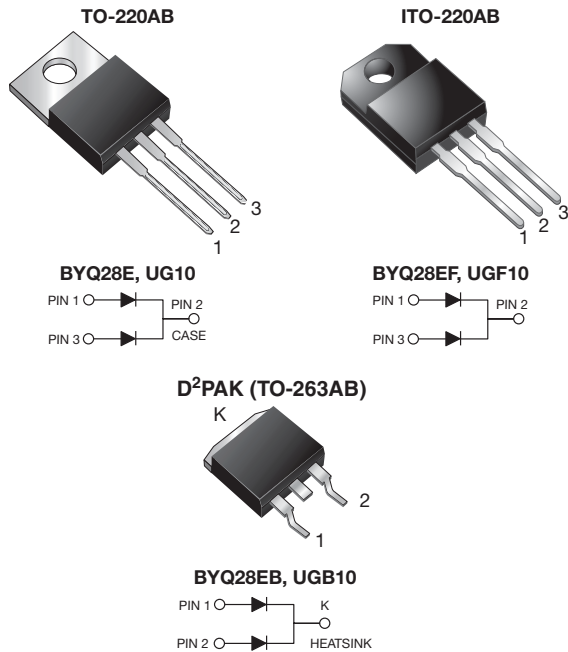




## Dual Common Cathode Ultrafast Rectifier



### FEATURES

- Power pack
- Glass passivated pellet chip junction
- Ultrafast recovery times
- Soft recovery characteristics
- Low switching losses, high efficiency
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C for D²PAK (TO-263AB package)
- Solder dip 275 °C max. 10 s, per JESD 22-B106 (for TO-220AB and ITO-220AB package)
- AEC-Q101 qualified available
- Automotive ordering code: base P/NHE3 (for ITO-220AB and D²PAK (TO-263AB package))
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

For use in low voltage, high frequency rectifier of switching power supplies, freewheeling diodes, DC/DC converters and polarity protection application.

### DESIGN SUPPORT TOOLS AVAILABLE



3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 5.0 A
$V_{RRM}$	100 V to 200 V
$I_{FSM}$	55 A
$t_{rr}$	25 ns
$V_F$	0.895 V
$T_J$ max.	150 °C
Package	TO-220AB, ITO-220AB, D²PAK (TO-263AB)
Circuit configuration	Common cathode

### MECHANICAL DATA

**Case:** TO-220AB, ITO-220AB, D²PAK (TO-263AB)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS-compliant, commercial grade

Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified ("X" denotes revision code e.g. A, B,...)

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

E3 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** as marked

**Mounting Torque:** 10 in-lbs max.

MAXIMUM RATINGS ( $T_C = 25\text{ °C}$ unless otherwise noted)					
PARAMETER	SYMBOL	UG10BCT	UG10CCT	UG10DCT	UNIT
		BYQ28E-100	BYQ28E-150	BYQ28E-200	
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	150	200	V
Working peak reverse voltage	$V_{RWM}$	100	150	200	V
Maximum DC blocking voltage	$V_{DC}$	100	150	200	V
Maximum average forward rectified current at $T_C = 100\text{ °C}$ total device per diode	$I_{F(AV)}$	10			A
		5.0			
Peak forward surge current 8.3 ms single half sine-wave	$I_{FSM}$	55			A
Non-repetitive peak reverse current per diode at $t_p = 100\text{ }\mu\text{s}$	$I_{RSM}$	0.2			A
Electrostatic discharge capacitor voltage, human body model: C = 250 pF, R = 1.5 k $\Omega$	$V_C$	8			kV
Operating junction and storage temperature range	$T_J, T_{STG}$	-40 to +150			°C
Isolation voltage (ITO-220AB only) from terminal to heatsink t = 1 min	$V_{AC}$	1500			V



