GKC65R900S

650V N-Channel COOLMOS

V_{DSS}	650	V
I_D	4	A
$R_{DS(ON)}$	0.908	Ω

Features

Ultra low $R_{DS(on)}$

Ultra low gate charge (typ. Q_g=10nC)

100% UIS tested

RoHS compliant

GK XXX
C65R900

Applications

Power factor correction (PFC).

Switched mode power supplies (SMPS).

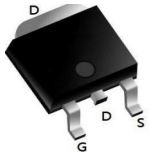
Uninterruptible power supply (UPS).

LOGO GK XXX CODE

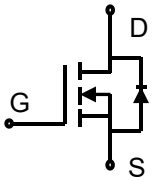
C65 R 900

VDSS $R_{DS(on)}$

TO-252



Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (@ T = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	650	V
Continuous drain current [1] (T_C = 25°C)	I_D	4	A
(T_C = 100°C)		3.2	A
Pulsed drain current [2]	I_{DM}	12	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse [3]	E_{AS}	120	mJ
Power Dissipation	P_D	60	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current	I_S	4	A
Diode pulse current	$I_{S,pulse}$	12	A

ELECTRICAL CHARACTERISTICS (T_C =25°C, unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.5	3.7	4.5	V
Drain cut-off current	I_{DSS}	V_{DS}=650V, V_{GS}=0 V,T_j =25°C	-	-	1	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=30V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-30V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=2A T_j = 25°C T_j = 150°C	- - -	 0.908 2.27	 0.95 -	Ω
Gate resistance	R_G	f=1 MHz, open drain	-	8.13	-	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} =100V, V_{GS}=0V, f=250kHz	-	357.06	-	pF
Output capacitance	C_{oss}		-	16.46	-	
Reverse transfer capacitance	C_{rss}		-	0.42	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} =400V, I_D=2A R_G = 10Ω, V_{GS}=10V	-	26.9	-	ns
Rise time	t_r		-	11.1	-	
Turn-off delay time	$t_{d(off)}$		-	25.8	-	
Fall time	t_f		-	35.3	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=520V, I_D=2A, V_{GS}=0 to 10 V	-	1.9	-	nC
Gate to drain charge	Q_{gd}		-	5.0	-	
Gate charge total	Q_g		-	10.0	-	
Gate plateau voltage	$V_{plateau}$		-	5.41	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=2A	-	-	1.1	V
Reverse recovery time	t_{rr}	V_R=400V, I_F=2A, dI_F/dt=100 A/μs	-	191.6	-	ns
Reverse recovery charge	Q_{rr}		-	858.6	-	nC
Peak reverse recovery current	I_{rrm}		-	10.53	-	A

Notes:

1. Limited by maximum junction temperature and duty cycle.
2. Limited by maximum junction temperature, maximum duty cycle is 0.75.
3. I_{AS}=2A, L=60mH, V_{DD}=60V, Starting Tj= 25°C.
4. The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot.

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.08	°C/W
Thermal Resistance, Junction-to-Ambient, minimal Footprint [4)]	$R_{\theta JA}$	62	°C/W
Soldering temperature, wave soldering only allowed at leads. (1.6mm from case for 10s)	T_{sold}	260	°C

