# Very Low Forward Voltage Trench-based Schottky Rectifier

Exceptionally Low  $V_F = 0.38 \text{ V}$  at  $I_F = 5 \text{ A}$ 

#### **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
- Pb-Free and Halide-Free Packages are Available

#### **Typical Applications**

- Switching Power Supplies including Notebook / Netbook Adapters, ATX and Flat Panel Display
- High Frequency and DC-DC Converters
- Freewheeling and OR-ing diodes
- Reverse Battery Protection
- Instrumentation

#### **Mechanical Characteristics**

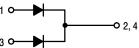
- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94-0 @ 0.125 in
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Maximum for 10 sec

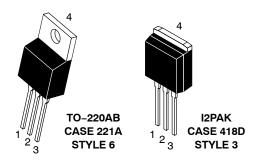


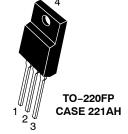
#### ON Semiconductor®

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# PIN CONNECTIONS









#### **ORDERING INFORMATION**

See detailed ordering and shipping information on page 5 of this data sheet.

#### **MAXIMUM RATINGS**

Rating		Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage		V <sub>RRM</sub> V <sub>RWM</sub> V <sub>R</sub>	100	V
Average Rectified Forward Current (Rated $V_R$ , $T_C = 120^{\circ}C$ )	Per device Per diode	I <sub>F(AV)</sub>	40 20	А
Peak Repetitive Forward Current (Rated V <sub>R</sub> , Square Wave, 20 kHz, T <sub>C</sub> = 125°C)	Per device Per diode	I <sub>FRM</sub>	60 30	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)		I <sub>FSM</sub>	250	А
Operating Junction Temperature		TJ	-40 to +150	°C
Storage Temperature		T <sub>stg</sub>	-40 to +150	°C
Voltage Rate of Change (Rated V <sub>R</sub> )		dv/dt	10,000	V/µs

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	NTST40100CTG, NTSB40100CT-1G	NTSB40100CTG	NTSJ40100CTG	Unit
Maximum Thermal Resistance per Diode Junction-to-Case Junction-to-Ambient	$egin{array}{c} R_{ heta JA} \end{array}$	1.3 70	0.79 46.3	4.0 105	°C/W

#### **ELECTRICAL CHARACTERISTICS** (Per Leg unless otherwise noted)

Rating	Symbol	Тур	Max	Unit
Maximum Instantaneous Forward Voltage (Note 1)	v <sub>F</sub>			V
$(I_F = 5 \text{ A}, T_J = 25^{\circ}\text{C})$ $(I_F = 10 \text{ A}, T_J = 25^{\circ}\text{C})$		0.46 0.56	_	
(I <sub>F</sub> = 20 A, T <sub>J</sub> = 25°C)		0.71	0.80	
$(I_F = 5 \text{ A}, T_J = 125^{\circ}\text{C})$ $(I_F = 10 \text{ A}, T_J = 125^{\circ}\text{C})$ $(I_F = 20 \text{ A}, T_J = 125^{\circ}\text{C})$		0.41 0.52 0.63	- - 0.68	
Maximum Instantaneous Reverse Current (Note 1) $(V_R = 70 \text{ V}, T_J = 25^{\circ}\text{C})$ $(V_R = 70 \text{ V}, T_J = 125^{\circ}\text{C})$	I <sub>R</sub>	12 8.0		μΑ mA
(Rated dc Voltage, $T_J = 25^{\circ}C$ ) (Rated dc Voltage, $T_J = 125^{\circ}C$ )		20 20	1000 45	μA 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 =  $300 \,\mu s$ , Duty Cycle  $\leq 2.0\%$ 

