

Very Low Forward Voltage Trench-based Schottky Rectifier

Exceptionally Low $V_F = 0.53\text{ V}$ at $I_F = 5\text{ A}$

NTSB40200CT, NRVTSB40200CT, NTSJ40200CT

Features

- Fine Lithography Trench-based Schottky Technology for Very Low Forward Voltage and Low Leakage
- Fast Switching with Exceptional Temperature Stability
- Low Power Loss and Lower Operating Temperature
- Higher Efficiency for Achieving Regulatory Compliance
- Low Thermal Resistance
- High Surge Capability
- NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and Halogen Free/BFR Free

Typical Applications

- Switching Power Supplies including Telecom AC to DC Power Stages, LED Lighting and ATX
- High Voltage DC-DC Converters
- Freewheeling and OR-ing Diodes
- Output Rectifier in Welding Power Supplies
- Industrial Automation

Mechanical Characteristics

- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94-0 @ 0.125 in
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes:
260°C Maximum for 10 s

This document contains information on some products that are still under development. ON Semiconductor reserves the right to change or discontinue these products without notice.

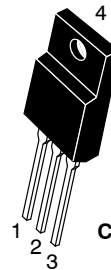
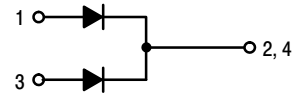


ON Semiconductor®

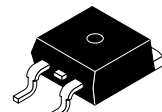
www.onsemi.com

**VERY LOW FORWARD
VOLTAGE, LOW LEAKAGE
SCHOTTKY BARRIER
RECTIFIERS 40 AMPERES,
200 VOLTS**

PIN CONNECTIONS



TO-220FP
CASE 221AH



D²PAK-3
CASE 418B

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

NTSB40200CT, NRVTSB40200CT, NTSJ40200CT

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	200	V
Average Rectified Forward Current (Rated V_R , $T_C = 125^\circ\text{C}$) NTSB40200CT, NRVTSB40200CT Per device (Rated V_R , $T_C = 130^\circ\text{C}$) NTSB40200CT, NRVTSB40200CT Per diode (Rated V_R , $T_C = 65^\circ\text{C}$) NTSJ40200CT Per device (Rated V_R , $T_C = 42^\circ\text{C}$) NTSJ40200CT Per diode	$I_{F(AV)}$	40 20 20 20	A
Peak Repetitive Forward Current (Rated V_R , Square Wave, 20 kHz, $T_C = 115^\circ\text{C}$) NTSB40200CT, NRVTSB40200CT Per device (Rated V_R , Square Wave, 20 kHz, $T_C = 125^\circ\text{C}$) NTSB40200CT, NRVTSB40200CT Per diode (Rated V_R , Square Wave, 20 kHz, $T_C = 40^\circ\text{C}$) NTSJ40200CT Per device (Rated V_R , Square Wave, 20 kHz, $T_C = 25^\circ\text{C}$) NTSJ40200CT Per diode	I_{FRM}	80 40 40 40	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}	250	A
Operating Junction Temperature	T_J	-55 to +150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$
ESD Rating (Human Body Model)		3A	
ESD Rating (Machine Model)		M4	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Rating	Symbol	NTSB40200CT NRVTSB40200CT	NTSJ40200CT	Unit
Typical Thermal Resistance Junction-to-Case Per Diode Junction-to-Case Per Device Junction-to-Ambient Per Device	$R_{\theta JC}$ $R_{\theta JA}$	1.29 0.79 40	6.94 6.05 105	$^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS

Rating	Symbol	Typ	Max	Unit
Instantaneous Forward Voltage (Note 1) ($I_F = 5\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 10\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 15\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 20\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 5\text{ A}$, $T_J = 125^\circ\text{C}$) ($I_F = 10\text{ A}$, $T_J = 125^\circ\text{C}$) ($I_F = 15\text{ A}$, $T_J = 125^\circ\text{C}$) ($I_F = 20\text{ A}$, $T_J = 125^\circ\text{C}$)	V_F	0.68 0.74 0.79 0.84 0.53 0.60 0.64 0.68	- - - 1.45 - - - 0.80	V
Instantaneous Reverse Current (Note 1) ($V_R = 180\text{ V}$, $T_J = 25^\circ\text{C}$) (Rated dc Voltage, $T_J = 25^\circ\text{C}$) ($V_R = 180\text{ V}$, $T_J = 125^\circ\text{C}$) (Rated dc Voltage, $T_J = 125^\circ\text{C}$)	I_R	3 5 5.3 7	- 100 - 30	μA μA mA mA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$

