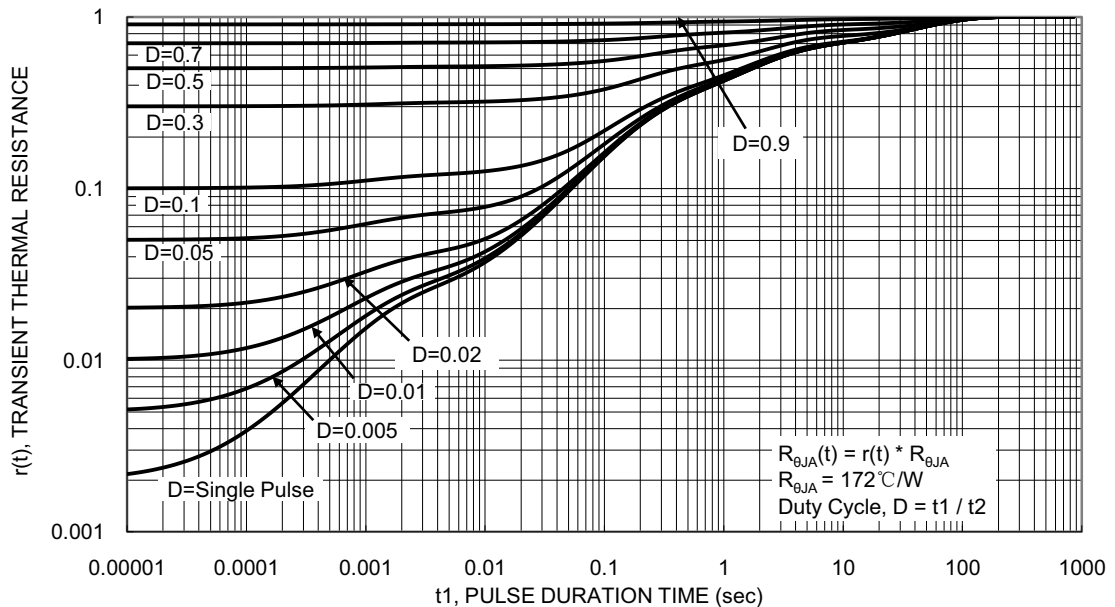
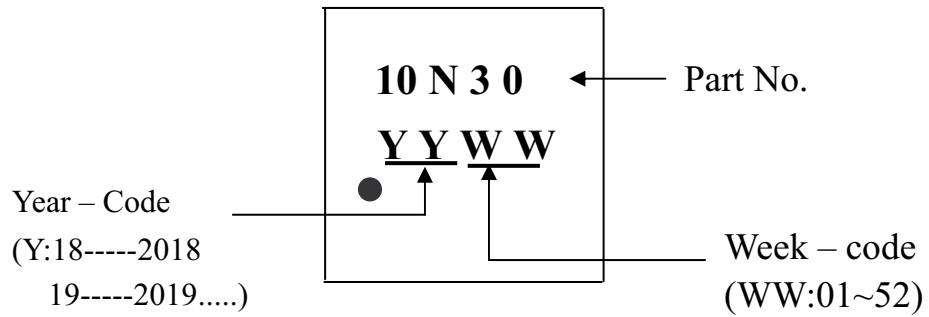


Figure 11. Transient Thermal Resistance



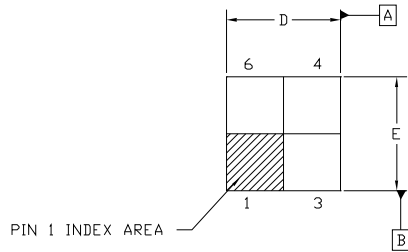
RECTRON

Marking on the body

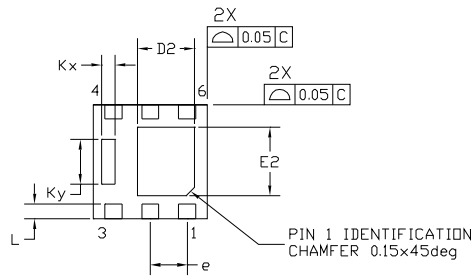


PQFN 2x2 Outline Package Details

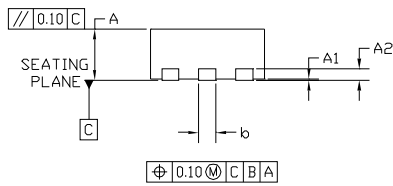
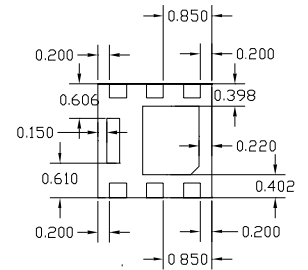
TOP VIEW