#### **TYPICAL CHARACTERISTICS**

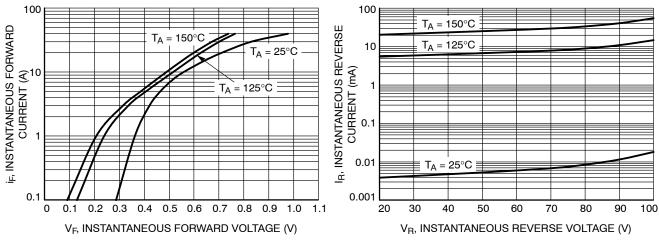


Figure 1. Typical Instantaneous Forward Characteristics

Figure 2. Typical Reverse Characteristics

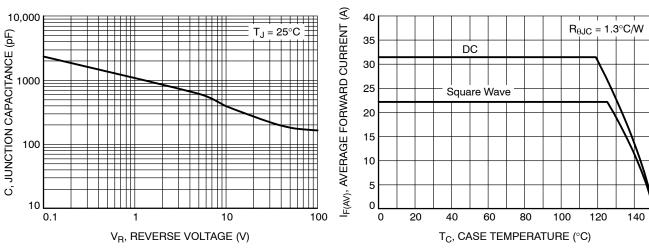
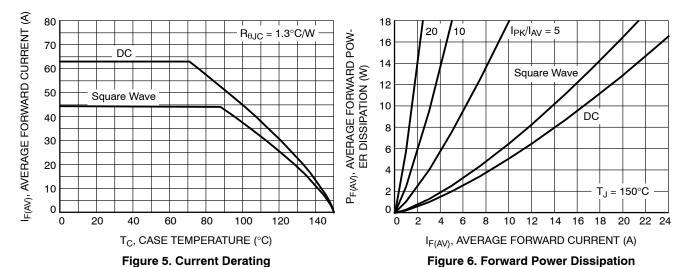


Figure 3. Typical Junction Capacitance

Figure 4. Current Derating per Leg



#### **TYPICAL CHARACTERISITICS**

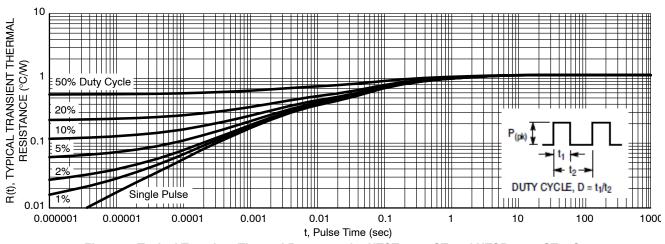


Figure 7. Typical Transient Thermal Response for NTST40100CT and NTSB40100CT-1G

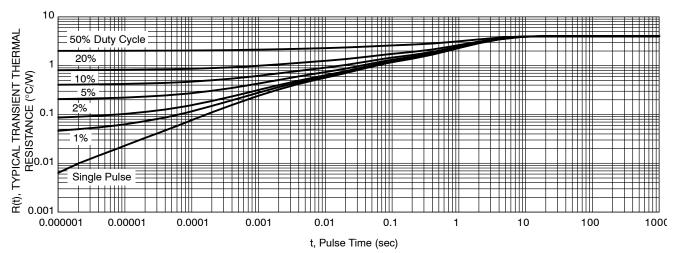


Figure 8. Typical Transient Thermal Response for NTSJ40100CTG

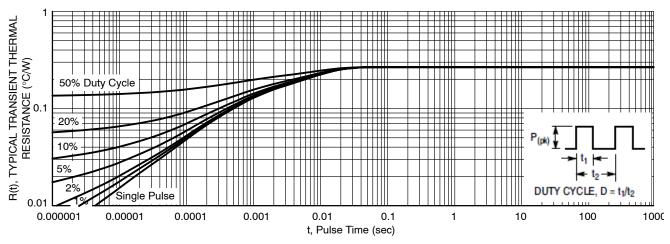


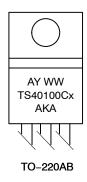
Figure 9. Typical Transient Thermal Response for NTSB40100CTG

#### **ORDERING INFORMATION**

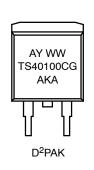
Device	Package	Shipping <sup>†</sup>
NTST40100CTG	TO-220AB (Pb-Free)	50 Units / Rail
NTSB40100CT-1G	I <sup>2</sup> PAK (Pb-Free)	50 Units / Rail
NTSB40100CTG	D <sup>2</sup> PAK (Pb-Free)	50 Units / Rail
NTSB40100CTT4G	D <sup>2</sup> PAK (Pb-Free)	800 / Tape & Reel
NTSJ40100CTG	TO-220FP (Halide-Free)	50 Units / Rail

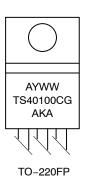
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

#### **MARKING DIAGRAMS**









A = Assembly Location

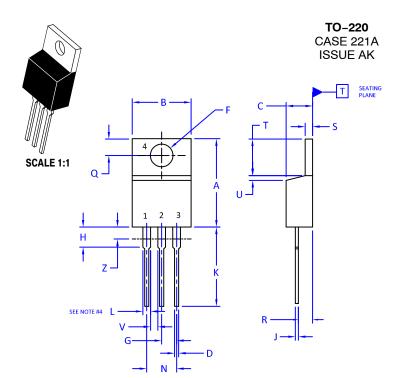
Y = Year

WW = Work Week
AKA = Polarity Designator

x = G or H

G = Pb-Free Package H = Halide-Free Package





**DATE 13 JAN 2022** 

#### NOTES:

- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
- 2. CONTROLLING DIMENSION: INCHES
- 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

