

FEATURES

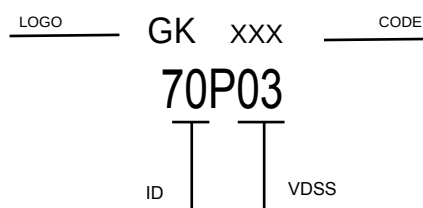
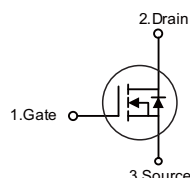
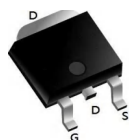
Green Device Available
Super Low Gate Charge
Excellent CdV/dt effect decline
Advanced high cell density Trench technology

DESCRIPTION

The 70P03 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The 70P03 meet the RoHS and Gree Product requirement 100% EAS guaranteed with full function reliability approved.
100% EAS Guaranteed

V_{DS}	-30 V
I_D	-70 A
$R_{DS(ON)}$	5.4m Ω



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current@ -10V ¹	$T_C=25^\circ\text{C}$	I_D	-70	A
	$T_C=75^\circ\text{C}$		-42	
Pulsed Drain Current ²		I_{DM}	-175	A
Single Pulse Avalanche Energy ³		EAS	31	mJ
Avalanche Current		I_{AS}	-25	A
Total Power Dissipation ⁴	$T_C=25^\circ\text{C}$	P_D	31.2	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ¹	$R_{\theta JA}$	43	$^\circ\text{C/W}$
Thermal Resistance from Junction-to-Case ¹	$R_{\theta JC}$	4	$^\circ\text{C/W}$

Electrical characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-30	-	-	V
Gate-body Leakage current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = -24V, V _{GS} = 0V	-	-	-1	μA
	T _J =55°C			-	-	-5	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.0	-1.6	-2.5	V
Drain-Source On-Resistance ²		R _{DS(on)}	V _{GS} = -10V, I _D = -12A	-	5.4	7	mΩ
			V _{GS} = -4.5V, I _D = -8A	-	7	10	
Forward Transconductance		g _{fs}	V _{DS} = -5V, I _D = -20A	-	28	-	S
Dynamic Characteristics							
Input Capacitance		C _{iss}	V _{DS} = -15V, V _{GS} =0V, f =1MHz	-	4320	-	pF
Output Capacitance		C _{oss}		-	529	-	
Reverse Transfer Capacitance		C _{rss}		-	487	-	
Switching Characteristics							
Gate Resistance		R _g	V _{DS} = 0V, V _{GS} = 0V, f=1.0MHz	-	4.0	-	Ω
Total Gate Charge		Q _g	V _{GS} = -10V, V _{DS} = -15V, I _D = -15A	-	45	-	nC
Gate-Source Charge		Q _{gs}		-	8.5	-	
Gate-Drain Charge		Q _{gd}		-	12.8	-	
Turn-On Delay Time		t _{d(on)}	V _{GS} = -10V, V _{DD} = -15V, R _G = 2.5Ω, I _D = -15A	-	18.9	-	nS
Rise Time		t _r		-	15.7	-	
Turn-Off Delay Time		t _{d(off)}		-	64.8	-	
Fall Time		t _f		-	36.5	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ²		V _{SD}	I _S = -1A, V _{GS} = 0V	-	-	-1	V
Continuous Source Current ^{1,5}		I _S	V _G =V _D =0V , Force Current	-	-	-80	A

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD} = -25V, V_{GS} = -10V, L = 0.1\text{mH}, I_{AS} = -25A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

