N2S065010PA2

Silicon Carbide Schottky Diode

V_{RRM}	= 650V
$I_F(T_C \leq 135℃)$	= 19A
Q_c	= 32nC

Features

- New Thin Wafer Technology
- Low Forward Voltage Drop (V_F)
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Positive Temperature Coefficient on V_F
- Temperature-independent Switching

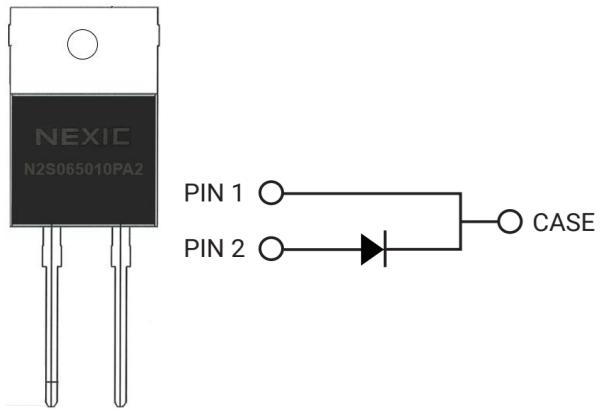
Benefits

- Replace Bipolar with Unipolar Device
- Reduction of Heat Sink Size
- Parallel Devices Without Thermal Runaway
- Essentially No Switching Losses

Applications

- Switch Mode Power Supplies
- Uninterruptible Power Supplies
- Server/Telecom Power Supplies
- Industrial Power Supplies

Package



TO-220-2

Part Number	Package	Marking
N2S065010PA2	TO-220-2	N2S065010PA2

Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	650	V	T_C = 25℃	
V_{RSM}	Surge Peak Reverse Voltage	650	V	T_C = 25℃	
V_R	DC Blocking Voltage	650	V	T_C = 25℃	
I_F	Forward Current	38 19 10	A	T_C ≤ 25℃ T_C ≤ 135℃ T_C ≤ 150℃	
I_{FSM}	Non-Repetitive Forward Surge Current	100	A	T_C = 25℃, t_p = 8.3ms, Half Sine Wave	
P_{tot}	Power Dissipation	150.6	W	T_C = 25℃	Fig.3
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to 150	℃		
	TO-220 Mounting Torque	1	Nm	M3 Screw	

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.30 1.46	1.5 1.6	V	I_F = 10A, T_J = 25℃ I_F = 10A, T_J = 150℃	Fig.1
I_R	Reverse Current	1.5 5.4	50 200	μA	V_R = 650V, T_J = 25℃ V_R = 650V, T_J = 150℃	Fig.2
C	Total Capacitance	606 61 47	/	pF	V_R = 0V, T_J = 25℃, f = 1MHz V_R = 200V, T_J = 25℃, f = 1MHz V_R = 400V, T_J = 25℃, f = 1MHz	Fig.5
Q_C	Total Capacitive Charge	32	/	nC	V_R = 400V, I_F = 10A di/dt = 200A/μs, T_J = 25℃	Fig.4

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.83	℃/W	Fig.6
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	68	℃/W	
T_{sold}	Soldering Temperature	260	℃	

