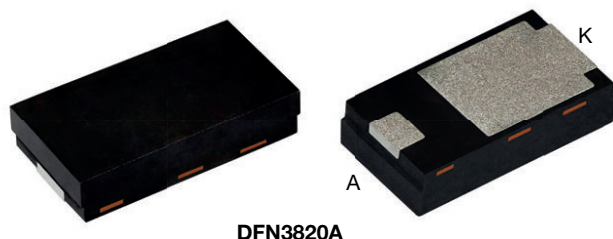


## Surface-Mount Standard Rectifier



### LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	4 A
$V_{RRM}$	200 V, 400 V, 600 V
$I_{FSM}$	60 A
$V_F$ at $I_F = 4$ A ( $T_J = 125$ °C)	0.86 V
$I_R$	10 $\mu$ A
$T_J$ max.	175 °C
Package	DFN3820A
Circuit configuration	Single

### FEATURES

- Low-profile package- typical height of 0.88 mm
- Leadless DFN package with side-wettable flanks suitable for customer AOI (Automatic Optical Inspection)
- Ideal for automated replacement
- Oxide planar chip junction
- Low forward voltage drop
- Typical IR less than 0.1  $\mu$ A
- ESD capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Compatible to SMP (DO-220AA) package case outline
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

### TYPICAL APPLICATIONS

General purpose, power line polarity protection and rail-to-rail protection in consumer, industrial, and automotive applications.

### MECHANICAL DATA

**Case:** DFN3820A

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	SE40ND	SE40NG	SE40NJ	UNIT
Device marking code		4D	4G	4J	
Maximum repetitive peak reverse voltage	V <sub>RRM</sub>	200	400	600	V
Maximum average forward rectified current (fig.1)	I <sub>F(AV)</sub> <sup>(1)</sup>	4			A
	I <sub>F(AV)</sub> <sup>(2)</sup>	1.7			
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	60			A
Operating junction temperature range	T <sub>J</sub> <sup>(3)</sup>	-55 to +175			°C
Storage temperature range	T <sub>STG</sub>	-55 to +175			

### Notes

(1) Mounted on 25 x 25mm pad area, 2 oz. FR4 PCB

(2) Free air, mounted on recommended copper pad area

(3) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$



ELECTRICAL CHARACTERISTICS (T <sub>J</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 2 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.91	-	V
	I <sub>F</sub> = 4 A			0.97	1.1	
	I <sub>F</sub> = 2 A	T <sub>J</sub> = 125 °C		0.79	-	
	I <sub>F</sub> = 4 A			0.86	0.98	
Reverse current	Rated V <sub>R</sub>	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	10	μA
		T <sub>J</sub> = 125 °C		21	100	
Typical reverse recovery time	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 01 A, I <sub>rr</sub> = 0.25 A		t <sub>rr</sub>	1.2	-	μs
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	24	-	pF

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: pulse width  $\leq 5\text{ ms}$ 

THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	135	169	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	5	6.3	

**Notes**(1) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ 

(2) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz. standard footprint

(3) Thermal resistance junction-to-mount to follow JEDEC® 51-14, transient dual interface test method (TDIM)

IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	$C = 100\text{ pF}$ , $R = 1.5\text{ k}\Omega$	$V_C$	H3B	$> 8\text{ kV}$
AEC-Q101-002	Machine model (contact mode)	$C = 200\text{ pF}$ , $R = 0\text{ }\Omega$		M4	$> 400\text{ V}$
JESD22-A114	Human body model (contact mode)	$C = 100\text{ pF}$ , $R = 1.5\text{ k}\Omega$		3B	$> 8\text{ kV}$
JESD22-A115	Machine model (contact mode)	$C = 200\text{ pF}$ , $R = 0\text{ }\Omega$		C	$> 400\text{ V}$
IEC 61000-4-2 <sup>(2)</sup>	Human body model (contact mode)	$C = 150\text{ pF}$ , $R = 330\text{ }\Omega$		4	$> 8\text{ kV}$
	Human body model (air-discharge mode) <sup>(1)</sup>	$C = 150\text{ pF}$ , $R = 330\text{ }\Omega$		4	$> 15\text{ kV}$