TYPICAL CHARACTERISTICS

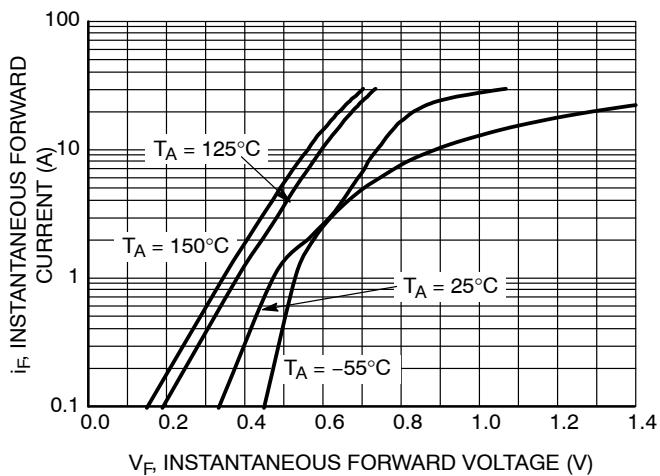


Figure 1. Typical Instantaneous Forward Characteristics

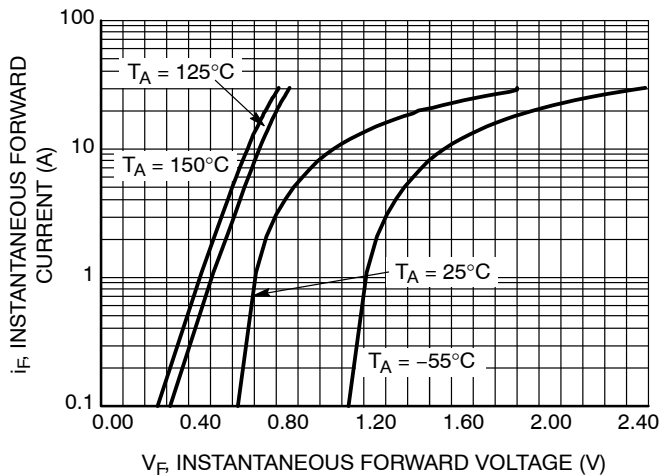


Figure 2. Maximum Instantaneous Forward Characteristics

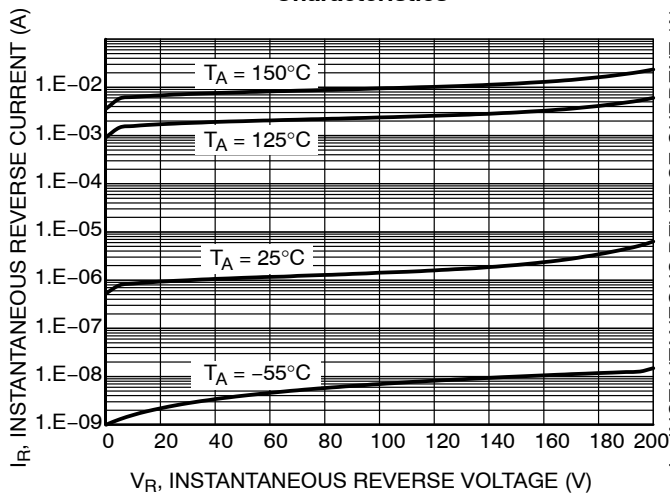


Figure 3. Typical Reverse Characteristics

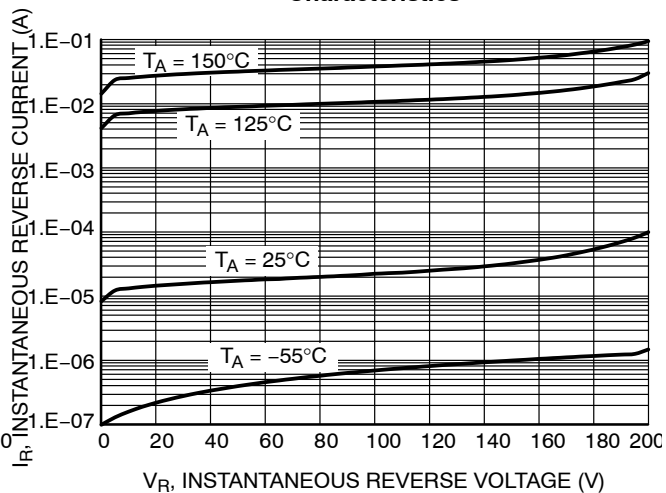


Figure 4. Maximum Reverse Characteristics