RATING AND CHARACTERISTIC CURVES

Fig 1: Output Characteristics

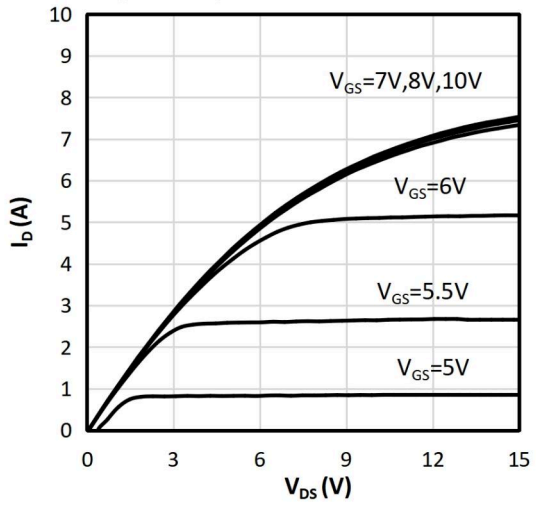


Fig 2: Transfer Characteristics

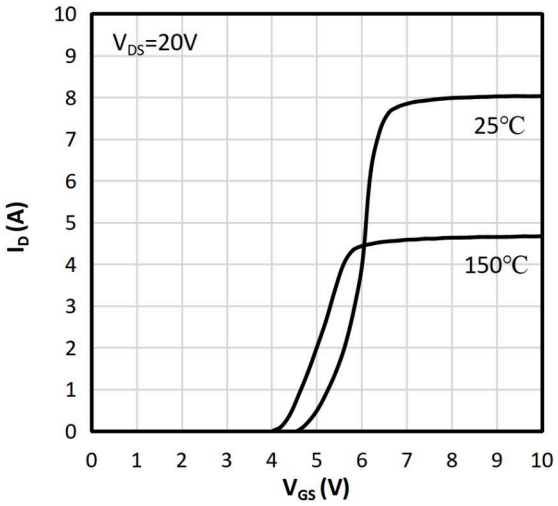


Fig 3: Rds(on) vs Drain Current

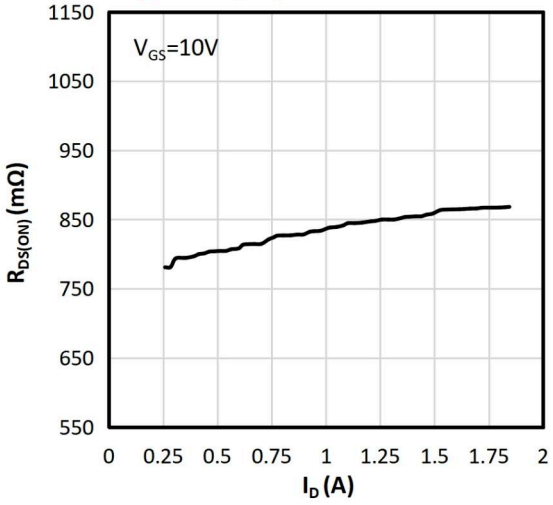


Fig 4: Rds(on) vs. Temperature

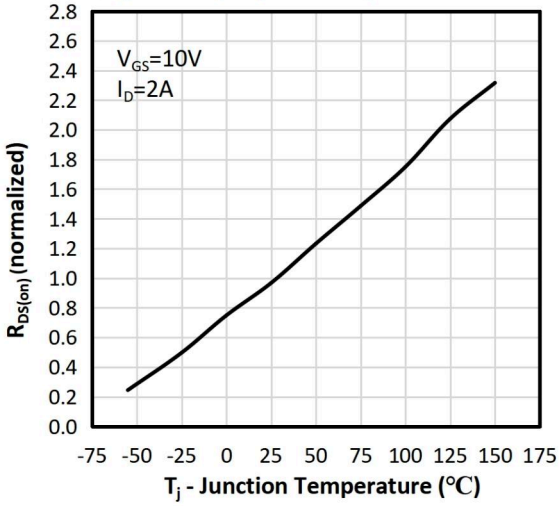


Fig 5: Breakdown Voltage vs. Temperature

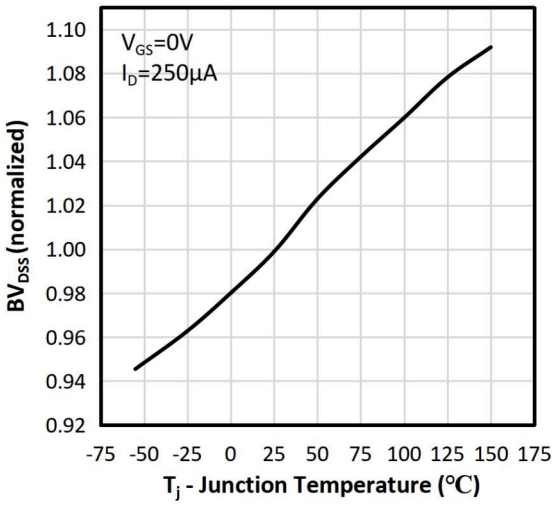
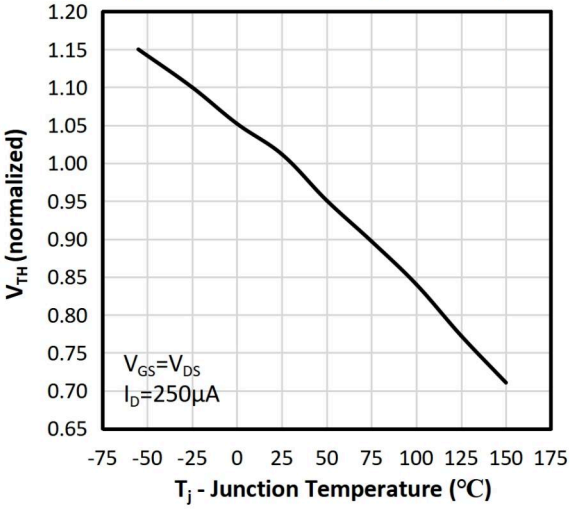


