

Features

Zero Forward Recovery Voltage
Zero Reverse Recovery Current
Excellent Surge Current Capability
Temperature Independent Switching
Positive Temperature Coefficient on V_F
High Frequency Operation

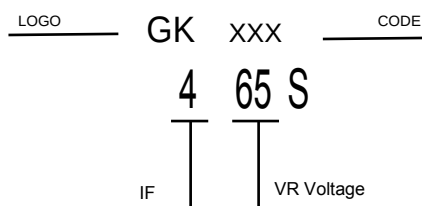
Benefits

Increased Power Density
Essentially no Switching Losses
Reduction of Heat Sink Requirements
Higher Efficiency
Reduced EMI

Applications

Uninterruptible Power Supplies
Switch Mode Power Supplies
Power Factor Correction
Motor Drivers

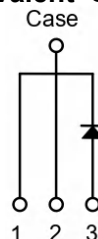
V_{RRM} 650 V
 I_F 4 A
 Q_c 19 nC



TO-252



Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Maximum ratings ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		650	V
I_F	Continuous Forward Current	$T_c=25^\circ\text{C}$ $T_c=135^\circ\text{C}$ $T_c=160^\circ\text{C}$	17 8 4	A
I_{FRM}	Repetitive Forward Surge Current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave	36	A
I_{FSM}	Non-Repetitive Forward Surge Current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave $T_c=150^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave	40 34	A
$I_{F,max}$	Non-Repetitive Forward Surge Current	$T_c=25^\circ\text{C}$, $t_p=10\mu\text{s}$, Pulse	530	A
$\int i^2 dt$	i^2t Value	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$ $T_c=150^\circ\text{C}$, $t_p=10\text{ms}$	8 5	A^2s
P_{tot}	Power Dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	71 30	W
E_{AS}	Non-Repetitive Avalanche Switching Energy	$V_{DD}=50\text{V}$, $L=1\text{mH}$, $I_D=7.6\text{A}$	28	mJ
E_{AR}	Repetitive Avalanche Energy	$V_{DD}=50\text{V}$, $L=640\mu\text{H}$, $I_D=7.6\text{A}$	18	mJ
T_J	Operating Junction Temperature		-40~175	$^\circ\text{C}$
T_{stg}	Storage Temperature		-40~150	$^\circ\text{C}$
T_{sold}	Soldering Temperature	1.6mm (0.063") from Case for 10s	260	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

Static Characteristics

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	$T_j=25^{\circ}\text{C}$	650			V
V_F	Diode forward voltage	$I_F=4\text{A}$, $T_j=25^{\circ}\text{C}$		1.26	1.52	V
		$I_F=4\text{A}$, $T_j=135^{\circ}\text{C}$		1.29	1.66	
		$I_F=4\text{A}$, $T_j=175^{\circ}\text{C}$		1.41	1.98	
I_R	Reverse current	$V_R=650\text{V}$, $T_j=25^{\circ}\text{C}$		1	50	μA
		$V_R=650\text{V}$, $T_j=175^{\circ}\text{C}$		7	200	

AC Characteristics

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=400\text{V}$, $T_j=25^{\circ}\text{C}$, $Q_C = \int_0^{V_R} C(V)dV$		19		nC
C	Total capacitance	$V_R=1\text{V}$, $f=1\text{MHz}$		227		pF
		$V_R=300\text{V}$, $f=1\text{MHz}$		34		
		$V_R=600\text{V}$, $f=1\text{MHz}$		31		
E_C	Capacitance stored energy	$V_R=400\text{V}$		3		μJ

Thermal Characteristics

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(j-c)}$	Thermal Resistance from Junction to Case		2.1		$^{\circ}\text{C/W}$