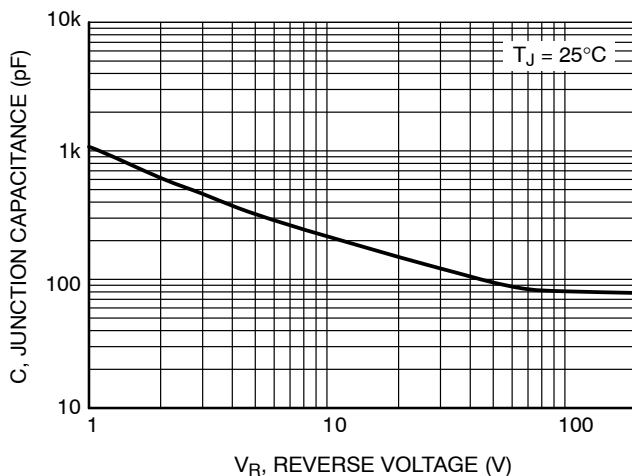


Figure 5. Typical Junction Capacitance

NTSB40200CT, NRVTSB40200CT, NTSJ40200CT

TYPICAL CHARACTERISTICS

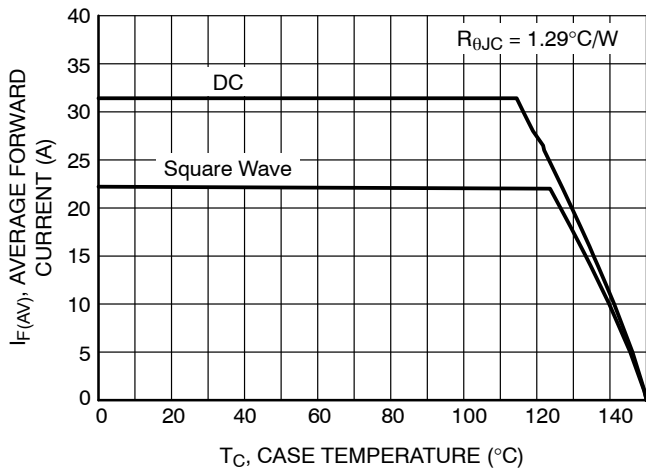


Figure 6. Current Derating per Diode (NTSB40200CT & NRVTSB40200CT)

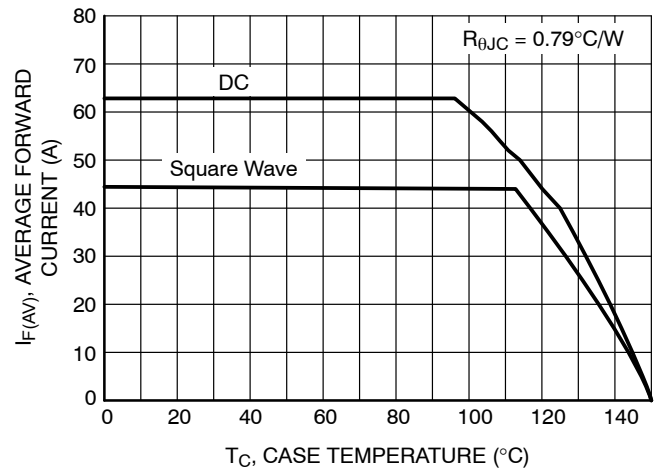


Figure 7. Current Derating per Device (NTSB40200CT & NRVTSB40200CT)