Fig 6: Threshold voltage vs. Temperature



RATING AND CHARACTERISTIC CURVES

Fig 7: Body-Diode Characteristics

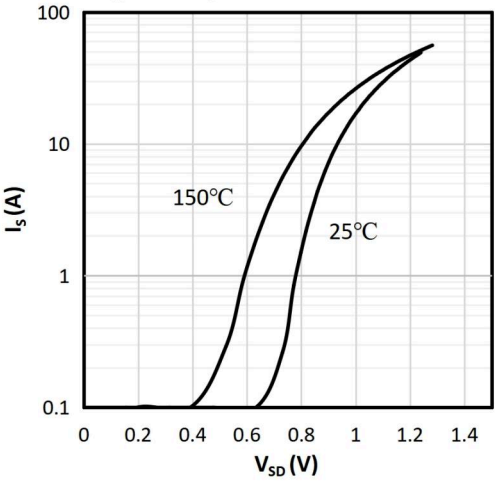


Fig 8: Capatitance Characteristics

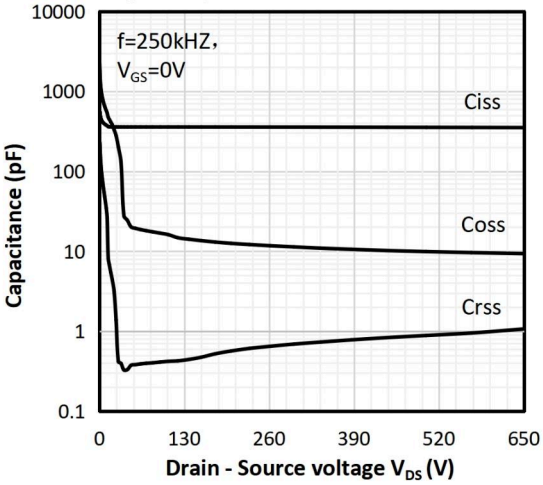


Fig 9: Gate charger Characteristics