#### 4. MAX WIDTH FOR F102 DEVICE = 1.35MM

	INCHES		MILLIMI	ETERS
DIM	MIN.	MAX.	MIN.	MAX.
Α	0.570	0.620	14.48	15.75
В	0.380	0.415	9.66	10.53
С	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.60	4.09
G	0.095	0.105	2.42	2.66
Н	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.41
Т	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045		1.15	
Z		0.080		2.04

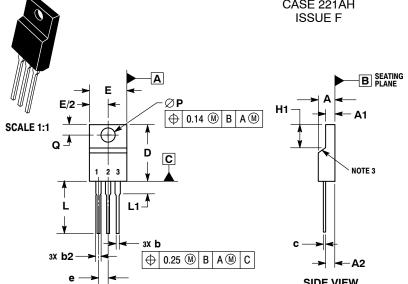
STYLE 1:		STYLE 2:		STYLE 3:		STYLE 4:	
PIN 1.	BASE	PIN 1.	BASE	PIN 1.	CATHODE	PIN 1.	MAIN TERMINAL 1
2.	COLLECTOR	2.	EMITTER	2.	ANODE	2.	MAIN TERMINAL 2
3.	EMITTER	3.	COLLECTOR	3.	GATE	3.	GATE
4.	COLLECTOR	4.	EMITTER	4.	ANODE	4.	MAIN TERMINAL 2
STYLE 5:		STYLE 6:		STYLE 7:		STYLE 8:	
PIN 1.	GATE	PIN 1.	ANODE	PIN 1.	CATHODE	PIN 1.	CATHODE
2.	DRAIN	2.	CATHODE	2.	ANODE	2.	ANODE
3.	SOURCE	3.	ANODE	3.	CATHODE	3.	EXTERNAL TRIP/DELAY
4.	DRAIN	4.	CATHODE	4.	ANODE	4.	ANODE
STYLE 9:		STYLE 10:		STYLE 11:		STYLE 12:	
PIN 1.	GATE	PIN 1.	GATE	PIN 1.	DRAIN	PIN 1.	MAIN TERMINAL 1
2.	COLLECTOR	2.	SOURCE	2.	SOURCE	2.	MAIN TERMINAL 2
3.	EMITTER	3.	DRAIN	3.	GATE	3.	GATE
4.	COLLECTOR	4.	SOURCE	4.	SOURCE	4.	NOT CONNECTED

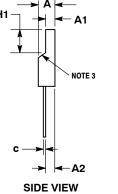
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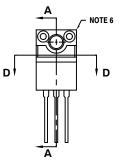
**DATE 30 SEP 2014** 

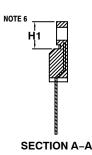






**FRONT VIEW** 





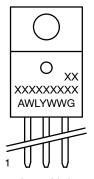
**ALTERNATE CONSTRUCTION** 

NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
- 2. CONTROLLING DIMENSION: MILLIMETERS.
  3. CONTOUR UNCONTROLLED IN THIS AREA.
- CONTOUR ONCOUNT HOLLED IN THIS AREA.
   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.
   DIMENSION b2 DOES NOT INCLUDE DAMBAR PROTRUSION.
   LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 2.00.
- 6. CONTOURS AND FEATURES OF THE MOLDED PACKAGE BODY MAY VARY WITHIN THE ENVELOP DEFINED BY DIMENSIONS AT AND H1 FOR MANUFACTURING PURPOSES.

THE THE CIT WAS A COLUMN				
	MILLIMETERS			
DIM	MIN	MAX		
Α	4.30	4.70		
A1	2.50	2.90		
A2	2.50	2.90		
b	0.54	0.84		
b2	1.10	1.40		
С	0.49	0.79		
D	14.70	15.30		
E	9.70	10.30		
е	2.54	BSC		
H1	6.60	7.10		
L	12.50	14.73		
L1		2.80		
P	3.00	3.40		
Q	2.80	3.20		

#### **GENERIC MARKING DIAGRAM\***



= Assembly Location

WL = Wafer Lot

= Year

WW = Work Week

G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ■", may or may not be present.