ELECTRICAL CHARACTERISTICS (T <sub>C</sub> = 25 °C unless otherwise noted)					
PARAMETER	TEST CONDITIONS		SYMBOL	VALUE	UNIT
Maximum instantaneous forward voltage per diode	I <sub>F</sub> = 10 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.25	V
	I <sub>F</sub> = 5 A			1.10	
		T <sub>J</sub> = 150 °C		0.895	
Maximum reverse current per diode at working peak reverse voltage		T <sub>J</sub> = 25 °C	I <sub>R</sub>	10	μA
		T <sub>J</sub> = 100 °C		200	
Maximum reverse recovery time per diode	I <sub>F</sub> = 1.0 A, di/dt = 100 A/μs, V <sub>R</sub> = 30 V, I <sub>rr</sub> = 0.1 I <sub>RM</sub>		t <sub>rr</sub>	25	ns
Maximum reverse recovery time per diode	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A		t <sub>rr</sub>	20	ns
Maximum stored charge per diode	I <sub>F</sub> = 2 A, di/dt = 20 A/μs, V <sub>R</sub> = 30 V, I <sub>rr</sub> = 0.1 I <sub>RM</sub>		Q <sub>rr</sub>	9	nC

**Note**

(1) Pulse test: 300 μs pulse width, 1 % duty cycle

THERMAL CHARACTERISTICS (T <sub>C</sub> = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	UG10	UGF10	UGB10	UNIT
		BYQ28E	BYQ28EF	BYQ28EB	
Typical thermal resistance per diode, junction to ambient	R <sub>θJA</sub>	50	55	50	°C/W
Typical thermal resistance per diode, junction to case	R <sub>θJC</sub>	4.5	6.7	4.8	

ORDERING INFORMATION (Example)					
PACKAGE	PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
TO-220AB	BYQ28E-200-E3/45	1.80	45	50/tube	Tube
ITO-220AB	BYQ28EF-200-E3/45	1.95	45	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	BYQ28EB-200-E3/45	1.77	45	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	BYQ28EB-200-E3/81	1.77	81	800/reel	Tape and reel
ITO-220AB	BYQ28EF-200HE3_A/P <sup>(1)</sup>	1.95	P	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	BYQ28EB-200HE3_A/P <sup>(1)</sup>	1.95	P	50/tube	Tube
D <sup>2</sup> PAK (TO-263AB)	BYQ28EB-200HE3_A/I <sup>(1)</sup>	1.95	I	800/reel	Tape and reel

**Note**

(2) AEC-Q101 qualified, available in ITO-220AB and D<sup>2</sup>PAK (TO-263AB) package



RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)