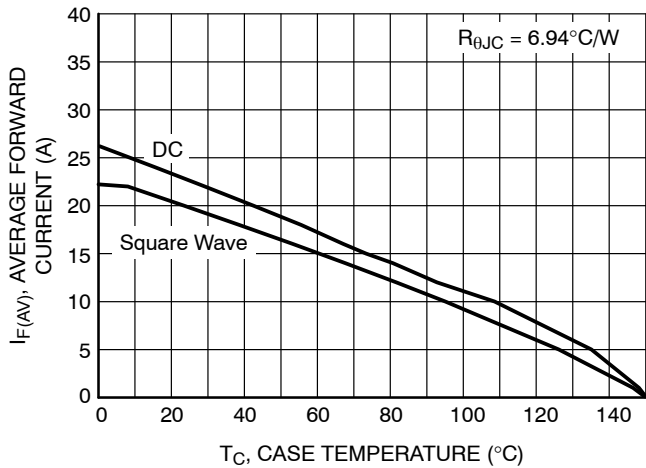


Figure 8. Current Derating per Diode (NTSJ40200CT)

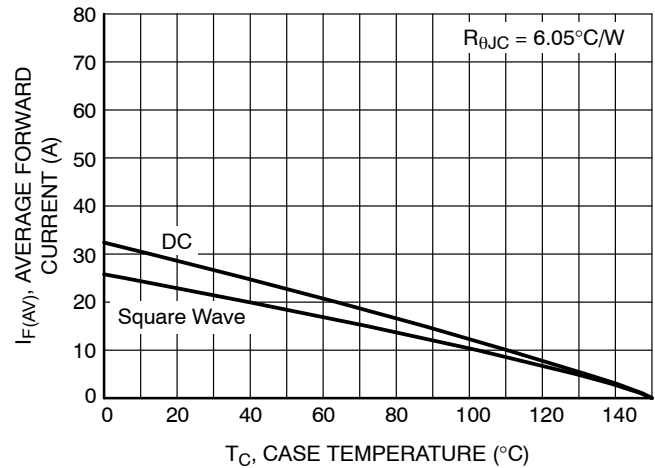


Figure 9. Current Derating per Device (NTSJ40200CT)

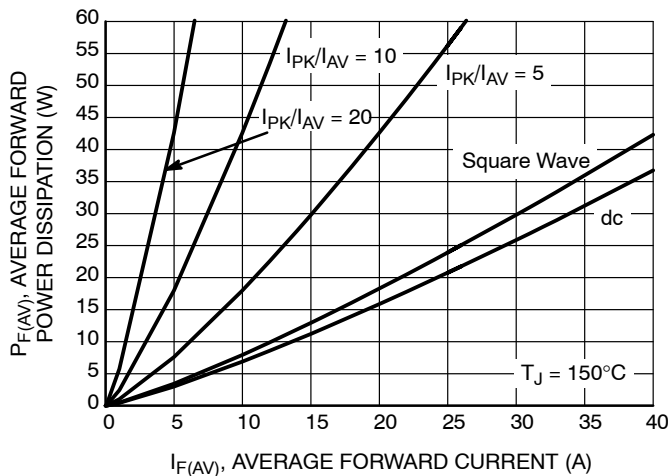


Figure 10. Forward Power Dissipation

TYPICAL CHARACTERISTICS

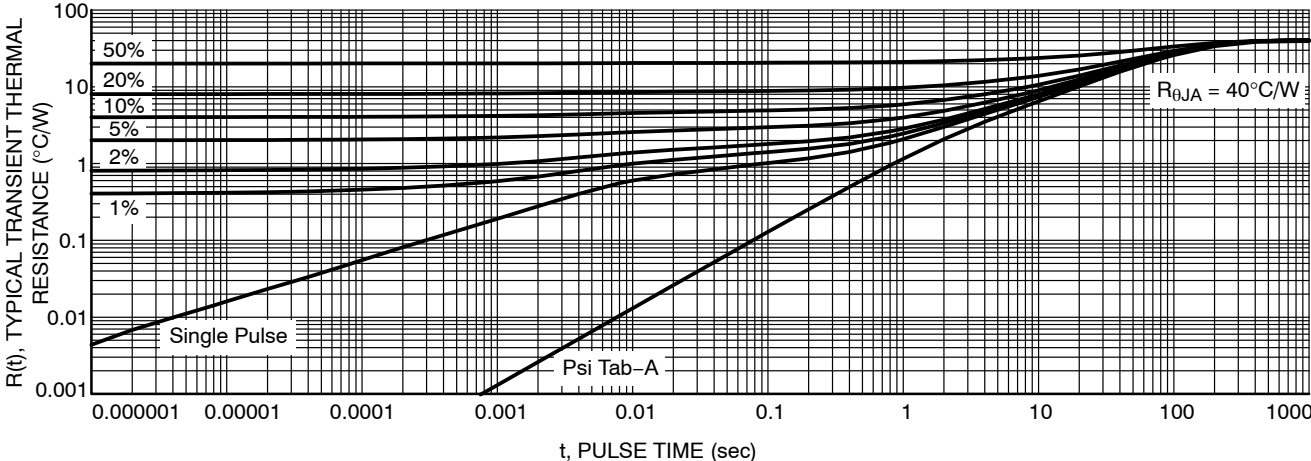


Figure 11. Typical Transient Thermal Response per Device (NTSB40200CTG)