RATING AND CHARACTERISTIC CURVES

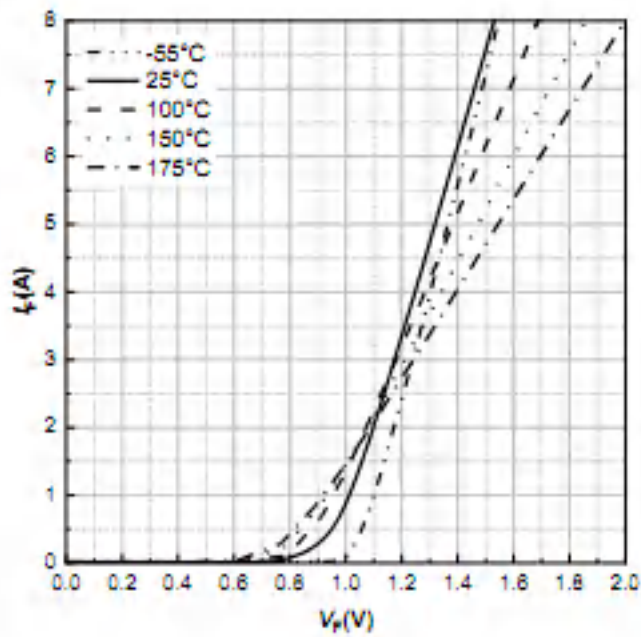


Figure 1. Typical forward characteristics

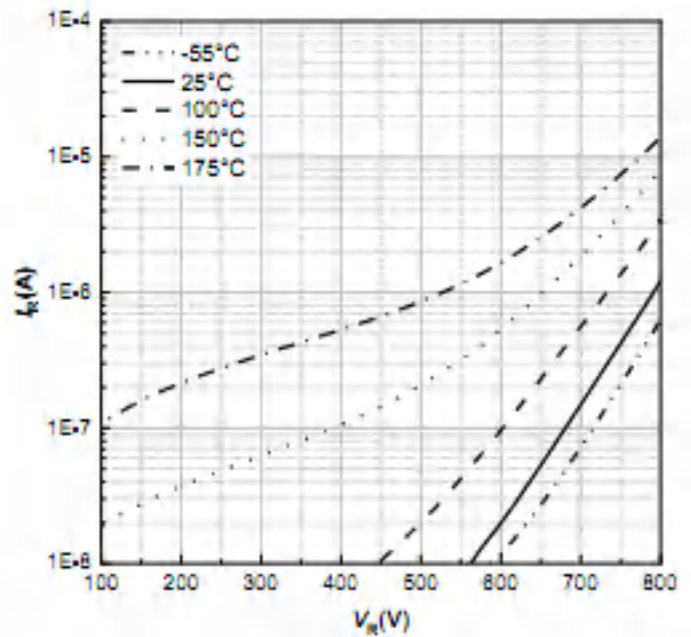


Figure 2. Typical reverse current as function of reverse voltage

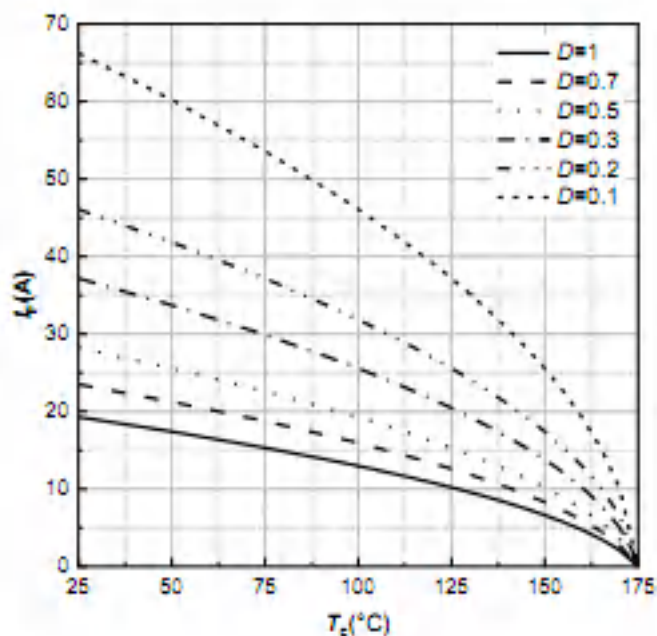


Figure 3. Diode forward current as function of temperature, D =duty cycle

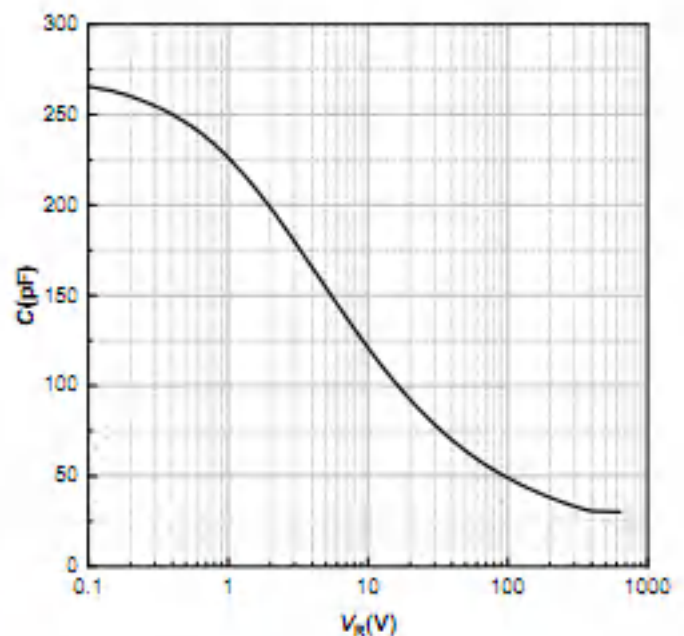


Figure 4. Typical capacitance as function of reverse voltage, $C=f(V_R)$, $T_J=25^\circ\text{C}$, $f=1\text{ MHz}$