**Notes**(1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance  $> 30\text{ kV}$ 

(2) System ESD standard



## ORDERING INFORMATION TABLE

Device code	S	E	40	N	J	H	M3
	1	2	3	4	5	6	7
1	-						Vishay standard recovery product
2	-						Oxide planar chip technology
3	-						Current rating (40 = 4 A)
4	-						Package type (N = DFN package)
5	-						Voltage rating (D = 200 V, G = 400 V, J = 600 V)
6	-						Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)
7	-						Material / Environment category (M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SE40NJ-M3/H	0.023	H	3500	7" diameter plastic tape and reel
SE40NJ-M3/I	0.023	I	14 000	13" diameter plastic tape and reel
SE40NJHM3/H <sup>(1)</sup>	0.023	H	3500	7" diameter plastic tape and reel
SE40NJHM3/I <sup>(1)</sup>	0.023	I	14 000	13" diameter plastic tape and reel

### Note

<sup>(1)</sup> AEC-Q101 qualified



## RATINGS AND CHARACTERISTICS CURVES ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

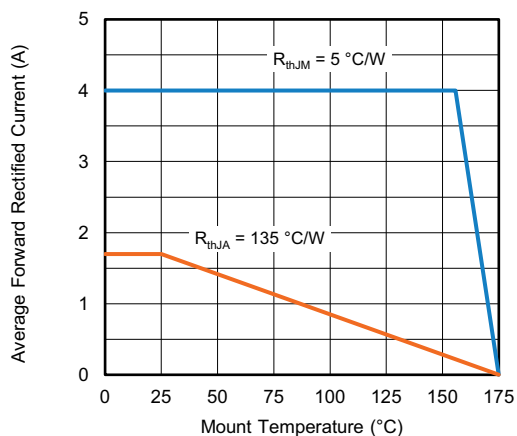


Fig. 1 - Maximum Forward Current Derating Curve

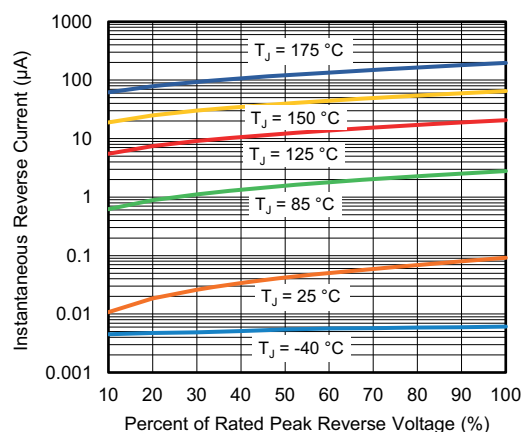


Fig. 4 - Typical Reverse Leakage Characteristics

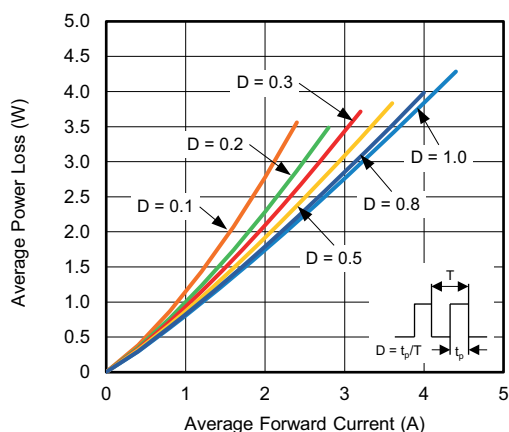


Fig. 2 - Forward Power Loss Characteristics

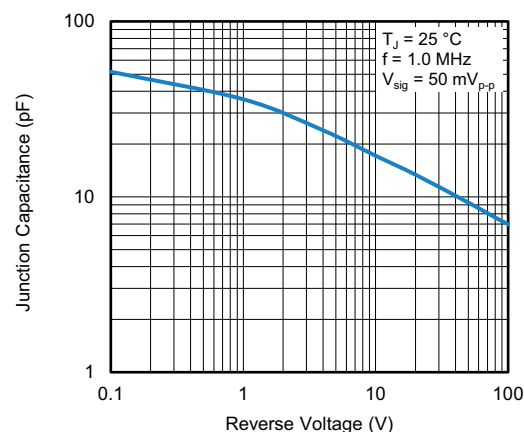


Fig. 5 - Typical Junction Capacitance

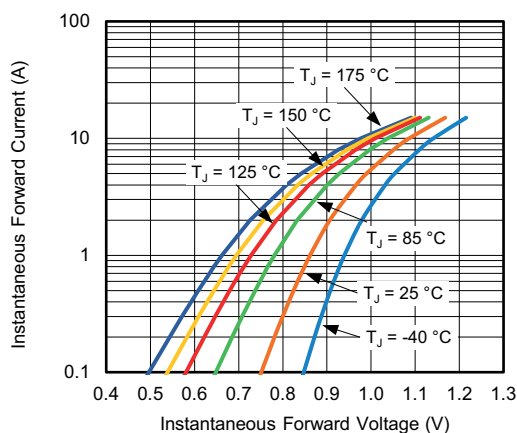


Fig. 3 - Typical Instantaneous Forward Characteristics

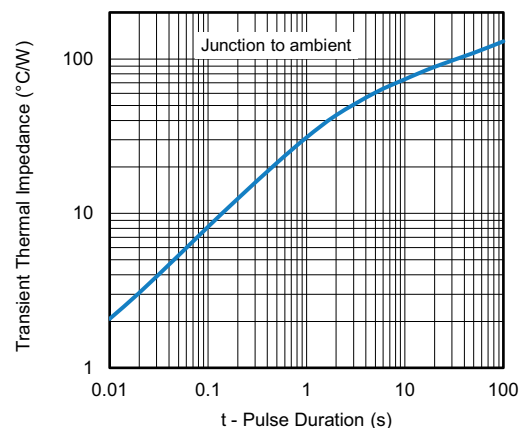
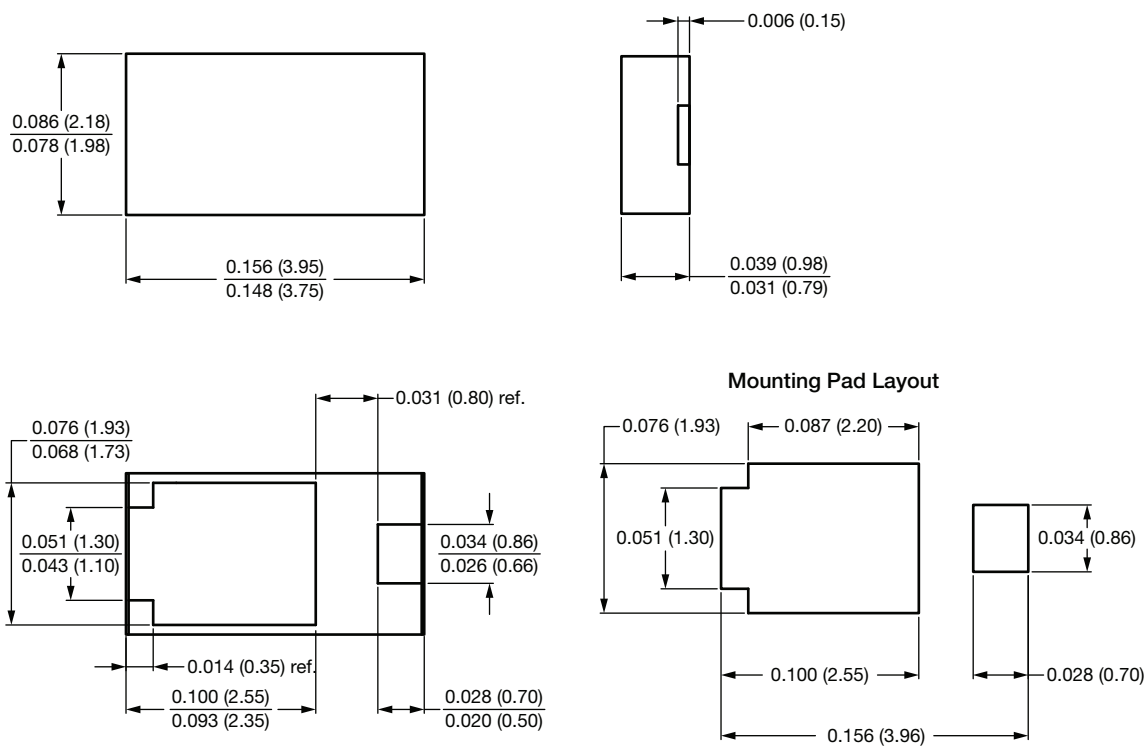


Fig. 6 - Typical Transient Thermal Impedance



**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**DFN3820A**





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