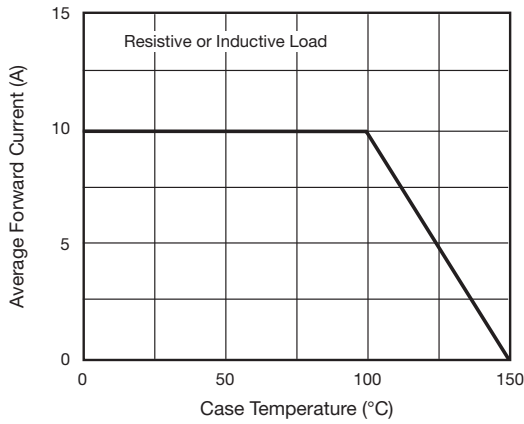


Fig. 1 - Forward Current Derating Curve

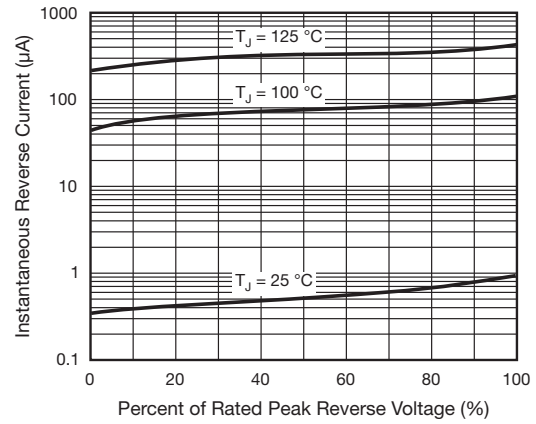


Fig. 4 - Typical Reverse Characteristics Per Diode

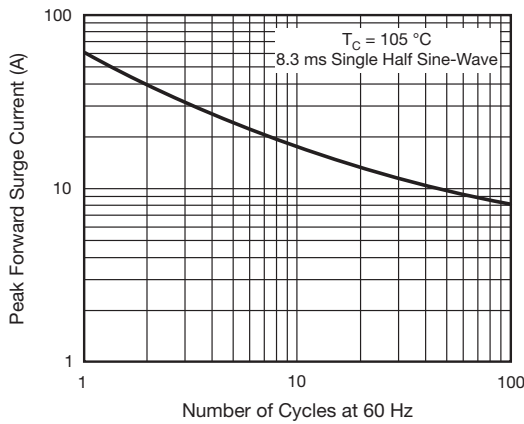


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current Per Diode

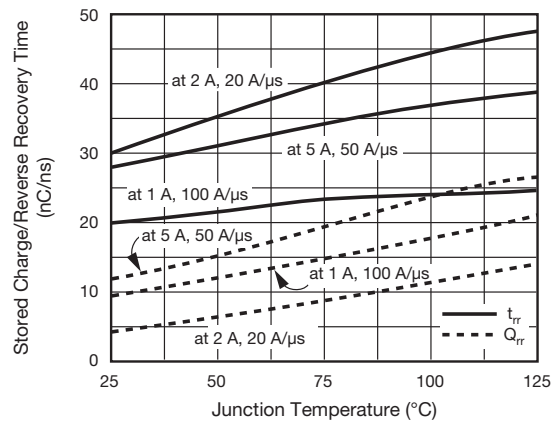


Fig. 5 - Reverse Switching Characteristics Per Diode

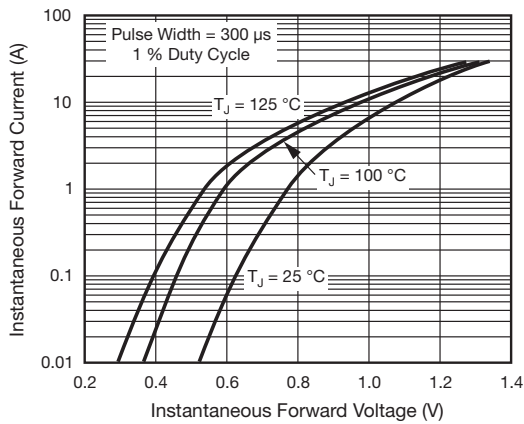


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

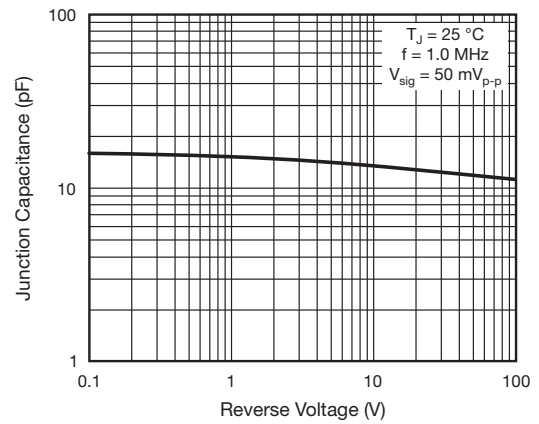
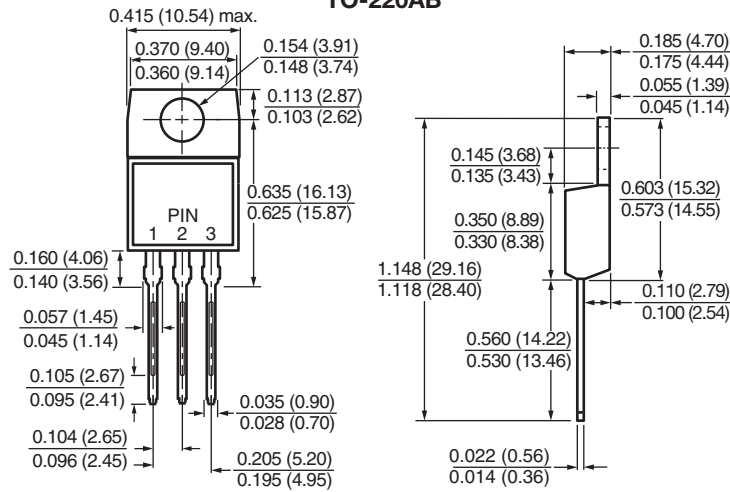