RATING AND CHARACTERISTIC CURVES

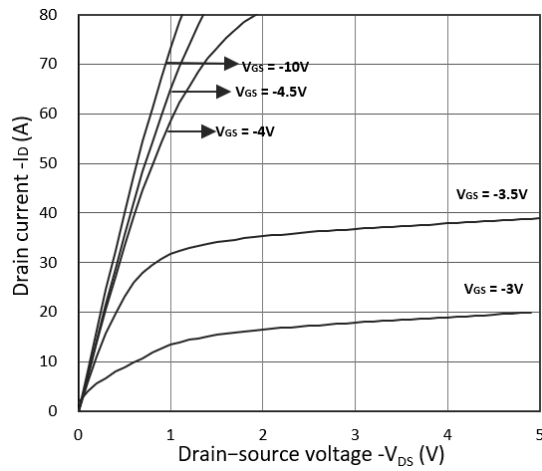


Figure 1. Output Characteristics

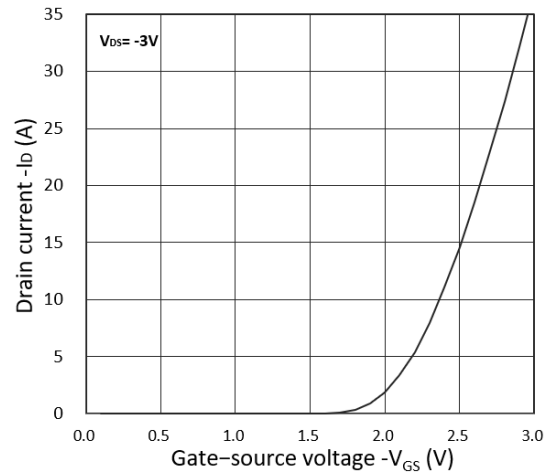


Figure 2. Transfer Characteristics

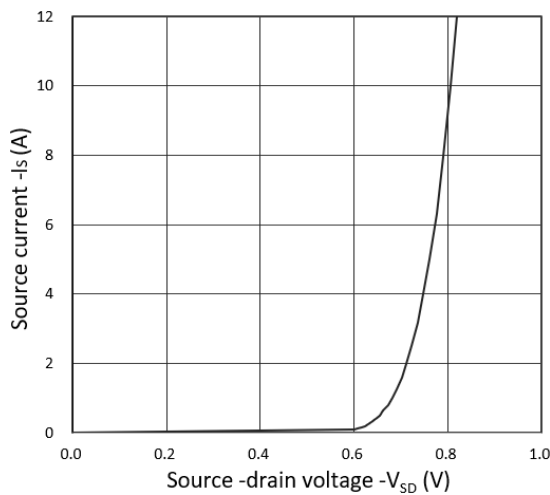


Figure 3. Forward Characteristics of Reverse

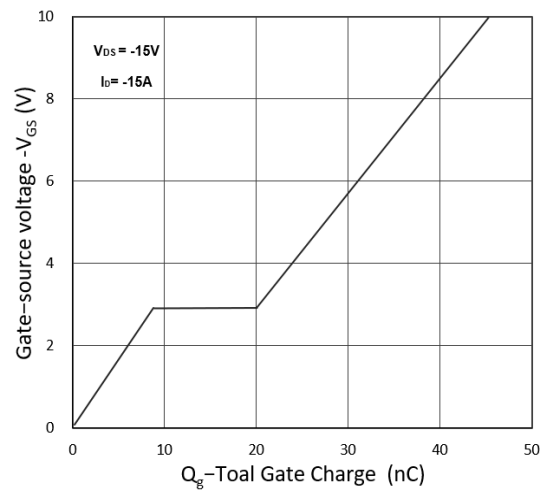


