Very Low Forward Voltage Trench-based Schottky Rectifier

Exceptionally Low $V_F = 0.50 \text{ V}$ 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
- These are Pb-Free Devices

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

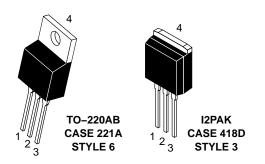
- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94–0 @ 0.125 in
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Maximum for 10 sec

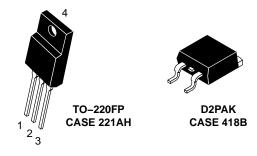


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PIN CONNECTIONS 2,4





ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section 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 _{RRM} V _{RWM} V _R	100	V
Average Rectified Forward Current (Rated V _R , T _C = 130°C)	Per device Per diode	I _{F(AV)}	20 10	А
Peak Repetitive Forward Current (Rated V _R , Square Wave, 20 kHz, T _C = 125°C)	Per device Per diode	I _{FRM}	40 20	А
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)		I _{FSM}	150	А
Operating Junction Temperature		TJ	-40 to +150	°C
Storage Temperature		T _{stg}	-40 to +150	°C
Voltage Rate of Change (Rated V _R)		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	NTST20100CTG, NTSB20100CT-1G	NTSB20100CTG	NTSJ20100CTG	Unit
Maximum Thermal Resistance per Diode Junction-to-Case Junction-to-Ambient	$R_{ heta JC} \ R_{ heta JA}$	2.5 70	1.5 46.9	4.49 105	°C/W

ELECTRICAL CHARACTERISTICS (Per Leg unless otherwise noted)

Rating	Symbol	Тур	Max	Unit
Maximum Instantaneous Forward Voltage (Note 1)	v _F			V
$(I_F = 5 \text{ A}, T_J = 25^{\circ}\text{C})$		0.55	_	
$(I_F = 10 \text{ A}, T_J = 25^{\circ}\text{C})$		0.65	0.83	
(I _F = 5 A, T _J = 125°C) (I _F = 10 A, T _J = 125°C)		0.50 0.58	- 0.68	
Maximum Instantaneous Reverse Current (Note 1)	I _R	47		
$(V_R = 70 \text{ V}, T_J = 25^{\circ}\text{C})$		17 5.2	_	μA
$(V_R = 70 \text{ V}, T_J = 125^{\circ}\text{C})$		5.3	_	mA
(Rated dc Voltage, T _J = 25°C)		_	800	μΑ
(Rated dc Voltage, T _J = 125°C)		12	25	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.

Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%

TYPICAL CHARACTERISITICS

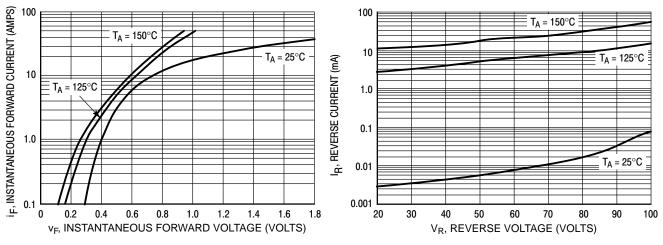


Figure 1. Typical Forward Voltage

Figure 2. Typical Reverse Current

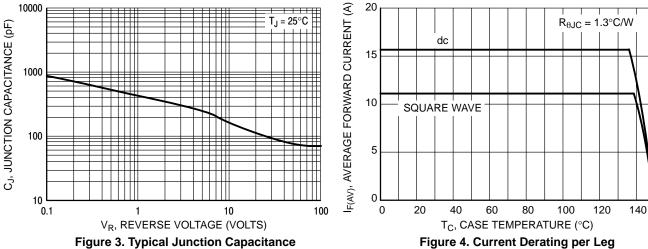


Figure 3. Typical Junction Capacitance

 $R_{\theta JC} = 1.3^{\circ}C/W$

40

35

30

25

20

15 10

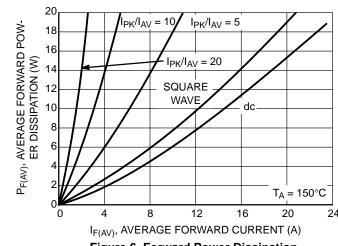
0

dc

SQUARE WAVE

20

I_{F(AV)}, AVERAGE FORWARD CURRENT (A)



T_C, CASE TEMPERATURE (°C) Figure 5. Current Derating

60

80

100

120

140

Figure 6. Forward Power Dissipation

TYPICAL CHARACTERISITICS

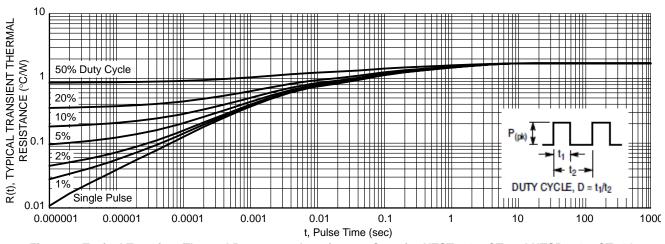


Figure 7. Typical Transient Thermal Response, Junction-to-Case for NTST20100CT and NTSB20100CT-1G