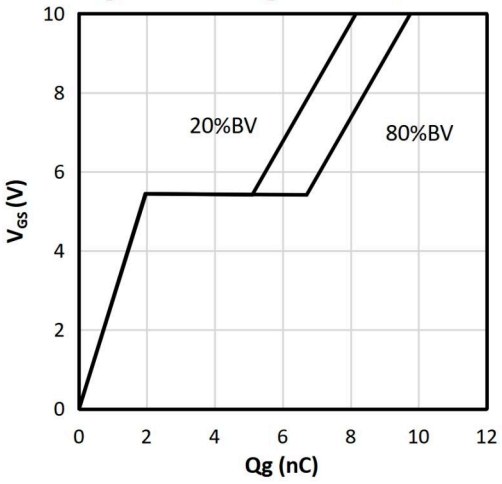


Fig 10: Drain Current Derating

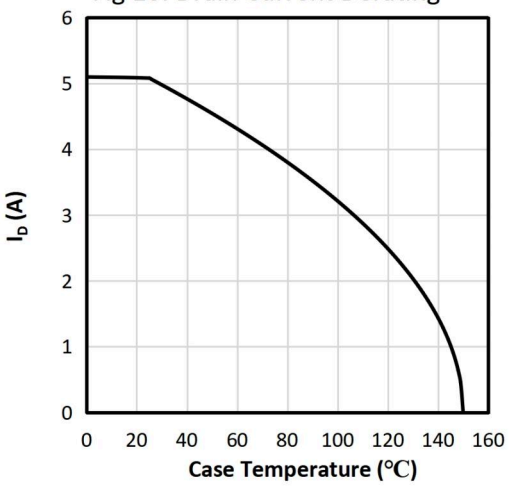


Fig 11: Power Dissipation vs.Temperature

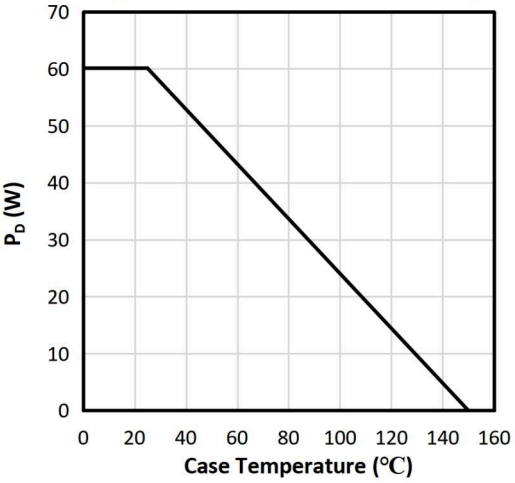
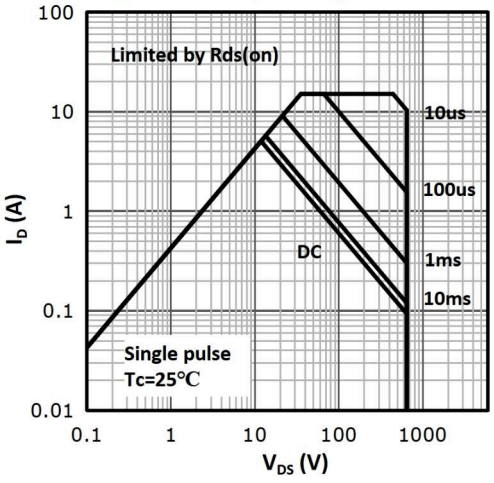
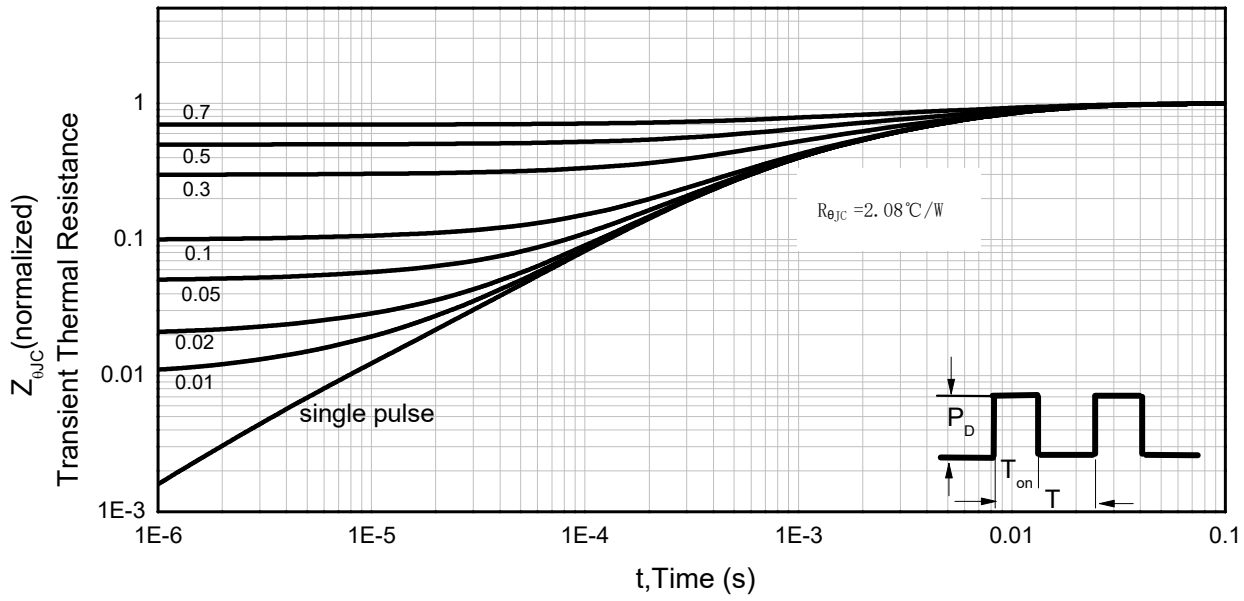