Figure 4. Gate Charge Characteristics

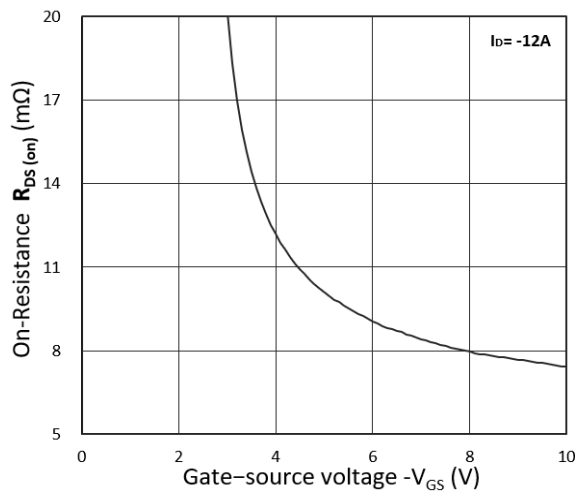


Figure 5. $R_{DS(on)}$ vs. V_{GS}

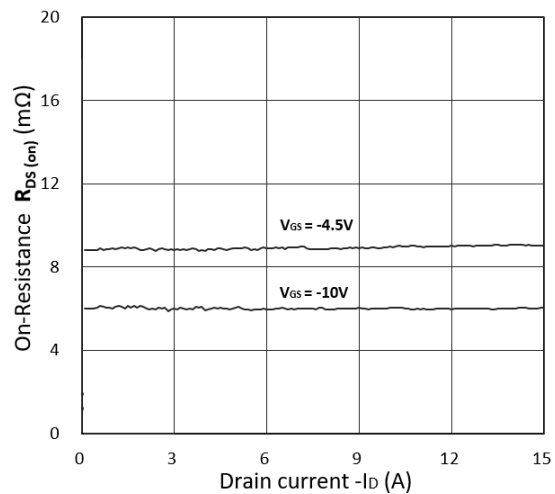


Figure 6. $R_{DS(on)}$ vs. I_D

RATING AND CHARACTERISTIC CURVES

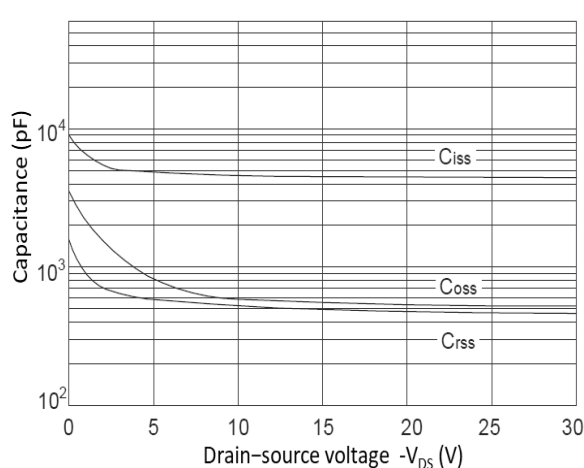


Figure 7. Capacitance Characteristics

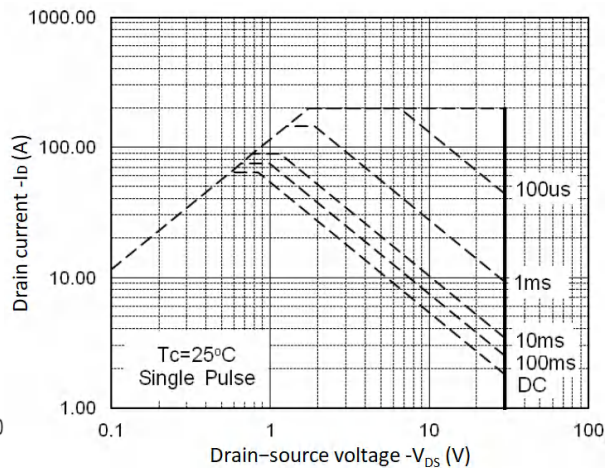