Fig. 6 - Typical Junction Capacitance Per Diode

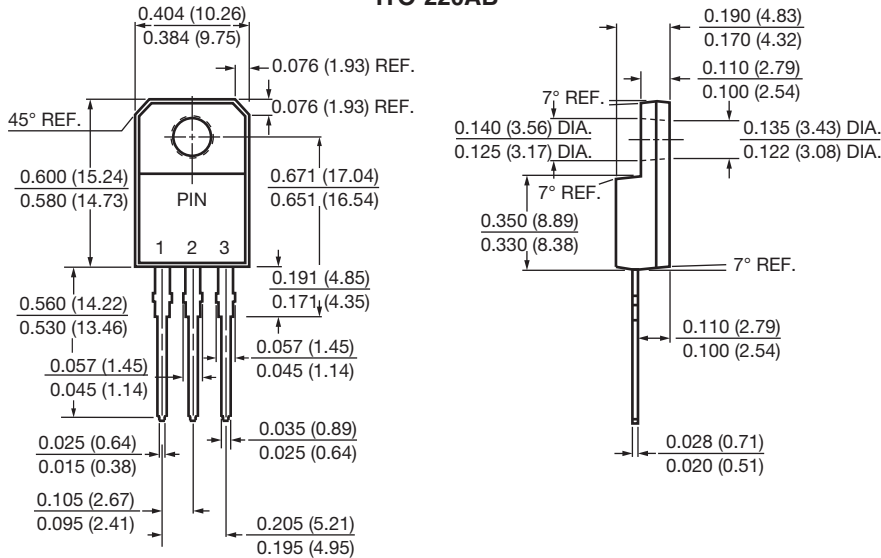


PACKAGE OUTLINE DIMENSION in inches (millimeters)

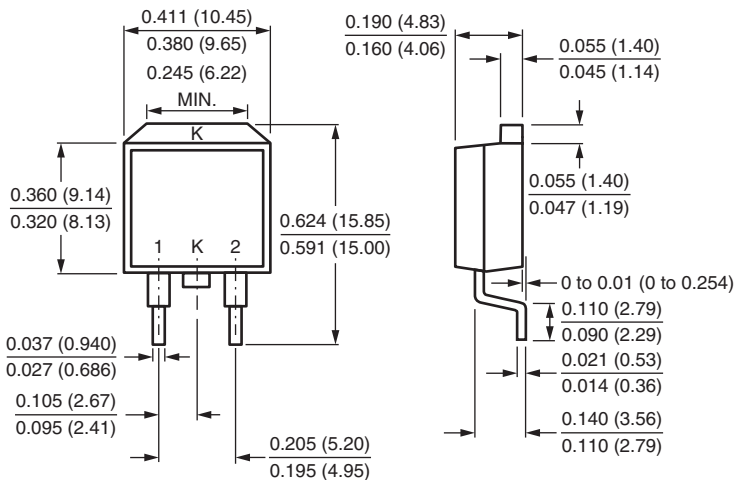
TO-220AB



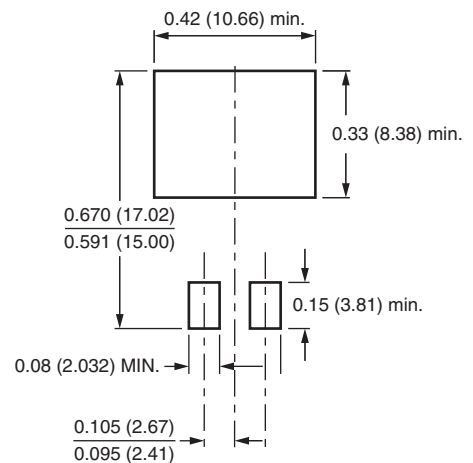
ITO-220AB



D<sup>2</sup>PAK (TO-263AB)



Mounting Pad Layout





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