

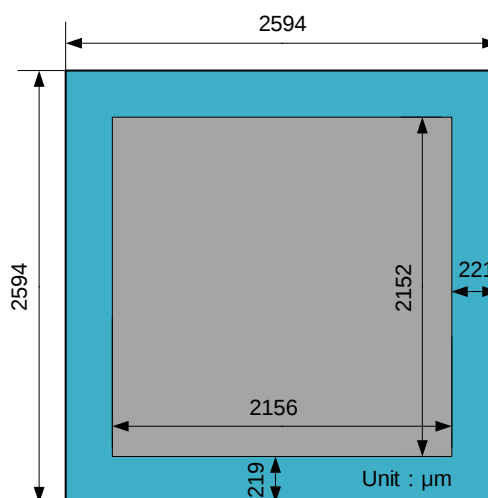
Features

- ◆ 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.	MS1D20065B	
V_{RRM}	=	650 V
$I_{F(AVG)}$	=	20 A
Q_C	=	76 nC

Wafer Parameters

Parameter	Typ.	Unit
Anode Pad Size	2594 x 2594	μm
Anode Pad Opening	2156 x 2152	μm
Wafer Diameter	150	mm
Thickness	175 $\pm$ 10	μm
Anode Metalization (Al)	4	μm
Cathode Metalization (Ti/Ni/Ag)	0.75/0.32/1.1	μm
Grossdie	2304	

Chip Outline (unit: μm)

Maximum ratings

Symbol	Parameter	Test conditions	Value	Unit
V_{RRM}	Repetitive peak reverse voltage		650	V
$I_{F(AVG)}$	Average forward current	$T_c=155^{\circ}\text{C}$	20*	A
I_{FSM}	Non-Repetitive forward surge current	$T_c=25^{\circ}\text{C}$, $t_p=10\text{ms}$, Half Sine Wave	170	A
P_{tot}	Power dissipation	$T_c=25^{\circ}\text{C}$ $T_c=110^{\circ}\text{C}$	267* 116*	W
T_j	Operating junction temperature		-55~175	$^{\circ}\text{C}$
T_{stg}	Storage temperature		-55~175	$^{\circ}\text{C}$

* Assumes thermal resistance of 0.56 $^{\circ}\text{C}/\text{W}$ or less

Electrical Characteristics**Static Characteristics**

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	$T_j=25^{\circ}\text{C}$	650			V
V_F	Diode forward voltage	$I_F=20\text{A}$ $T_j=25^{\circ}\text{C}$ $I_F=20\text{A}$ $T_j=175^{\circ}\text{C}$		1.32 1.43	1.46 1.80	V
I_R	Reverse current	$V_R=650\text{V}$ $T_j=25^{\circ}\text{C}$ $V_R=650\text{V}$ $T_j=175^{\circ}\text{C}$		1 19	50 200	μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=400\text{V}$ $T_j=25^{\circ}\text{C}$ $Q_C = \int_0^{V_R} C(V)dV$		76		nC
C	Total capacitance	$V_R=1\text{V}$ $f=1\text{MHz}$ $V_R=300\text{V}$ $f=1\text{MHz}$ $V_R=600\text{V}$ $f=1\text{MHz}$		1091 123 104		pF
E_C	Capacitance stored energy	$V_R=400\text{V}$		11.3		μJ