Figure 8. Safe Operating Area

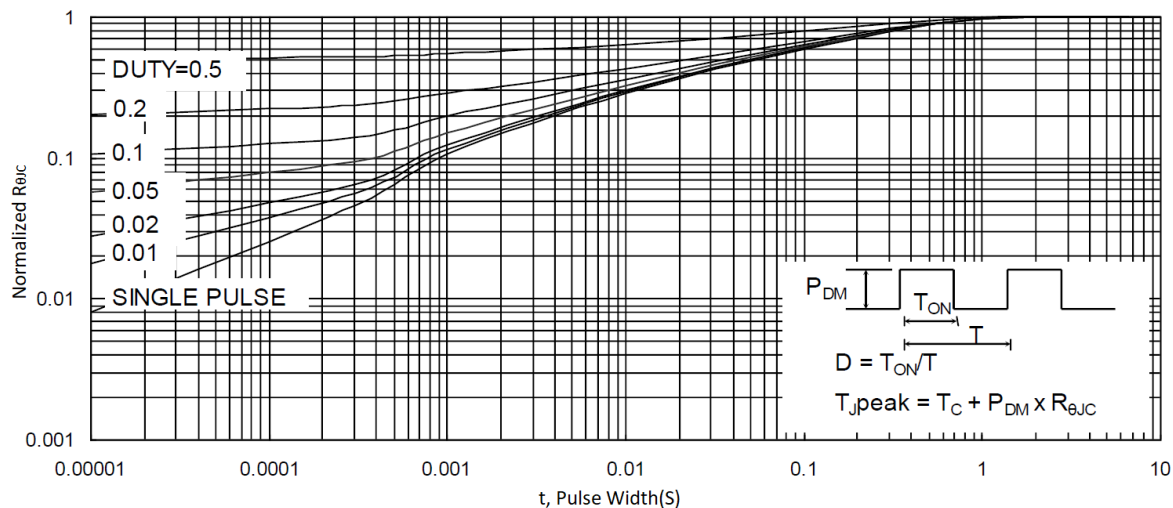


Figure 9. Normalized Maximum Transient Thermal Impedance

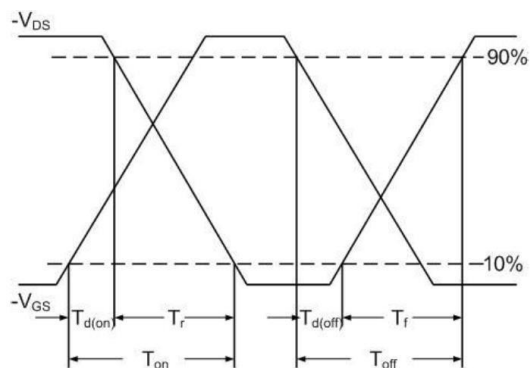


Figure 10. Switching Time Waveform

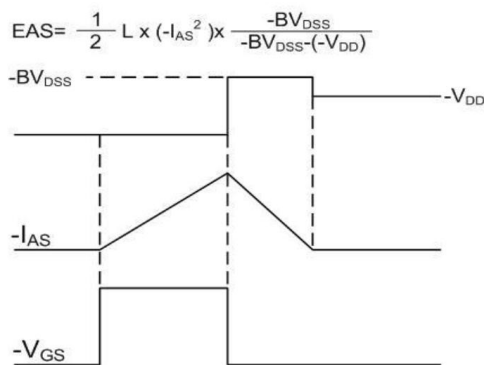
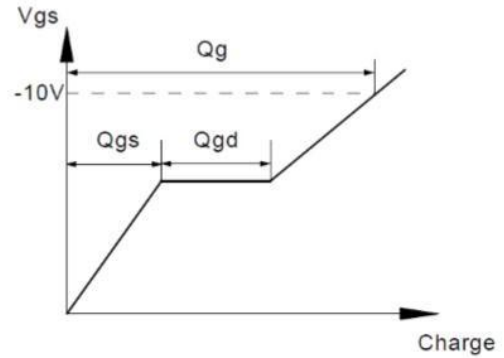
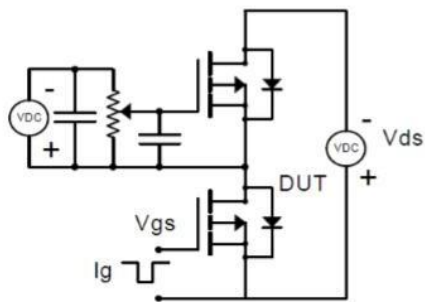