STYLE 1:		STYLE 2:	
PIN 1.	MAIN TERMINAL 1	PIN 1.	CATHODE
2.	MAIN TERMINAL 2	2.	ANODE
3.	GATE	3.	GATE

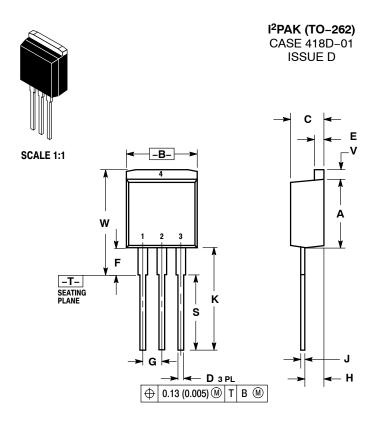
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# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®





**DATE 16 OCT 2007** 

#### NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- 2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.335	0.380	8.51	9.65
В	0.380	0.406	9.65	10.31
C	0.160	0.185	4.06	4.70
D	0.026	0.035	0.66	0.89
Ε	0.045	0.055	1.14	1.40
F	0.122	REF	3.10 REF	
G	0.100	BSC	2.54 BSC	
Н	0.094	0.110	2.39	2.79
J	0.013	0.025	0.33	0.64
K	0.500	0.562	12.70	14.27
S	0.390 REF		9.90	REF
٧	0.045	0.070	1.14	1.78
W	0.522	0.551	13.25	14.00

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2: PIN 1. GATE 2. DRAIN 3. SOURCE

STYLE 3: PIN 1. ANODE 2. CATHODE 3. ANODE 4. CATHODE STYLE 4:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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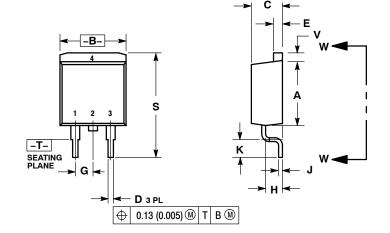




D<sup>2</sup>PAK 3 CASE 418B-04 **ISSUE L** 

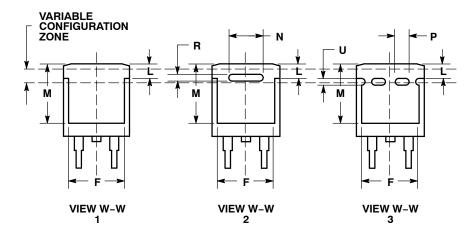
**DATE 17 FEB 2015** 

#### SCALE 1:1



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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
Α	0.340	0.380	8.64	9.65
В	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
Е	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
Н	0.080	0.110	2.03	2.79
7	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
М	0.280	0.320	7.11	8.13
N	0.197 REF		5.00 REF	
Р	0.079 REF		2.00 REF	
R	0.039 REF		0.99 REF	
S	0.575	0.625	14.60	15.88
٧	0.045	0.055	1.14	1.40



STYLE 1: PIN 1. BASE 2. COLLECTOR
3. EMITTER
4. COLLECTOR STYLE 2: PIN 1. GATE 2. DRAIN 3. SOURCE 4. DRAIN STYLE 3: PIN 1. ANODE 2. CATHODE 3. ANODE 4. CATHODE

STYLE 4:

PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 5: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. ANODE

STYLE 6: PIN 1. NO CONNECT
2. CATHODE
3. ANODE
4. CATHODE

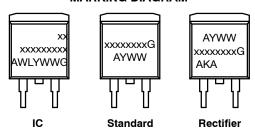
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**DATE 17 FEB 2015** 

# GENERIC MARKING DIAGRAM\*



xx = Specific Device Code A = Assembly Location

 WL
 = Wafer Lot

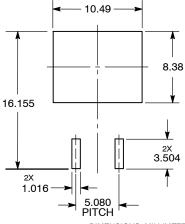
 Y
 = Year

 WW
 = Work Week

 G
 = Pb-Free Package

 AKA
 = Polarity Indicator

#### **SOLDERING FOOTPRINT\***



DIMENSIONS: MILLIMETERS

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<sup>\*</sup>This information is generic. Please refer to device data sheet for actual part marking. Pb–Free indicator, "G" or microdot " ■", may or may not be present.

<sup>\*</sup>For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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BAS16E6433HTMA1 BAT 54-02LRH E6327 NSR05F40QNXT5G NTE555 JANS1N6640 SB07-03C-TB-H SB1003M3-TL-W SK310-T

SK32A-LTP SK34B-TP SS3003CH-TL-E GA01SHT18 CRS10I30A(TE85L,QM MA4E2501L-1290 MBRB30H30CT-1G SB007-03C-TB-E SK32A-TP SK33B-TP SK38B-TP NRVBM120LT1G NTE505 NTSB30U100CT-1G SS15E-TP VS-6CWQ10FNHM3 ACDBA1100LR-HF ACDBA1200-HF ACDBA2100-HF ACDBA3100-HF CDBQC0530L-HF ACDBA340-HF ACDBA260LR-HF

ACDBA1100-HF SK310B-TP MA4E2502L-1246 MA4E2502H-1246 NRVBM120ET1G NSR01L30MXT5G NTE573 NTE6081 SB560 PMAD1108-LF