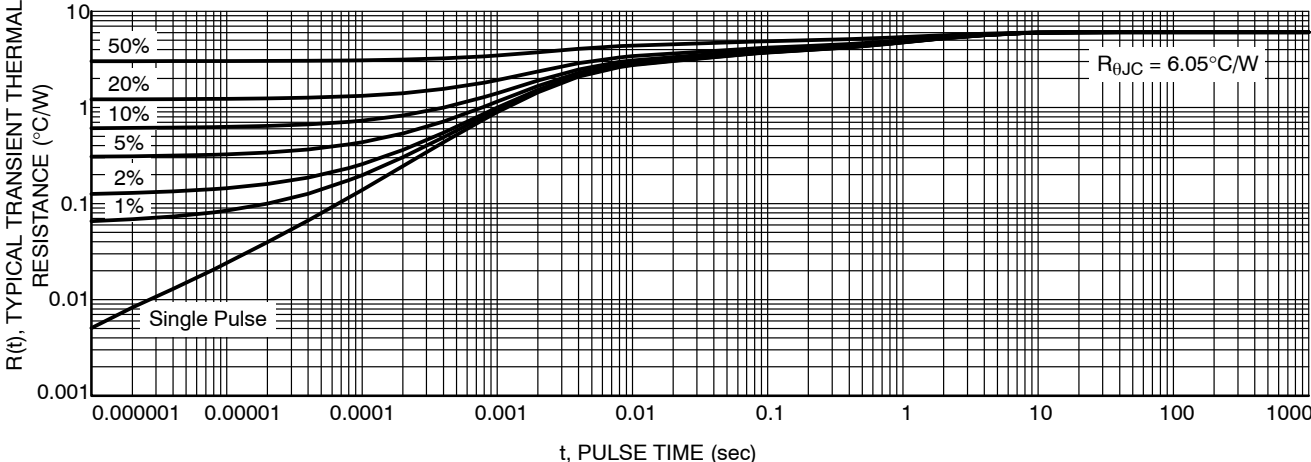


Figure 12. Typical Transient Thermal Response per Device (NTSJ40200CTG)

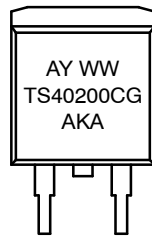
NTSB40200CT, NRVTSB40200CT, NTSJ40200CT

ORDERING INFORMATION

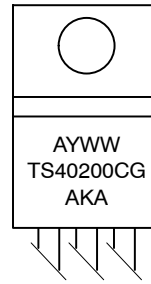
Device	Package	Shipping
NTSB40200CTG	D ² PAK-3 (Pb-Free)	50 Units / Rail
NTSB40200CTT4G	D ² PAK-3 (Pb-Free)	800 / Tape & Reel
NRVTSB40200CTT4G*	D ² PAK-3 (Pb-Free)	800 / Tape & Reel
NTSJ40200CTG (In Development)	TO-220FP (Halide-Free)	50 Units / Rail

*NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

MARKING DIAGRAMS



D²PAK-3



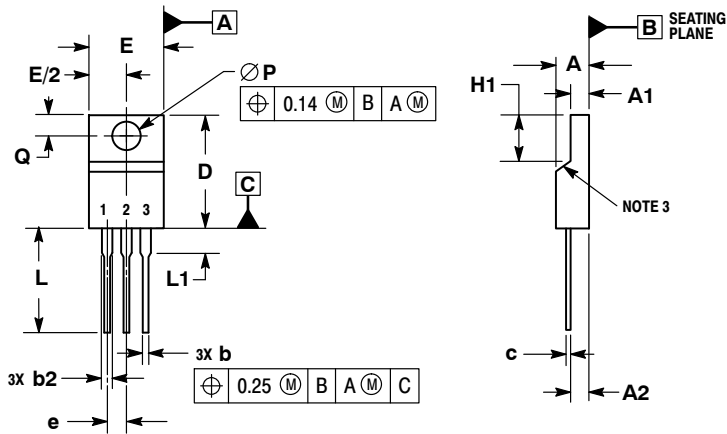
TO-220FP

- A = Assembly Location
- Y = Year
- WW = Work Week
- AKA = Polarity Designator
- G = Pb-Free Package

