

QRD3320004 Preliminary

High Voltage Diode Module 200 Amperes/3300 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters		
А	5.51	140.0		
В	2.87	73.0		
С	1.50	38.0		
D	4.88±0.01	124.0±0.25		
E	2.24±0.01	57.0±0.25		
F	1.18	30.0		
G	0.43	11.0		

Dimensions	Inches	Millimeters
Н	0.38	9.75
J	0.20	5.0
К	1.04	26.5
L	M5 Metric	M5
М	0.63 Min.	16.0 Min.
Ν	0.28 Dia.	7.0 Dia.



Description:

High voltage diodes feature highly insulating housings that offer enhanced protection by means of greater creepage and strike clearance distance for many demanding applications like medium voltage drives and auxiliary traction applications.

Features:

- Aluminum Nitride (AIN) Ceramic Substrate for Low Thermal Impedance
- Copper Baseplate
- □ Fast Recovery Time (1.2 µs max.)
- Industry Standard Packages Allow Common Bus Work to Complementary High Isolation Diodes
- No Additional Insulation Components Required
- □ UL Recognized (E78240)

Applications:

- Diodes for 18-24 Pulse Front End Rectifiers in 10.2 KV Isolation
- □ High Voltage Power Supplies
- □ Medium Voltage Drives
- □ Motor Drives
- □ Traction



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Maximum Ratings, $T_j = 25$ °C unless otherwise specified

Ratings		Symbol	QRD3320004	Units
Repetitive Peak Reverse Blocking Voltage		V _{RRM}	3300	Volts
Non-Repetitive Peak Reverse Blocking Voltage		V _{RSM}	V _{RRM} + 100	Volts
DC Current	Resistive Load, T _C = 80°C	I _{F(DC)}	260	Amperes
	Resistive Load, $T_C = 100^{\circ}C$	I _{F(DC)}	200	Amperes
Peak Half Cycle Non-Repetitive Surge Current (t = 8.3mS, 100% V _{RRM} Reapplied)		I _{FSM}	1900	Amperes
I ² t for Fusing for One Cycle (t = 8.3mS, 100% V _{RRM} Reapplied)		l ² t	15	kA ² sec
Junction Temperature		Тј	-50 to +150	°C
Operating Temperature		T _{op}	-50 to +150	°C
Storage Temperature		T _{stg}	-55 to +150	°C
Maximum Mounting Torque, M6	Mounting Screw		44	in-lb
Maximum Mounting Torque, M5	Terminal Screw		35	in-lb
Module Weight (Typical)		_	800	Grams
Partial Discharge		Q _{pd}	10	рС
$(V1 = 3500 V_{RMS}, V2 = 2600 V_{I})$	RMS, f = 60Hz (Acc. to IEC 1287))			
V Isolation (60 Hz, Circuit to Bas	se, All Terminals Shorted, t = 60 sec.)	V _{RMS}	6000	Volts



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Electrical Characteristics, $T_i = 25$ °C unless otherwise specified

CharacteristicsSymbol		Test Conditions		Min.	Typ.	Max.	Units
Peak Reverse Leakage Current	I _{RRM}	Rated V _{RRM}		_	—	5	mA
Peak On-State Voltage	V _{FM}	I _F = 200A, T _j = 25°C		_	2.3	3.0	Volts
		I _F = 200A, T _j = 125°C			2.45	_	Volts
		I _F = 200A, T _j = 150°C		_	2.55	_	Volts
Reverse Recovery Time	t _{rr}		T _j = 25°C	_	0.50	—	μs
			T _j = 125°C	_	0.70	—	μs
			T _j = 150°C	_	0.80	—	μs
Reverse Recovery Current	I _{rr}		T _j = 25°C		125	—	Amperes
		$V_{CC} = 1800 V,$	T _j = 125°C	_	150	—	Amperes
		I _F = 165A,	T _j = 150°C	_	155	—	Amperes
Reverse Recovery Charge	Q _{rr}	$V_{GE} = \pm 15V,$	T _j = 25°C		105	—	μC
		$R_{G(on)} = 15\Omega$,	T _j = 125°C	_	170	—	μC
		L _S = 100nH,	T _j = 150°C	—	200	—	μC
Reverse Recovery Energy ^{*1}	E _{rec(10%)}	Inductive Load	$T_j = 25^{\circ}C$	—	105	—	mJ
		(See Fig.1, Fig. 2)	T _j = 125°C	_	175	—	mJ
			T _j = 150°C		200	_	mJ
Reverse Recovery Energy*2	E _{rec}		$T_j = 25^{\circ}C$	—	120	—	mJ
			$T_j = 125^{\circ}C$		200	_	mJ
			T _j = 150°C	—	230	—	mJ
Stray Inductance	LSAK			_	60	_	nH
Lead Resistance Terminal-Chip	R _{AK}	$T_{C} = 25^{\circ}C$			0.8	_	mΩ

Thermal and Mechanical Characteristics, $T_i = 25$ °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Тур.	Max.	Units
Thermal Resistance, Junction to Case ^{*3}	R _{th(j-c)}	Per Diode	_	_	0.096	°C/W
Thermal Resistance, Case to Sink Lubricated*3	R _{th(c-s)}	Thermal Grease Applied	_	_	0.018	°C/W
		Per Module ^{*4}				
Comparative Tracking Index	CTI		600	_	_	
Clearance Distance in Air (Terminal to Base)	d _{a(t-b)}		31.0	_	_	mm
Creepage Distance Along Surface	d _{s(t-b)}		35.0	_	_	mm
(Terminal to Base)						
Clearance Distance in Air	d _{a(t-t)}		19	_	_	mm
(Terminal to Terminal)						
Creepage Distance Along Surface	d _{s(t-t)}		54		_	mm
(Terminal to Terminal)	. ,					

*1 $E_{rec(10\%)}$ is the integral of $0.1V_R \times 0.1I_F \times dt$.

*2 Definition of all items according to IEC 60747, unless otherwise stated.

*3 T_C measured point is just under the chip.

*4 Typical value is measured by using thermally conductive grease of λ = 1.0 [W/(m • K)].



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Test Circuit and Definition of Switching Characteristics



Figure 1 – Switching Test Circuit



Diode Part: Reverse Recovery





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