Fig 12: Safe Operating Area

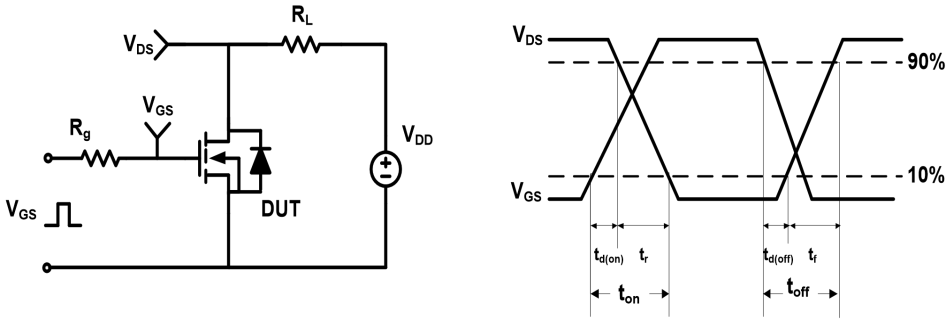


RATING AND CHARACTERISTIC CURVES

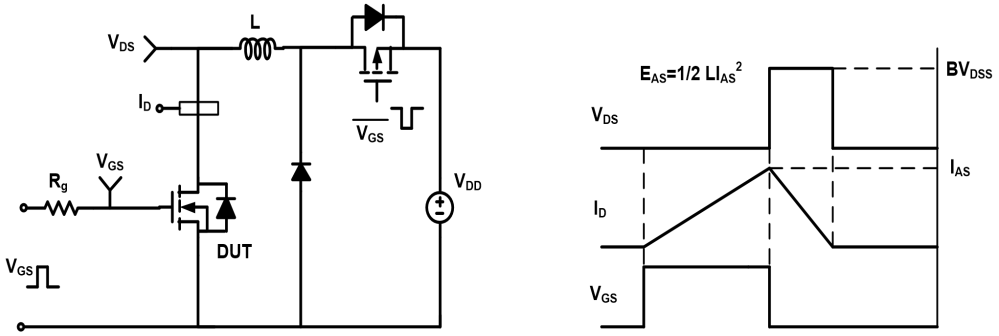
Figure 13. Normalized Maximum Transient Thermal Impedance (R_{thJC})