Typical Performance

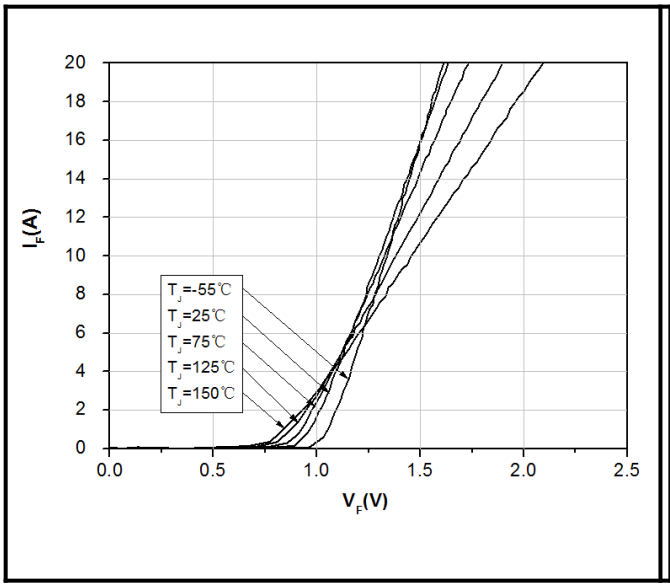


Figure 1. Forward Characteristics

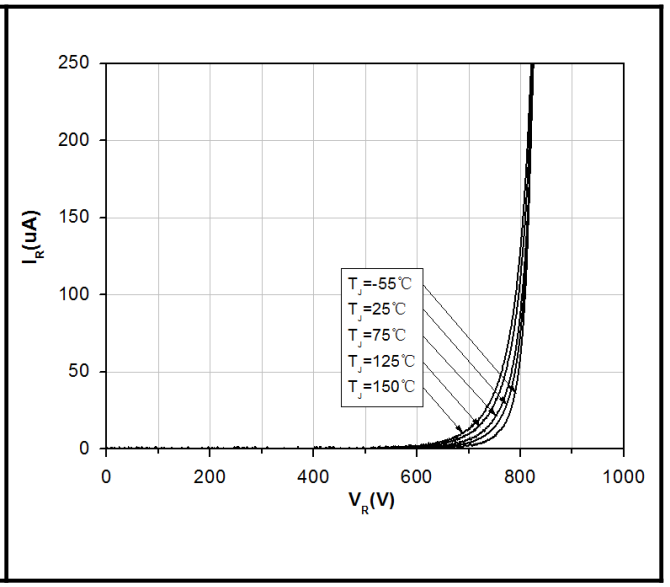


Figure 2. Reverse Characteristics

Typical Performance

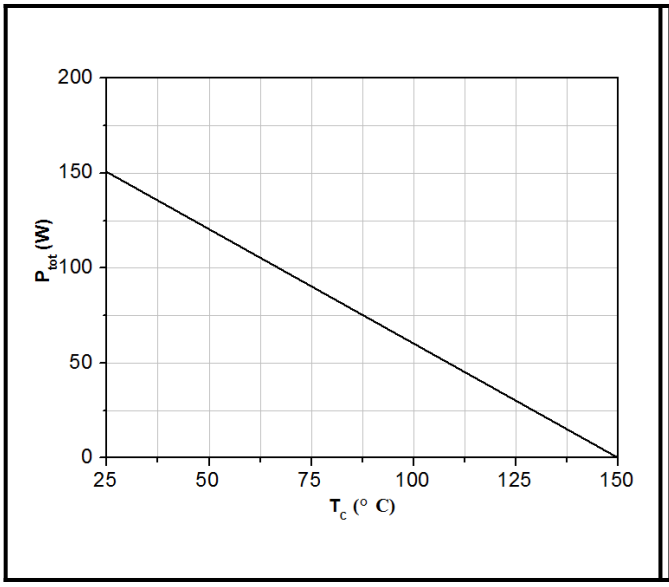


Figure 3. Power Derating

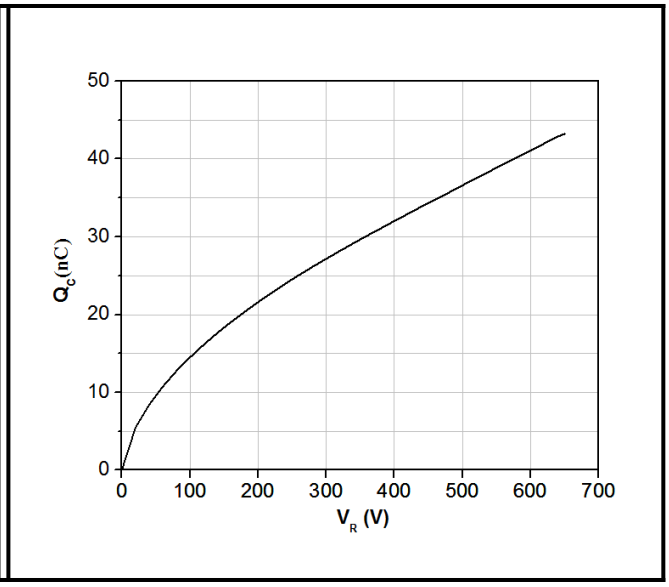


Figure 4. Total Capacitive Charge vs. Reverse Voltage

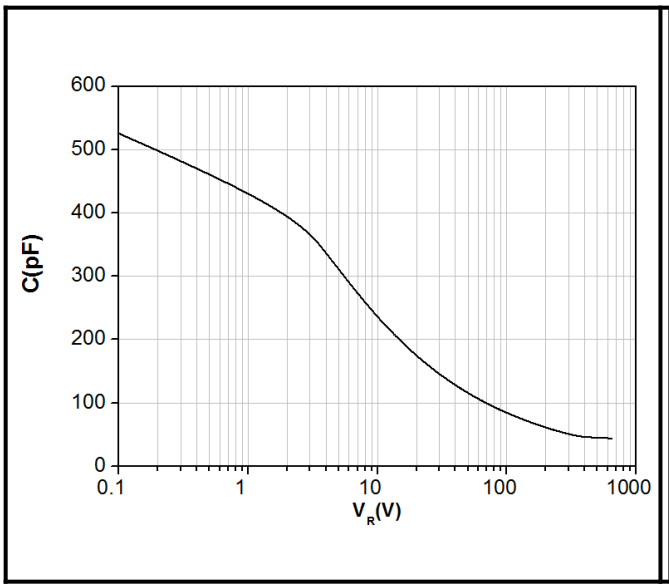


Figure 5. Total Capacitance vs. Reverse Voltage

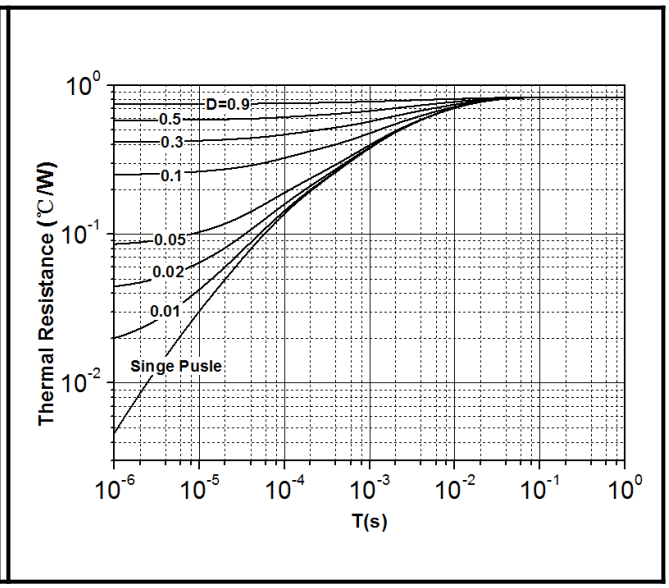
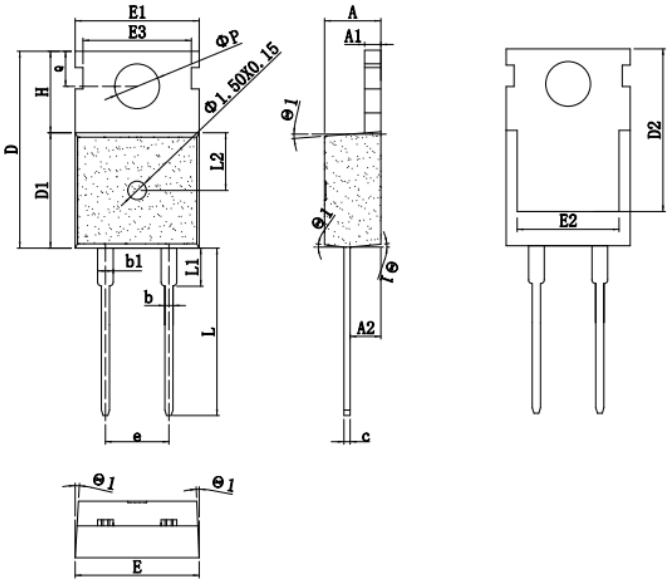


Figure 6. Transient Thermal Impedance

Package Dimensions

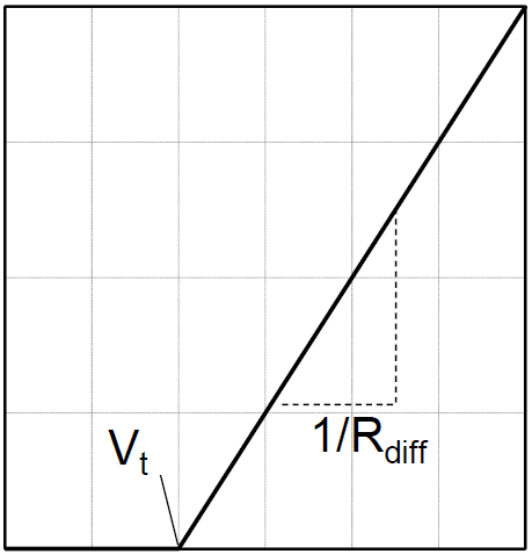
Package TO-220-2



SYMBOL	mm		
	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.25	1.30	1.35
A2	2.30	2.40	2.50
b	0.70	0.80	0.90
b1	1.25	1.33	1.42
c	0.45	0.50	0.55
D	15.55	15.70	15.85
D1	9.10	9.20	9.30
D2	12.90	13.10	13.30
D3	15.45	15.80	16.15
E	9.80	10.02	10.15
E1	8.55	8.70	8.85
E2	7.80	8.00	8.20
e	5.08BSC		
H	6.40	6.50	6.60
L	13.00	13.28	13.45
L1	—	—	3.40
L2	4.50	4.65	4.80
ϕP	3.55	3.65	3.75
Q	2.70	2.80	2.90
θ1	2°	—	7°

Simplified Diode Model

Equivalent IV Curve for Model



Mathematical Equation

$$V_F = V_t + I_F \times R_{diff}$$

$$V_t = -0.001 \times T_j + 0.99 \text{ [V]}$$
$$R_{diff} = 6.9 \times 10^{-7} \times T_j^2 + 4.3 \times 10^{-5} \times T_j + 0.28 \text{ [Ω]}$$

Note:

T_j = Diode Junction Temperature In Degrees Celsius, valid from 25°C to150°C
I_F= Forward Current Less than 20A