

FEATURES

- Double Side Cooling
- High Surge Capability
- Low Inductance Internal Construction

KEY PARAMETERS

V_{DRM}	2800V
$I_{T(AV)}$	5912A
I_{TSM}	83000A
dV/dt^*	1000V/μs
dI/dt	250A/μs

APPLICATIONS

- High Voltage Power Converters
- DC Motor Control
- High Voltage Power Supplies

VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages V_{DRM} and V_{RRM} V	Conditions
DCR1673SM2828	2800	$T_{vj} = -40^{\circ}\text{C}$ to 125°C , $I_{DRM} = I_{RRM} = 500\text{mA}$, $V_{DRM}, V_{RRM} t_p = 10\text{ms}$, $V_{DSM} \& V_{RSM} =$ $V_{DRM} \& V_{RRM} + 100\text{V}$ respectively
DCR1673SM2626	2600	
DCR1673SM2424	2400	
DCR1673SM2222	2200	

Lower voltage grades available.

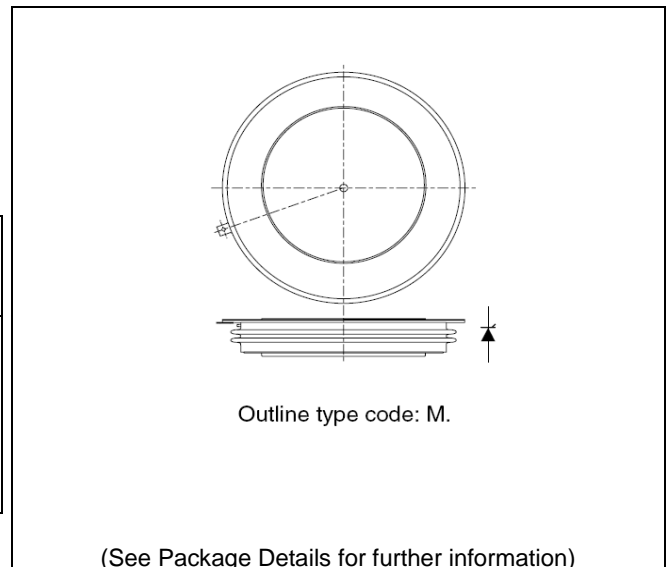


Fig. 1 Package outline

ORDERING INFORMATION

When ordering, select the required part number shown in the Voltage Ratings selection table.

For example:

DCR1673SM2424

Note: Please use the complete part number when ordering and quote this number in any future correspondence relating to your order.

CURRENT RATINGS

T_{case} = 60°C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
Double Side Cooled				
I _{T(AV)}	Mean on-state current	Half wave resistive load	5912	A
I _{T(RMS)}	RMS value	-	9286	A
I _T	Continuous (direct) on-state current	-	8753	A
Single Side Cooled (Anode side)				
I _{T(AV)}	Mean on-state current	Half wave resistive load	3911	A
I _{T(RMS)}	RMS value	-	6143	A
I _T	Continuous (direct) on-state current	-	5312	A

T_{case} = 80°C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
Double Side Cooled				
I _{T(AV)}	Mean on-state current	Half wave resistive load	4661	A
I _{T(RMS)}	RMS value	-	7321	A
I _T	Continuous (direct) on-state current	-	6751	A
Single Side Cooled (Anode side)				
I _{T(AV)}	Mean on-state current	Half wave resistive load	3030	A
I _{T(RMS)}	RMS value	-	4759	A
I _T	Continuous (direct) on-state current	-	4003	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}C$ $V_R = 60\%V_{RRM}$	66.4	kA
I^2t	I^2t for fusing		22.0	MA ² s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}C$ $V_R = 0$	83.0	kA
I^2t	I^2t for fusing		34.45	MA ² s

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions	Min.	Max.	Units	
$R_{th(j-c)}$	Thermal resistance – junction to case	Double side cooled	DC	-	0.005	$^{\circ}C/W$
		Single side cooled	Anode DC	-	0.01	$^{\circ}C/W$
			Cathode DC	-	0.01	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Clamping force 83.0kN (with mounting compound)	Double side	-	0.001	$^{\circ}C/W$
			Single side	-	0.002	$^{\circ}C/W$
T_{vj}	Virtual junction temperature	Blocking V_{DRM} / V_{RRM}	-	125	$^{\circ}C$	
T_{stg}	Storage temperature range		-55	125	$^{\circ}C$	
F_m	Clamping force		74.0	91.0	kN	

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Max.	Units	
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$	-	500	mA	
dV/dt	Max. linear rate of rise of off-state voltage	To 67% V_{DRM} , $T_j = 125^{\circ}C$, gate open	-	1000	V/ μ s	
dl/dt	Rate of rise of on-state current	From 67% V_{DRM} to 1000A Gate source 20V, 20 Ω , $t_r = 0.5\mu$ s to 1A, $T_j = 125^{\circ}C$	Repetitive 50Hz	-	250	A/ μ s
			Non-repetitive	-	500	A/ μ s
$V_{T(TO)}$	Threshold voltage – Low level	At $T_{vj} = 125^{\circ}C$	-	0.82	V	
r_T	On-state slope resistance – Low level	At $T_{vj} = 125^{\circ}C$	-	0.076	m Ω	
t_{gd}	Delay time	$V_D = 67\% V_{DRM}$, gate source 30V, 15 Ω $t_r = 0.5\mu$ s, $T_j = 25^{\circ}C$	0.5	1.5	μ s	
I_L	Latching current	$T_j = 25^{\circ}C$, $V_D = 5V$	150	750	mA	
I_H	Holding current	$T_j = 25^{\circ}C$, $V_{G-K} = \infty$	40	200	mA	