NTSB40200CT, NRVTSB40200CT, NTSJ40200CT

PACKAGE DIMENSIONS

TO-220 FULLPACK, 3-LEAD CASE 221AH ISSUE D



NOTES:

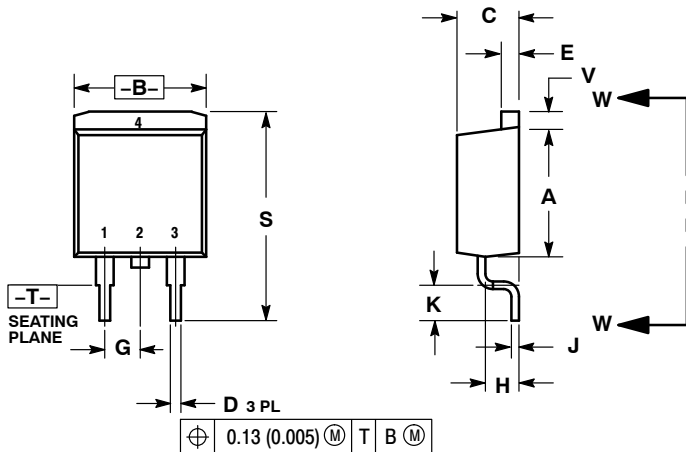
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR UNCONTROLLED IN THIS AREA.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH AND GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEASURED AT OUTERMOST EXTREME OF THE PLASTIC BODY.
5. DIMENSION b2 DOES NOT INCLUDE DAMBAR PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 2.00.

DIM	MILLIMETERS	
	MIN	MAX
A	4.30	4.70
A1	2.50	2.90
A2	2.50	2.70
b	0.54	0.84
b2	1.10	1.40
c	0.49	0.79
D	14.70	15.30
E	9.70	10.30
e	2.54 BSC	
H1	6.70	7.10
L	12.70	14.73
L1	---	2.10
P	3.00	3.40
Q	2.80	3.20

NTSB40200CT, NRVTSB40200CT, NTSJ40200CT

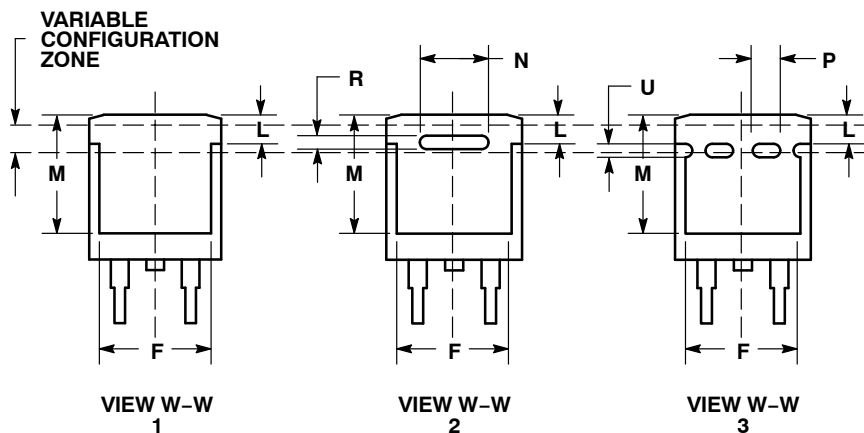
PACKAGE DIMENSIONS

D²PAK 3
CASE 418B-04
ISSUE L



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	1.83
M	0.280	0.320	7.11	8.13
N	0.197 REF		5.00 REF	
P	0.079 REF		2.00 REF	
R	0.039 REF		0.99 REF	
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40



ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Email Requests to: orderlit@onsemi.com

TECHNICAL SUPPORT
North American Technical Support:
Voice Mail: 1 800-282-9855 Toll Free USA/Canada
Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:
Phone: 00421 33 790 2910
For additional information, please contact your local Sales Representative