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

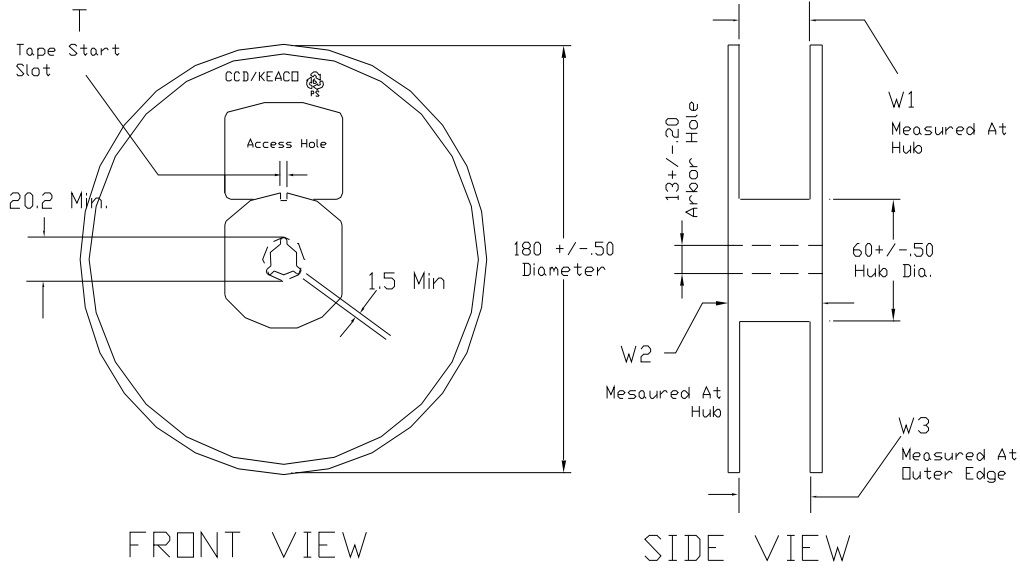
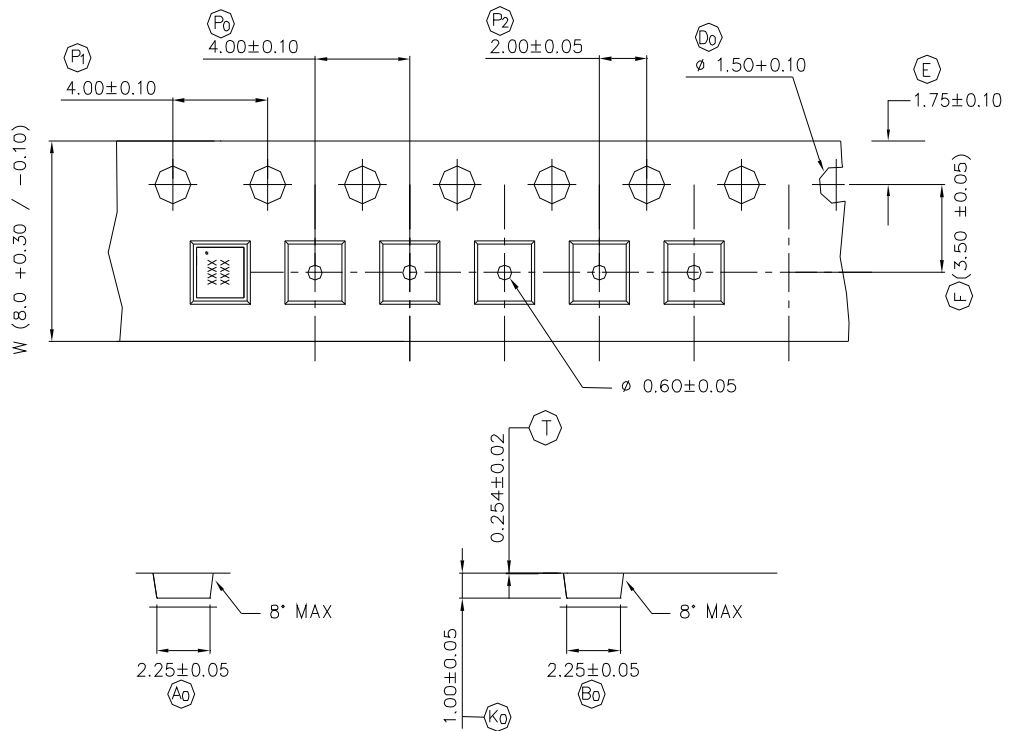


TABLE 1: REEL DETAILS

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 $\geq 1 \times 10^5$ but $< 1 \times 10^{12}$ ohm/sq.



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