



## QR406/QR406F/QR406D/QD406S

### PLANAR STRUCTURED SUPERFAST RECOVERY RECTIFIERS

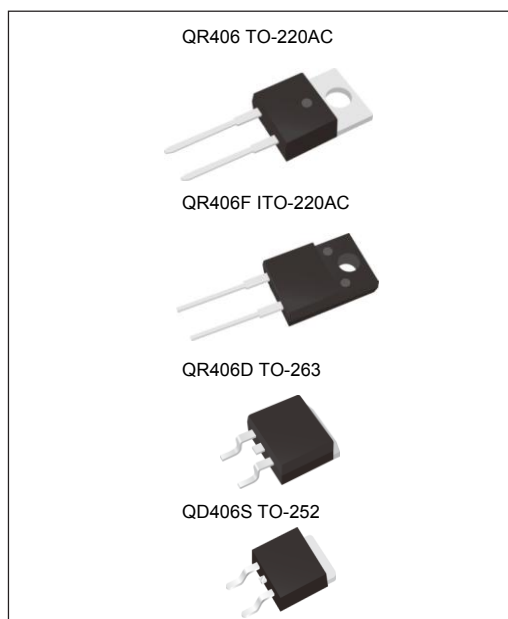
**VOLTAGE** 600 Volt **CURRENT** 4 Ampere

#### FEATURES

- Planar structure with EPI wafer
- Ultrafast recovery time, low  $V_F$  and soft recovery
- For PFCDM operation
- Low leakage current
- Plastic package has Underwriters Laboratory Flammability Classification 94V-O Flame Retardant Epoxy Molding Compound
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

#### MECHANICAL DATA

- Case: TO-220AC, ITO-220AC, TO-263, TO-252 package
- Terminals: Lead solderable per MIL-STD-750, Method 2026
- TO-220AC Weight: 0.067 ounces, 1.89 grams
- ITO-220AC Weight: 0.055 ounces, 1.56 grams
- TO-263 Weight: 0.049 ounces, 1.38 grams
- TO-252 Weight: 0.0104 ounces, 0.297 grams



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

PARAMETER	SYMBOL	VALUE	UNIT
Maximum recurrent peak reverse voltage	$V_{RRM}$	600	V
Maximum rms voltage	$V_{RMS}$	420	V
Maximum dc blocking voltage	$V_R$	600	V
Maximum average forward rectified current	$I_{F(AV)}$	4	A
Peak forward surge current 8.3ms single half sine-wave superimposed on rated load	$I_{FSM}$	35	A
Typical thermal resistance	$R_{\theta JC}$	TO-220AC(Note 1) ITO-220AC(Note 1) TO-263 (Note 1) TO-252 (Note 2)	2 5.5 2 5.5 °C/W
Operating junction temperature range	$T_J$	-55 to + 175	°C
Storage temperature range	$T_{STG}$	-55 to + 175	°C

#### NOTE :

1. Device mounted on a infinite heatsink , then measured the center of the marking side.
2. Device mounted on a 10cm\*10cm\*0.5mm copper pad area , then measured the center of the marking side.



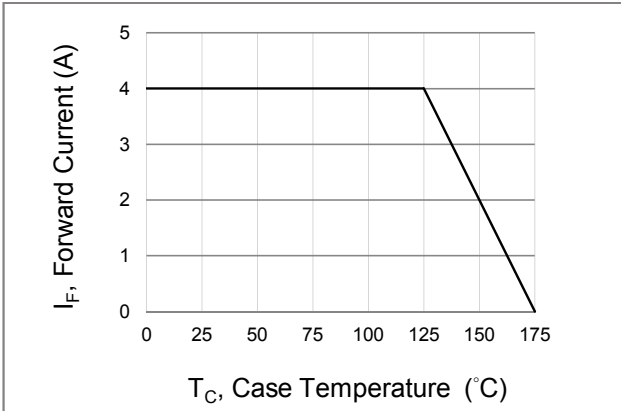
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### ELECTRICAL CHARACTERISTICS(T<sub>A</sub>=25°C unless otherwise noted)

