

Features

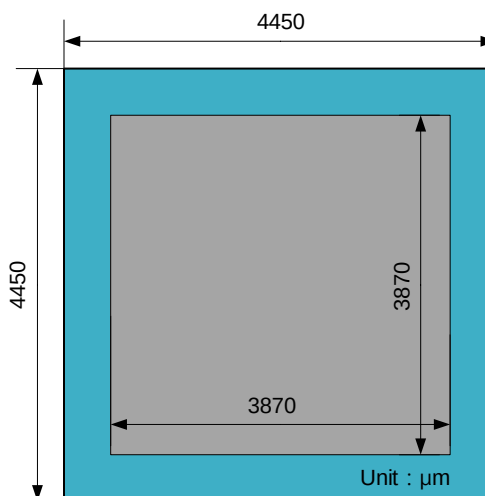
- ◆ Zero Forward Recovery Voltage
- ◆ Zero Reverse Recovery Current
- ◆ Excellent Surge Current Capability
- ◆ Temperature Independent Switching
- ◆ Positive Temperature Coefficient on V_F
- ◆ High Frequency Operation

Part NO.	MSD40120B	
V_{RRM}	=	1200 V
$I_{F(AVG)}$	=	40 A
Q_C	=	204 nC

Wafer Parameters

Parameter	Typ.	Unit
Die Size	4450 x 4450	μm
Anode Pad Opening	3870 x 3870	μm
Wafer Diameter	150	mm
Thickness	175 $\pm$ 10	μm
Anode Metalization (Al)	4	μm
Cathode Metalization (Ti/Ni/Ag)	0.1/0.4/1	μm
Grossdie	761	

Chip Outline (unit: μm)



Maximum ratings

Symbol	Parameter	Test conditions	Value	Unit
V_{RRM}	Repetitive peak reverse voltage		1200	V
V_{RSM}	Surge peak reverse voltage		1200	V
$I_{F(AVG)}$	Average forward current	$T_c=145^{\circ}\text{C}$	40*	A
I_{FSM}	Non-Repetitive forward surge current	$T_c=25^{\circ}\text{C}$, $t_p=10\text{ms}$, Half Sine Wave	272	A
P_{tot}	Power dissipation	$T_c=25^{\circ}\text{C}$ $T_c=110^{\circ}\text{C}$	452* 196*	W
T_j	Operating junction temperature		-55~175	$^{\circ}\text{C}$
T_{stg}	Storage temperature		-55~175	$^{\circ}\text{C}$

* Assumes thermal resistance of 0.332 $^{\circ}\text{C}/\text{W}$ or less

Electrical Characteristics**Static Characteristics**

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	$T_j=25^{\circ}\text{C}$	1200			V
V_F	Diode forward voltage	$I_F=40\text{A}$ $T_j=25^{\circ}\text{C}$ $I_F=40\text{A}$ $T_j=175^{\circ}\text{C}$		1.48 2.17		V
I_R	Reverse current	$V_R=1200\text{V}$ $T_j=25^{\circ}\text{C}$ $V_R=1200\text{V}$ $T_j=175^{\circ}\text{C}$		8 54		μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=800\text{V}$ $T_j=25^{\circ}\text{C}$ $Q_C = \int_0^{V_R} C(V)dV$		204		nC
C	Total capacitance	$V_R=1\text{V}$ $f=1\text{MHz}$ $V_R=400\text{V}$ $f=1\text{MHz}$ $V_R=800\text{V}$ $f=1\text{MHz}$		2270 192 144		pF
E_C	Capacitance stored energy	$V_R=800\text{V}$		105		μJ