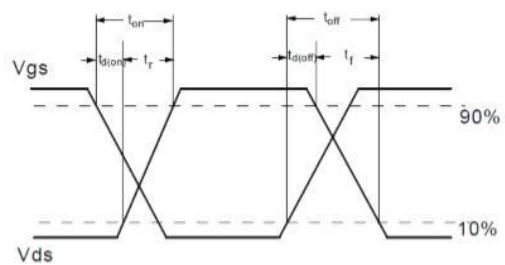
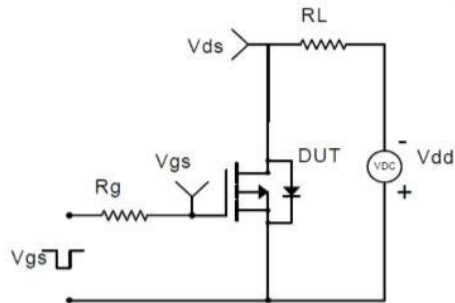
Figure 11. Unclamped Inductive Switching
Waveform

Test Circuit

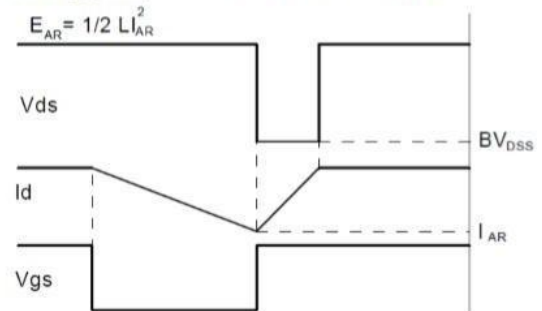
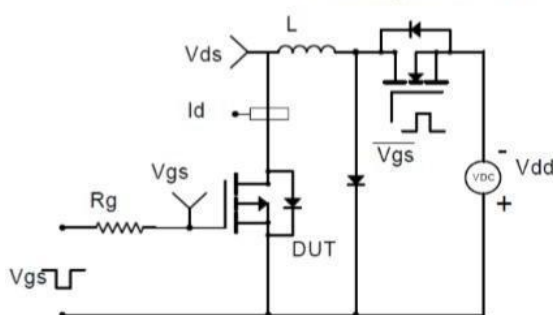
Gate Charge Test Circuit & Waveform



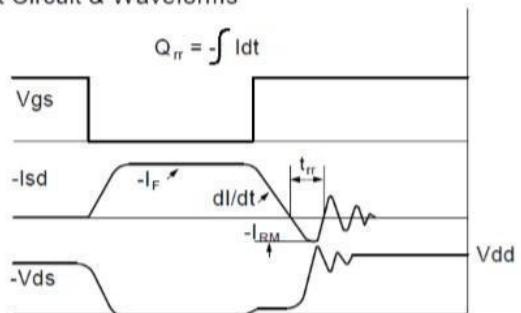
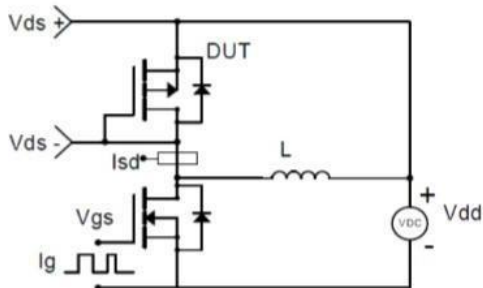
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