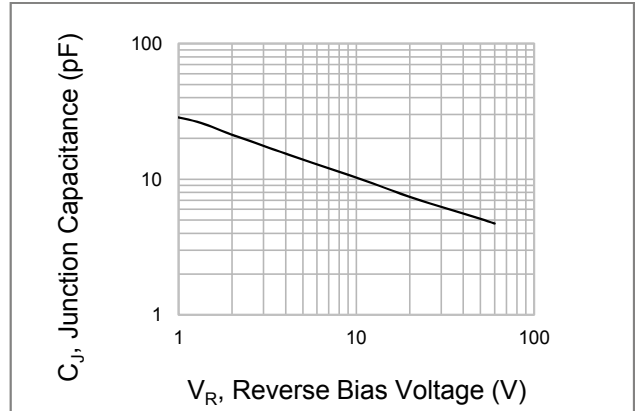
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Breakdown voltage	V <sub>BR</sub>	I <sub>R</sub> =100μA T <sub>J</sub> =25°C	600	-	-	V
Instantaneous forward voltage	V <sub>F</sub>	I <sub>F</sub> =1A T <sub>J</sub> =25°C	-	1.02	-	V
		I <sub>F</sub> =4A T <sub>J</sub> =25°C	-	1.23	1.45	V
		I <sub>F</sub> =1A T <sub>J</sub> =125°C	-	0.84	-	V
		I <sub>F</sub> =4A T <sub>J</sub> =125°C	-	1.1	1.3	V
Reverse leakage current	I <sub>R</sub>	V <sub>R</sub> =600V T <sub>J</sub> =25°C T <sub>J</sub> =125°C	- -	- -	3 100	μA
Reverse recovery time	T <sub>RR</sub>	I <sub>F</sub> =0.5A I <sub>R</sub> =1A I <sub>RR</sub> =0.25A T <sub>J</sub> =25°C	-	-	45	ns
		I <sub>F</sub> =1A V <sub>R</sub> =30V di/dt=100A/μs T <sub>J</sub> =25°C	-	-	35	ns
		I <sub>F</sub> =4A V <sub>R</sub> =400V di/dt=200A/μs T <sub>J</sub> =25°C	-	60	-	ns
Peak recovery current	I <sub>RRM</sub>	I <sub>F</sub> =4A V <sub>R</sub> =400V di/dt=200A/μs T <sub>J</sub> =25°C	-	4	-	A
Reverse recovery charge	Q <sub>RR</sub>	I <sub>F</sub> =4A V <sub>R</sub> =400V di/dt=200A/μs T <sub>J</sub> =25°C	-	135	-	nC



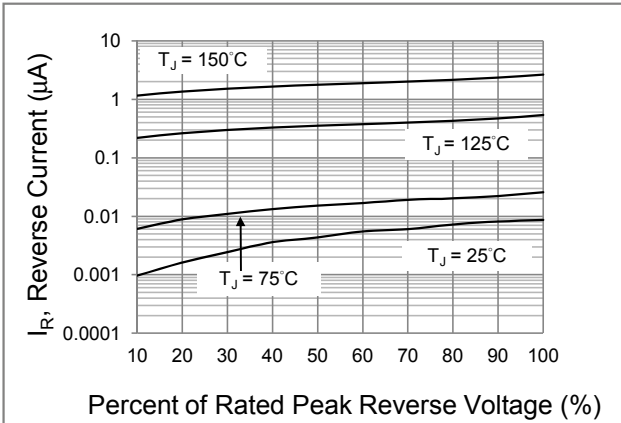
# QR406/QR406F/QR406D/QD406S



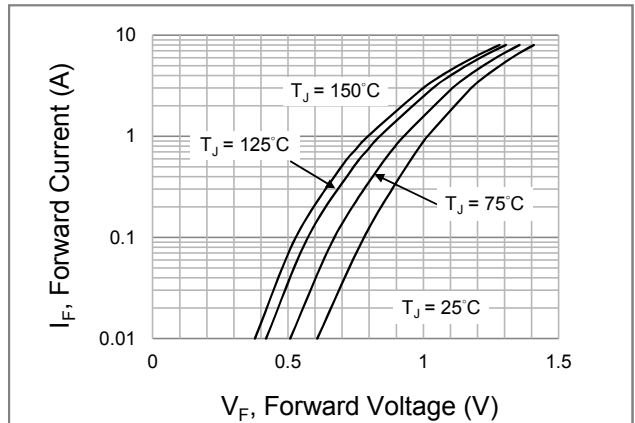
**Fig.1 Forward Current Derating Curve**