Typical Performance

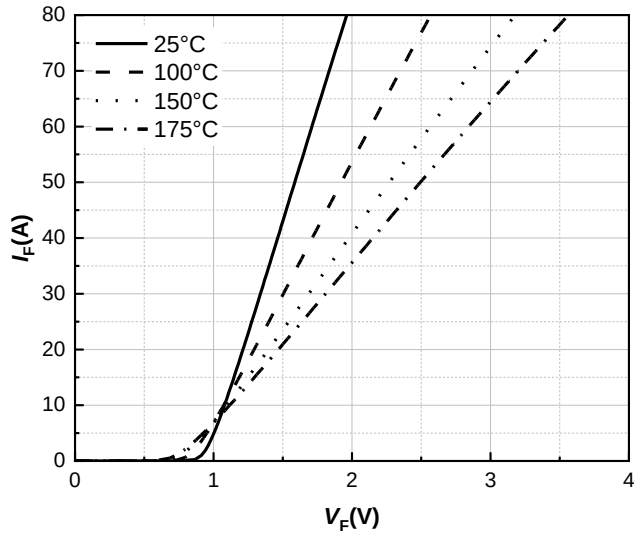


Figure 1. Typical forward characteristics

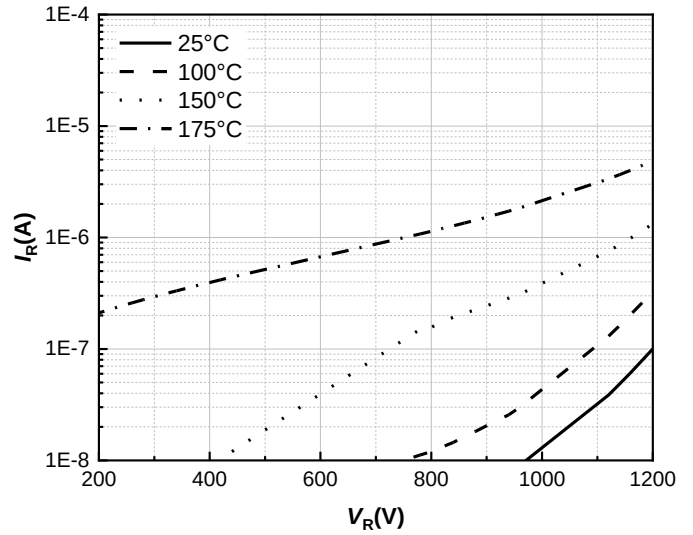


Figure 2. Typical reverse current as function of reverse voltage

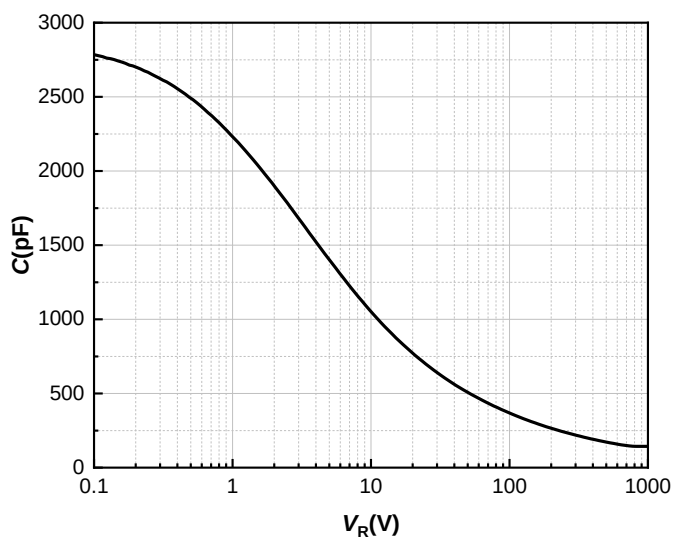


Figure 3. Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_j=25^\circ\text{C}$; $f=1\text{ MHz}$

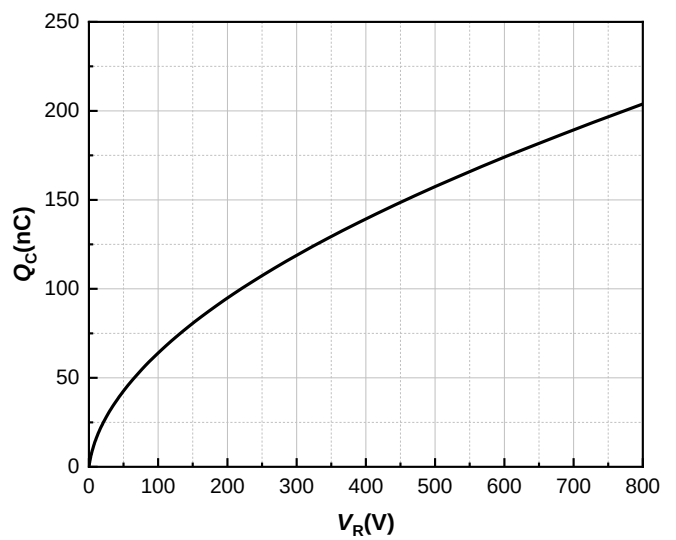


Figure 4. Typical reverse charge as function of reverse voltage