RATING AND CHARACTERISTIC CURVES

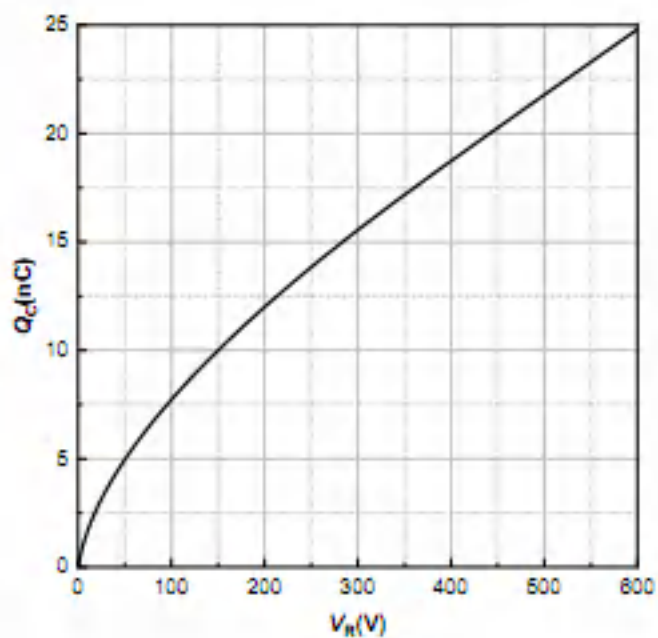


Figure 5. Typical reverse charge as function of reverse voltage

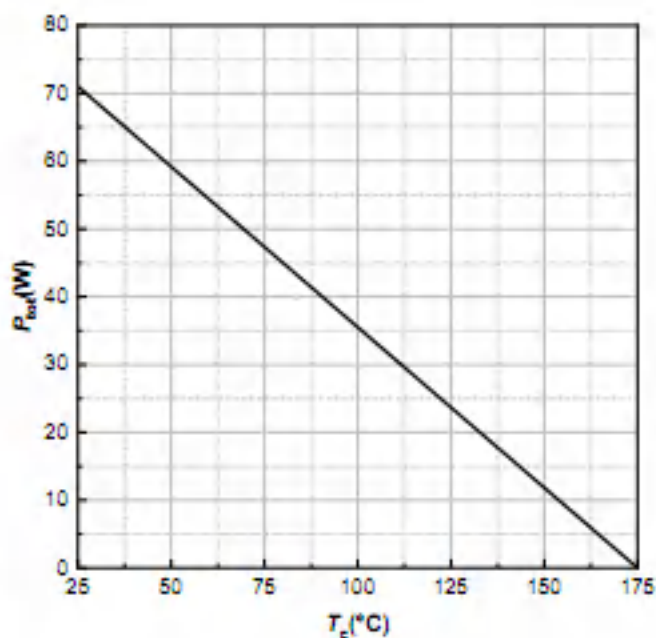