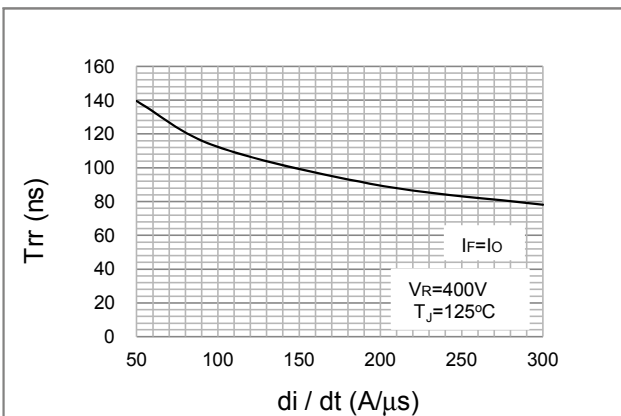
**Fig.2 Typical Junction Capacitance**



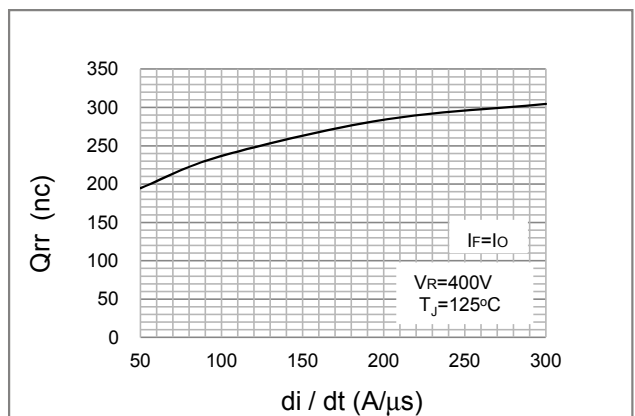
**Fig.3 Typical Reverse Characteristics**



**Fig.4 Typical Forward Characteristics**



**Fig.5 Typical Reverse recovery time versus di/dt**



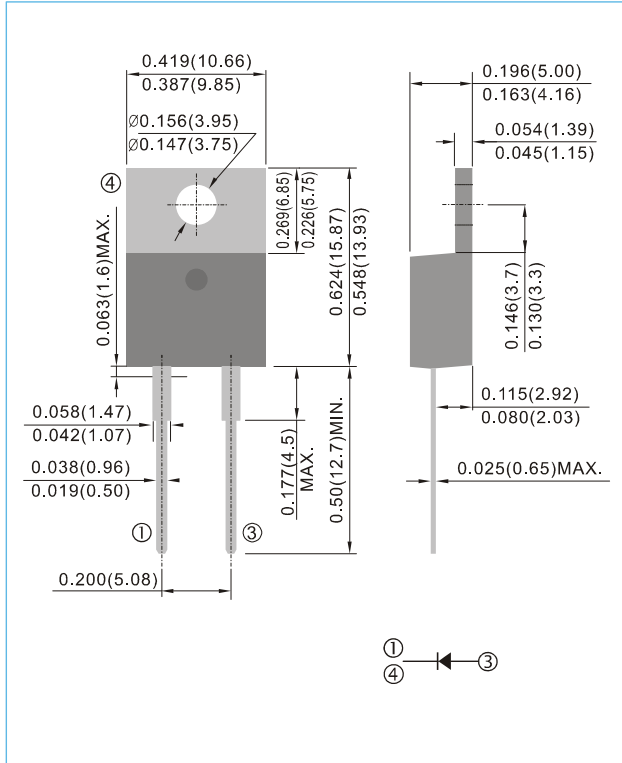
**Fig.6 Typical Reverse recovery charges versus di/dt**



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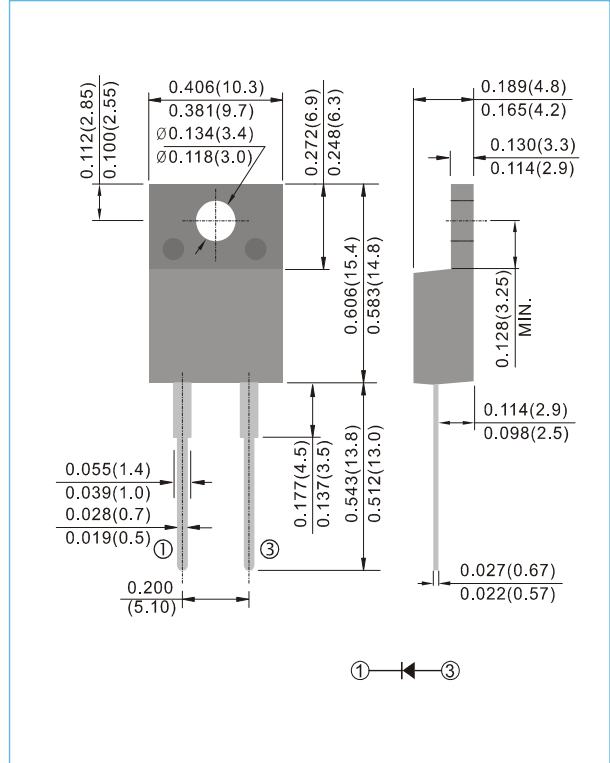
## TO-220AC