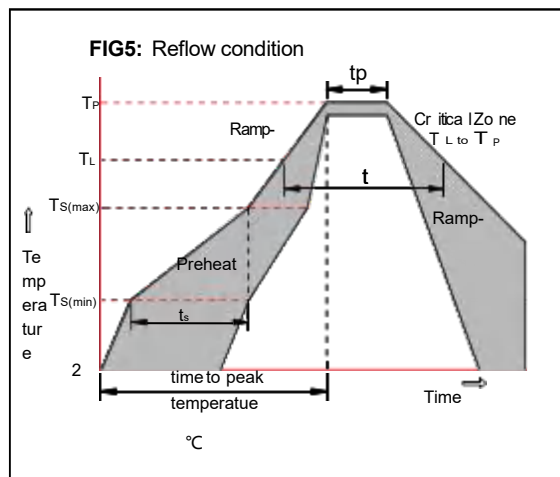


Diode Recovery Test Circuit & Waveforms



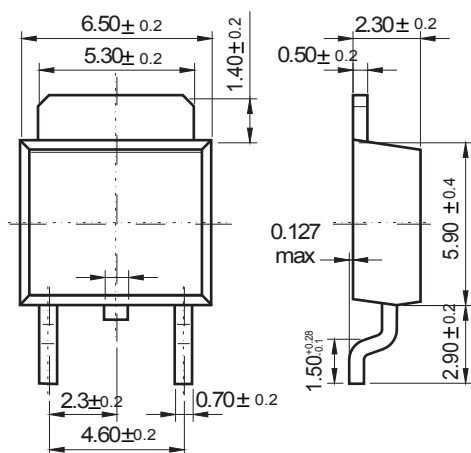
Soldering parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C

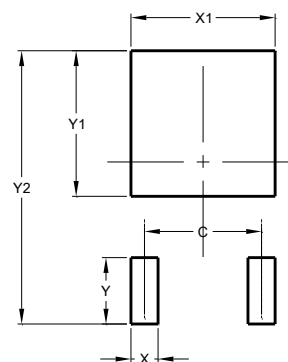


Package Dimensions & Suggested Pad Layout

TO-252

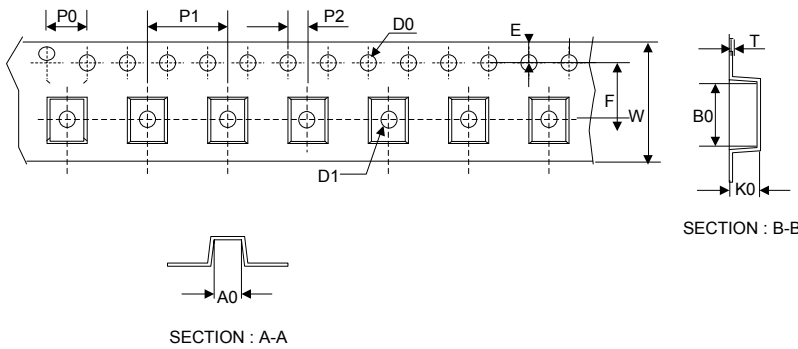
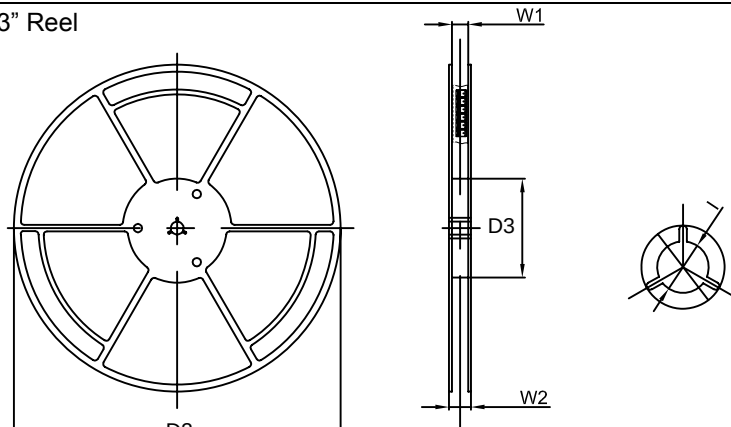


Dimensions in inches and (millimeters)



Dimensions	Value (in mm)
C	4.55
X	1.50
X1	5.80
Y	2.70
Y1	6.00
Y2	10.90

Tape & reel specification

Tape		Symbol	Dimension (mm)
		P0	4.00±0.20
		P1	8.00±0.20
		P2	2.00±0.20
		D0	1.55±0.15
		D1	1.55±0.20
		E	1.75±0.20
		F	7.50±0.20
		W	16.00±0.20
		A0	7.10±0.20
		B0	10.50±0.20
		K0	2.70±0.20
		T	0.30±0.10
		D2	330.0±5.0
		D3	100.0±4.0
		W1	20.0±5.0
13" Reel		W2	25.0±5.0
		I	13.0±2.0
		Quantity: 2500PCS	