Typical Performance

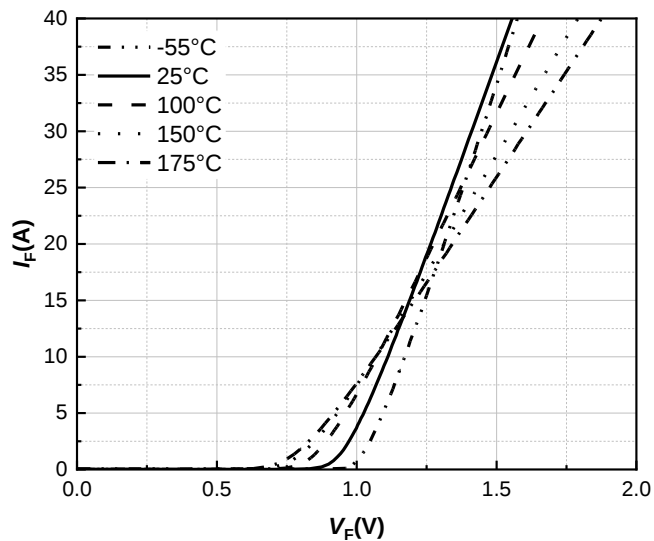


Figure 1. Typical forward characteristics

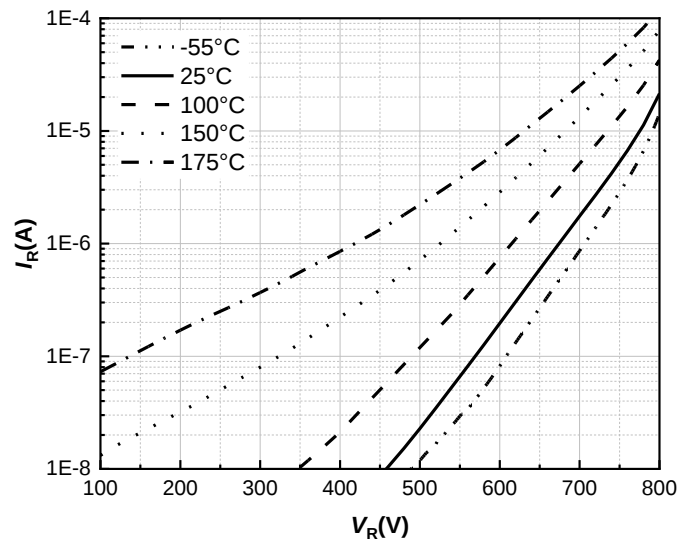


Figure 2. Typical reverse current as function of reverse voltage

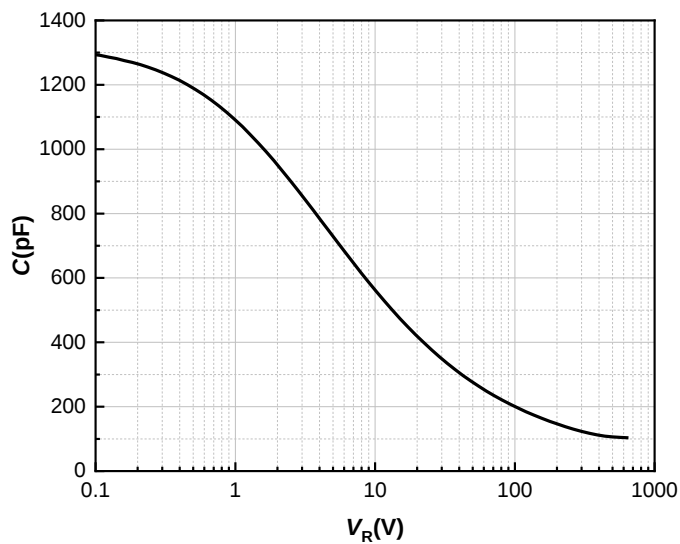


Figure 3. Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_J=25^\circ\text{C}$; $f=1\text{ MHz}$

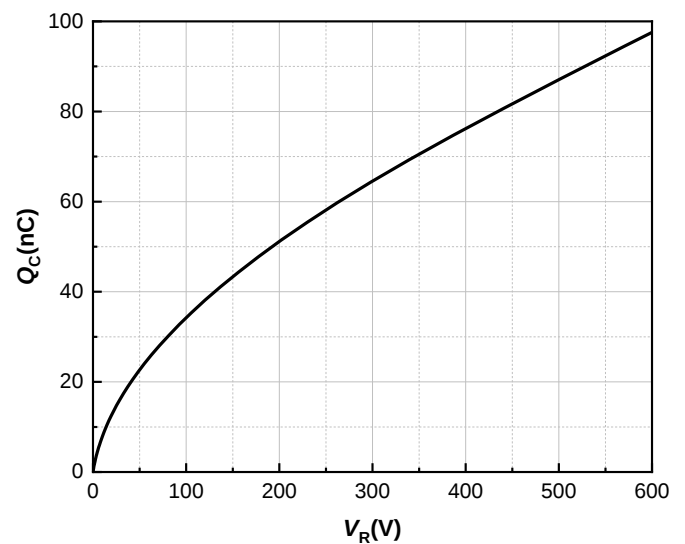


Figure 4. Typical reverse charge as function of reverse voltage