Figure 6. Power dissipation as function of case temperature

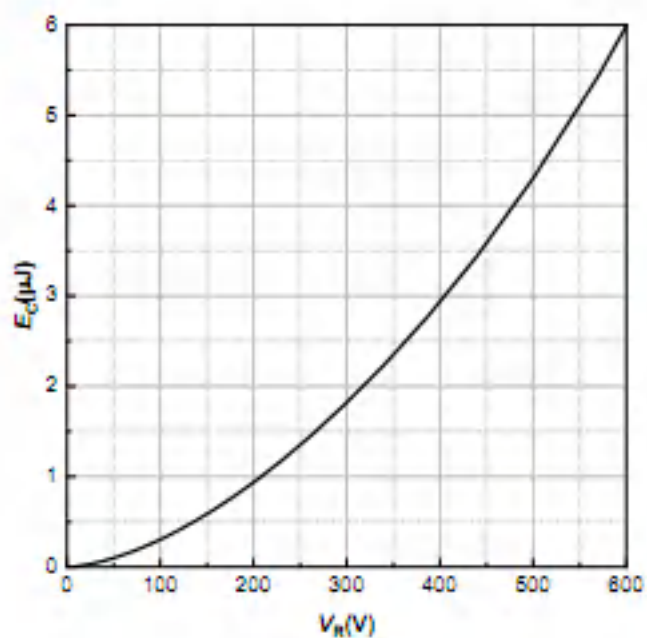


Figure 7. Capacitance stored energy

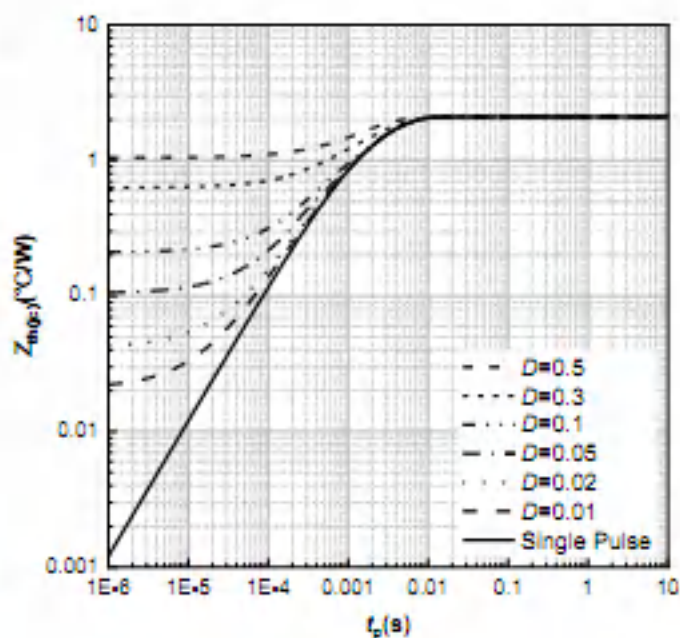
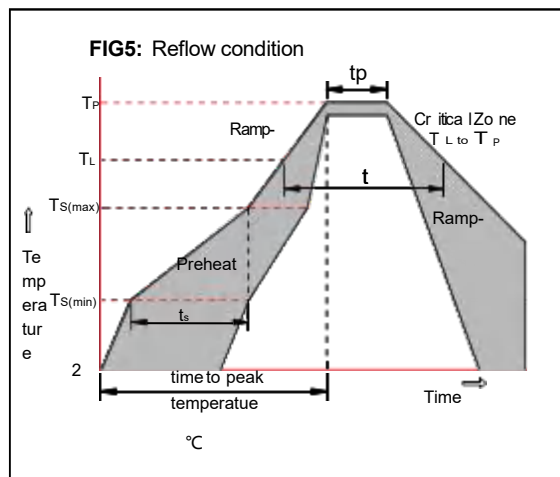