Unit : inch(mm)



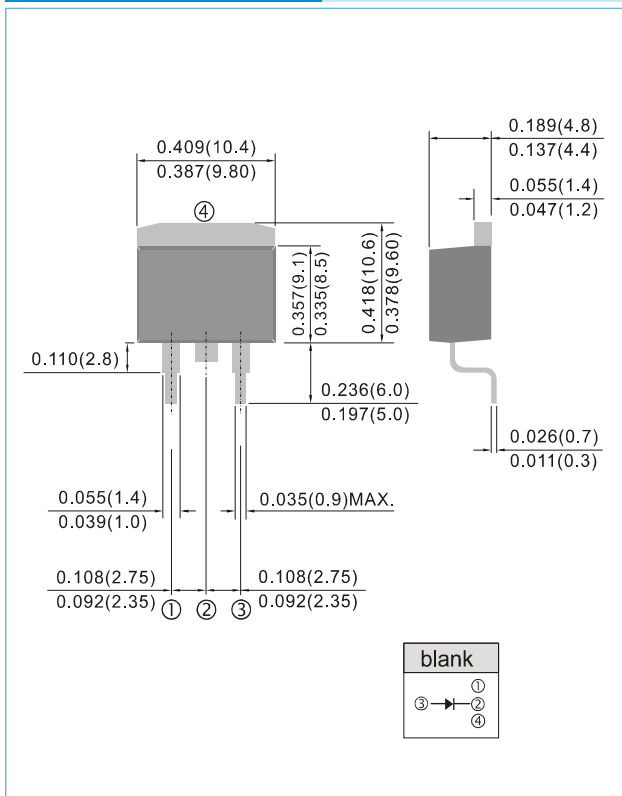
## ITO-220AC

Unit : inch(mm)



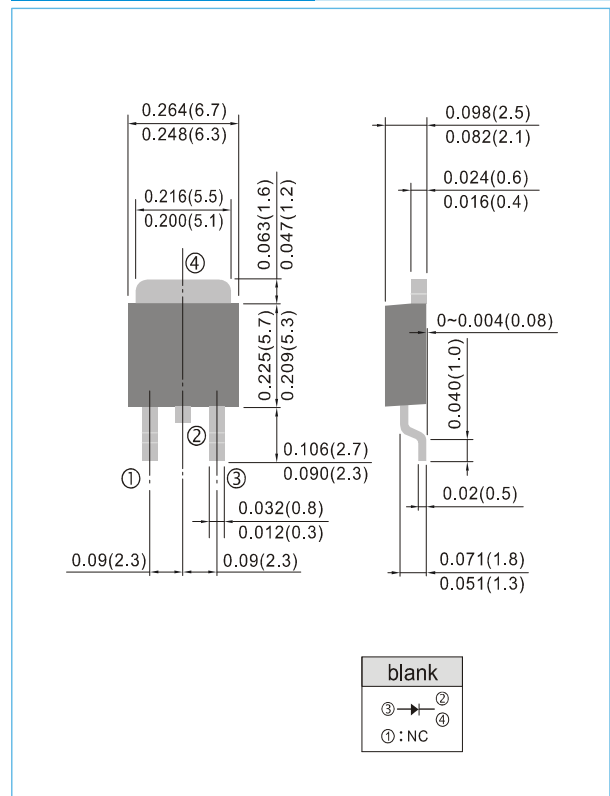
## TO-263 / D<sup>2</sup>PAK

Unit : inch(mm)



## TO-252

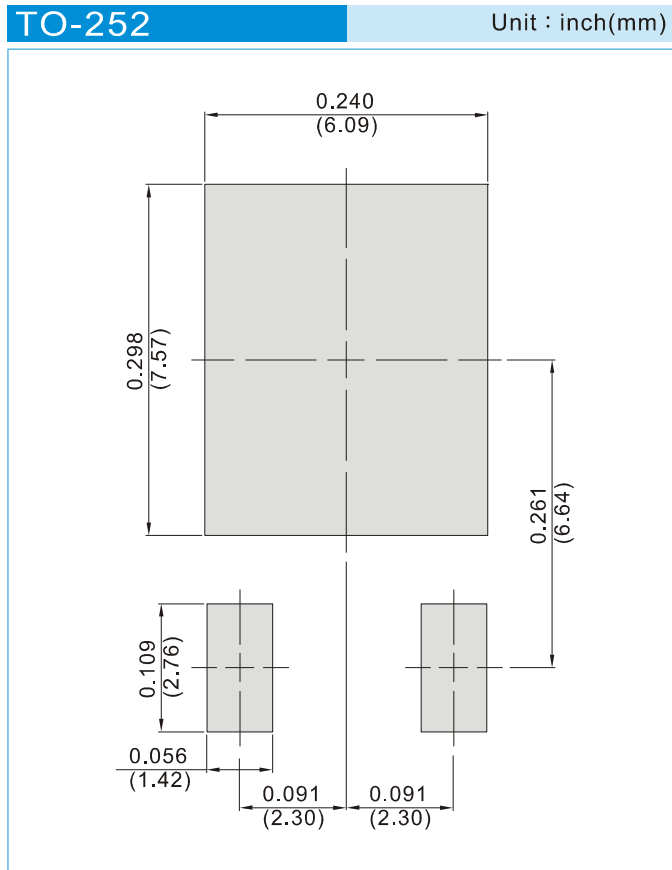
Unit : inch(mm)