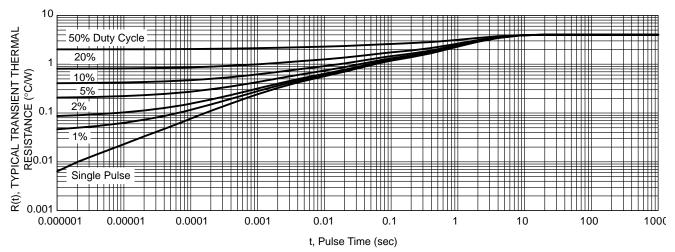


Figure 8. Typical Transient Thermal Response, Junction-to-Case for NTSJ20100CTG

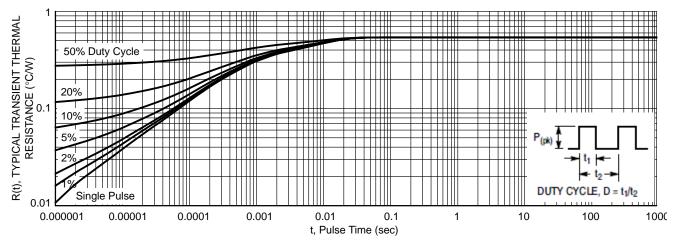


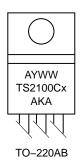
Figure 9. Typical Transient Thermal Response for NTSB20100CTG

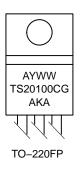
${\tt NTST20100CTG,\,NTSB20100CT-1G,\,NTSJ20100CTG,\,NTSB20100CTG}$

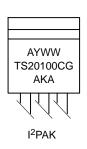
ORDERING INFORMATION

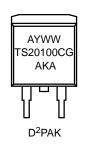
Device	Package	Shipping
NTST20100CTG	TO-220AB (Pb-Free)	50 Units / Rail
NTSB20100CT-1G	I ² PAK (Pb-Free)	50 Units / Rail
NTSJ20100CTG	TO-220FP (Halide-Free)	50 Units / Rail
NTSB20100CTG	D ² PAK (Pb-Free)	50 Units / Rail
NTSB20100CTT4G	D ² PAK (Pb-Free)	800 / Tape & Reel

MARKING DIAGRAMS









A = Assembly Location

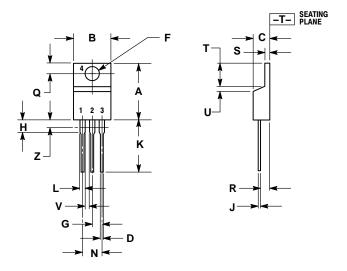
Y = Year WW = Work Week AKA = Polarity Designator

x = G or H

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

PACKAGE DIMENSIONS

TO-220 CASE 221A-09 **ISSUE AH**



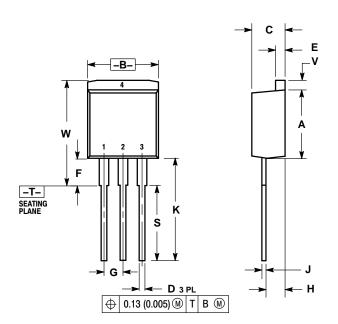
- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.570	0.620	14.48	15.75
В	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
7	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
œ	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
5	0.000	0.050	0.00	1.27
٧	0.045		1.15	
Z		0.080		2.04

STYLE 6: PIN 1. ANODE

- 2. CATHODE 3. ANODE 4. CATHODE

I²PAK (TO-262) CASE 418D ISSUE D



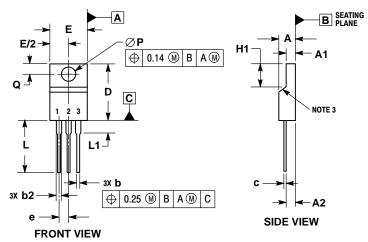
- NOTES: 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982. 2. CONTROLLING DIMENSION: INCH.

	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
С	0.160	0.185	4.06	4.70
D	0.026	0.035	0.66	0.89
E	0.045	0.055	1.14	1.40
F	0.122 REF		3.10 REF	
G	0.100	0.100 BSC		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

PACKAGE DIMENSIONS

TO-220 FULLPACK, 3-LEAD

CASE 221AH **ISSUE F**

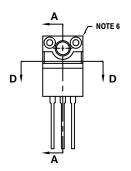


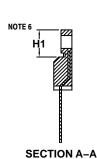


- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ASME
- 1. DIMENSIONING AND TOLERANDING FEB AGME
 Y14.5M, 1994.
 2. CONTROLLING DIMENSION: MILLIMETERS.
 3. CONTOUR UNCONTROLLED IN THIS AREA.
 4. DIMENSIONS O AND E DO NOT INCLUDE MOLD FLASH AND GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 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.
- 6. CONTOURS AND FEATURES OF THE MOLDED PACKAGE BODY MAY VARY WITHIN THE ENVELOP DEFINED BY DIMENSIONS A1 AND H1 FOR MANUFACTURING PURPOSES.

	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		
Е	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		



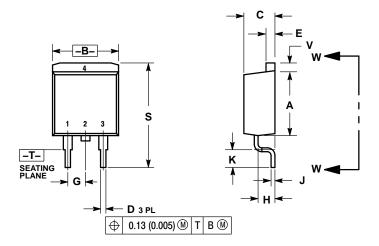




ALTERNATE CONSTRUCTION

PACKAGE DIMENSIONS

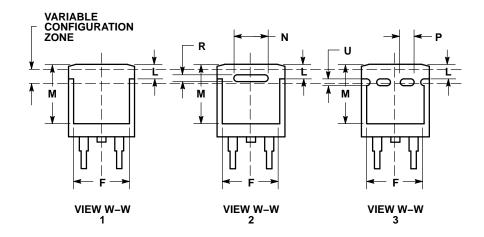
D²PAK 3 CASE 418B-04 ISSUE K



NOTES:

- 1. DIMENSIONING AND TOLERANCING
- PER ANSI Y14.5M, 1982. 2. CONTROLLING DIMENSION: INCH.
- 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
С	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	
Н	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
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
V	0.045	0.055	1.14	1.40



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