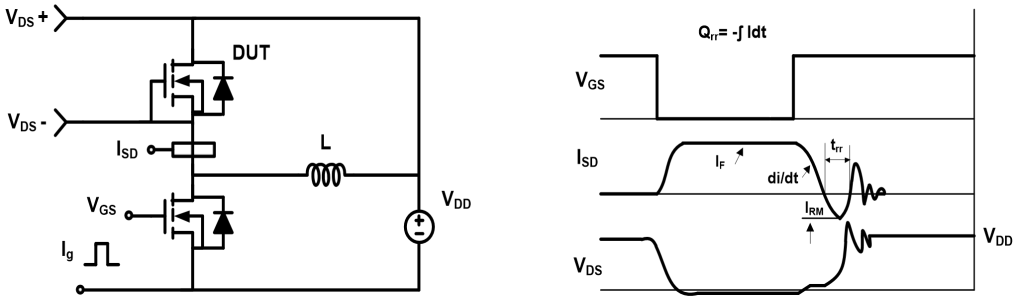
Test Circuit



Unclamped Inductive Switching (UIS) Test Circuit & Waveform



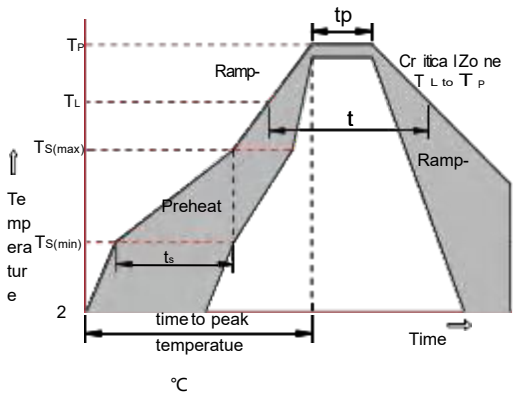
Diode Recovery Test Circuit & Waveform



Soldering parameters

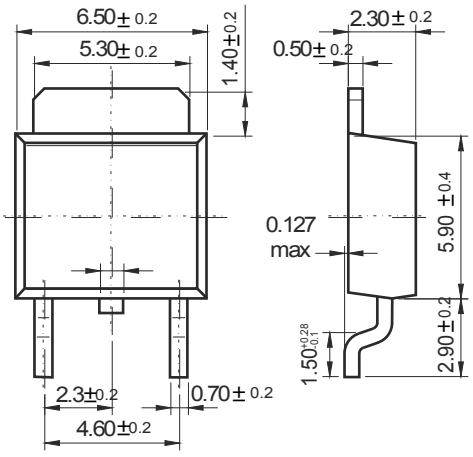
Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid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

FIG5: Reflow condition

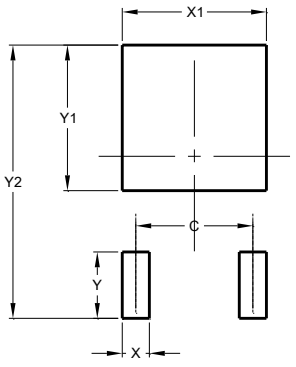


Package Dimensions & Suggested Pad Layout

TO-252



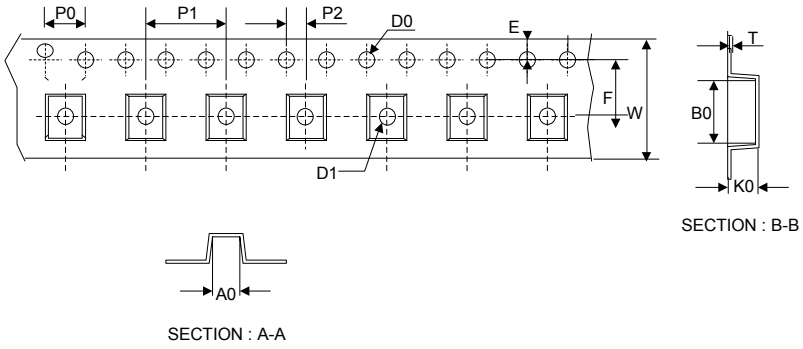
Dimensions in inches and (millimeters)



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

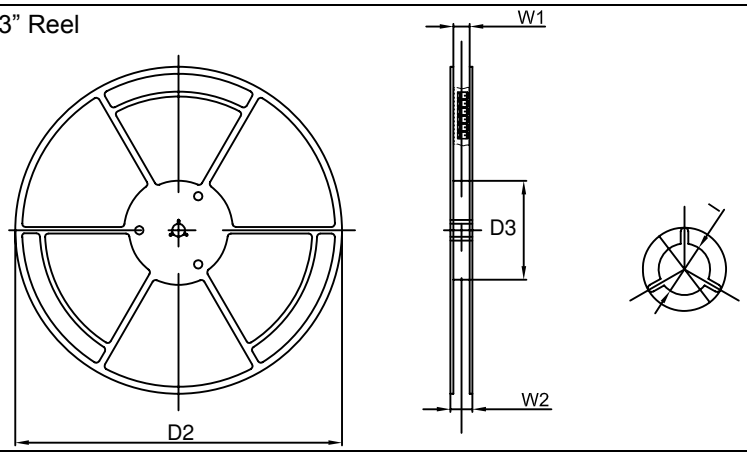
Tape & rell specification

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

13” Reel



D2	330.0±5.0
D3	100.0±4.0
W1	20.0±5.0
W2	25.0±5.0
I	13.0±2.0

Quantity: 2500PCS