## QR406/QR406F/QR406D/QD406S

### MOUNTING PAD LAYOUT



### ORDER INFORMATION

- Packing information  
T/R - 3K per 13" plastic Reel

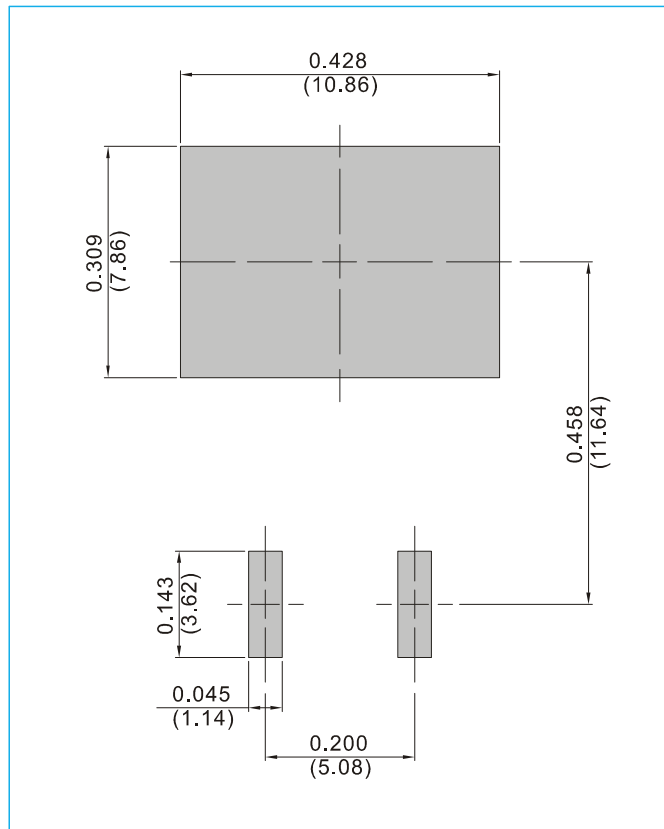


# QR406/QR406F/QR406D/QD406S

## MOUNTING PAD LAYOUT

**TO-263 / D<sup>2</sup>PAK**

Unit : inch(mm)



## ORDER INFORMATION

- Packing information  
T/R - 0.8K per 13" plastic Reel



## QR406/QR406F/QR406D/QD406S

### Part No\_packing code\_Version

QR406\_T0\_00001  
 QR406F\_T0\_00001  
 QR406D\_R2\_00001  
 QD406S\_L2\_00001  
 QD406S\_S2\_00001

For example :

**RB500V-40\_R2\_00001**



Packing Code <b>XX</b>				Version Code <b>XXXXX</b>		
Packing type	1 <sup>st</sup> Code	Packing size code	2 <sup>nd</sup> Code	HF or RoHS	1 <sup>st</sup> Code	2 <sup>nd</sup> ~5 <sup>th</sup> Code
Tape and Ammunition Box (T/B)	<b>A</b>	N/A	<b>0</b>	<b>HF</b>	<b>0</b>	serial number
Tape and Reel (T/R)	<b>R</b>	7"	<b>1</b>	<b>RoHS</b>	<b>1</b>	serial number
Bulk Packing (B/P)	<b>B</b>	13"	<b>2</b>			
Tube Packing (T/P)	<b>T</b>	26mm	<b>X</b>			
Tape and Reel (Right Oriented) (TRR)	<b>S</b>	52mm	<b>Y</b>			
Tape and Reel (Left Oriented) (TRL)	<b>L</b>	PANASERT T/B CATHODE UP (PBCU)	<b>U</b>			
FORMING	<b>F</b>	PANASERT T/B CATHODE DOWN (PBCD)	<b>D</b>			



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