Figure 8. Max. transient thermal impedance, $Z_{th(jc)} = f(t_p)$, parameter: $D = t_p/T$

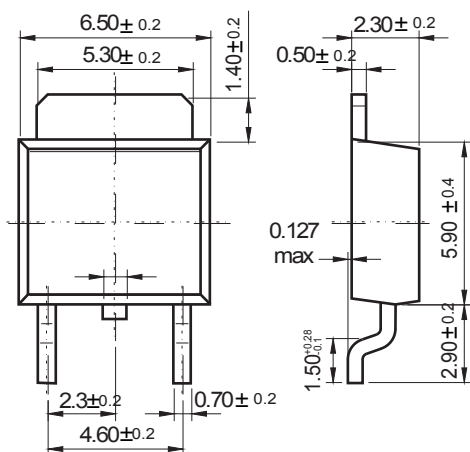
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
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

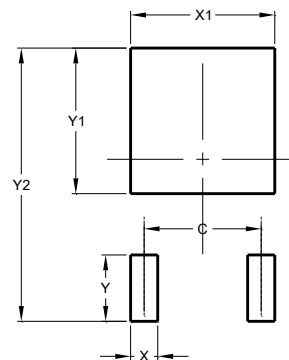


Package Dimensions & Suggested Pad Layout

TO-252



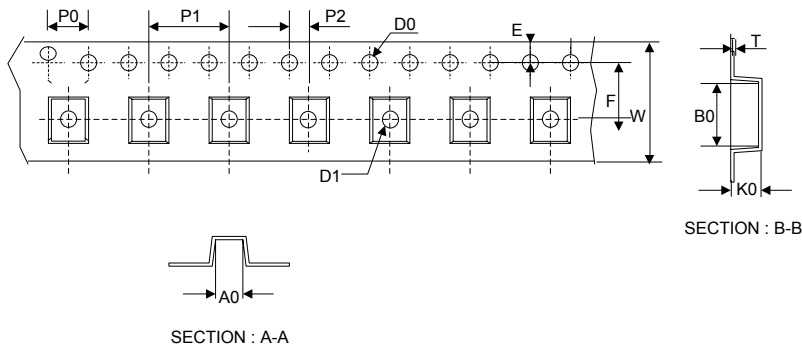
Dimensions in inches and (millimeters)



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

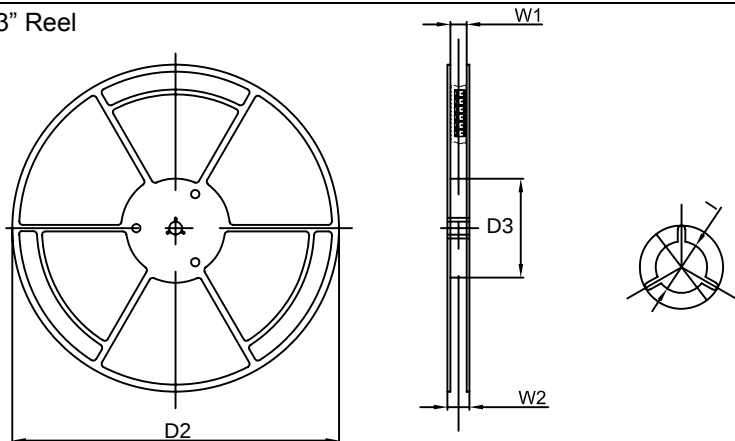
Tape & reel specification

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
W2	25.0±5.0
I	13.0±2.0

13" Reel



Quantity: 2500PCS