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$	3.5	V
V_{GD}	Gate non-trigger voltage	At V_{DRM} , $T_{case} = 125^{\circ}C$	0.25	V
I_{GT}	Gate trigger current	$V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$	500	mA
V_{FGM}	Peak forward gate voltage	Anode positive with respect to cathode	30	V
V_{FGN}	Peak forward gate voltage	Anode negative with respect to cathode	0.25	V
V_{RGM}	Peak forward gate voltage	-	5	V
I_{FGM}	Peak forward gate current	Anode positive with respect to cathode	30	A
P_{GM}	Peak gate power	See Gate Characteristics curve/table	150	W
$P_{G(AV)}$	Mean gate power	-	10	W

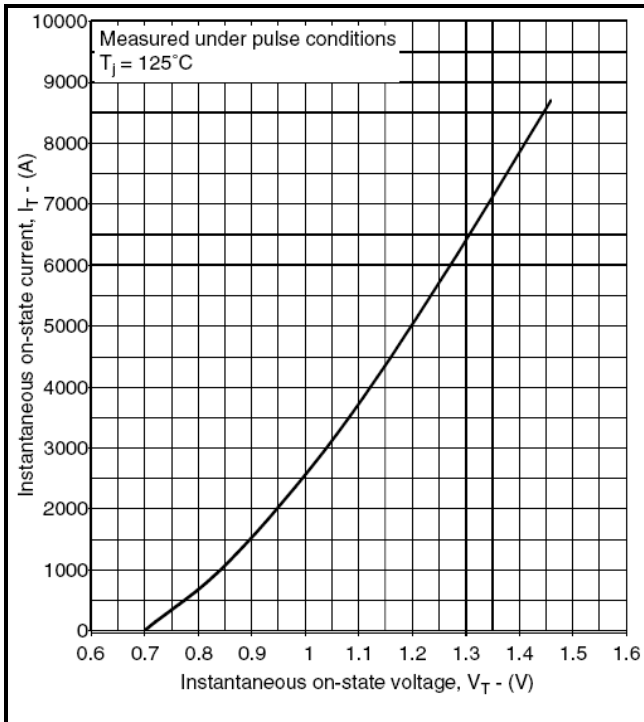


Fig.2 Maximum (limit) on-state characteristics

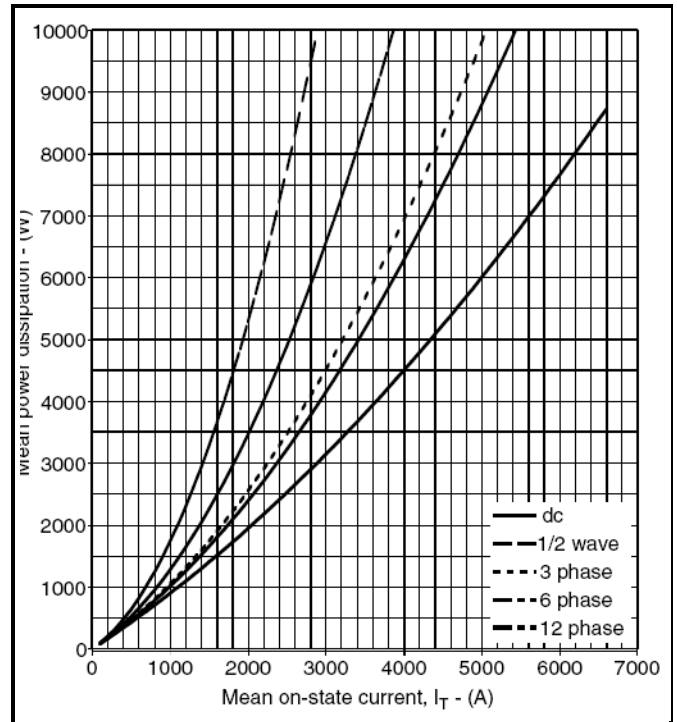


Fig.3 Power dissipation curves

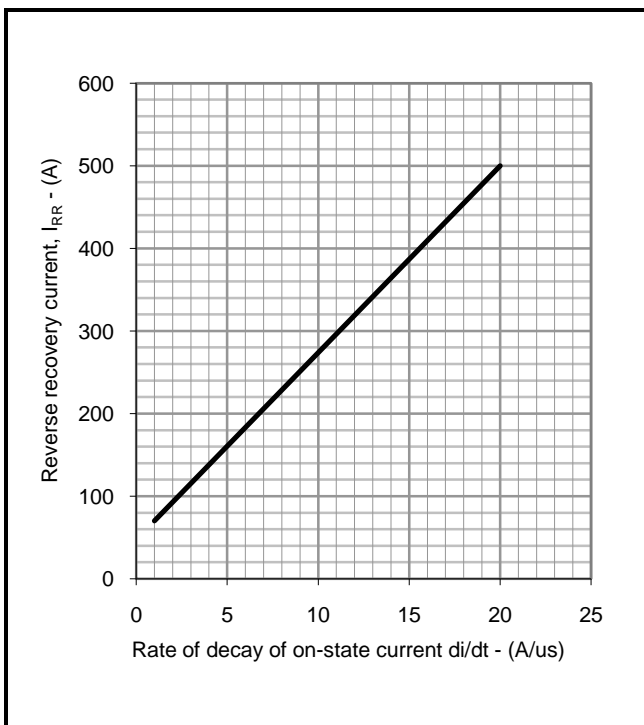


Fig.4. Reverse recovery current

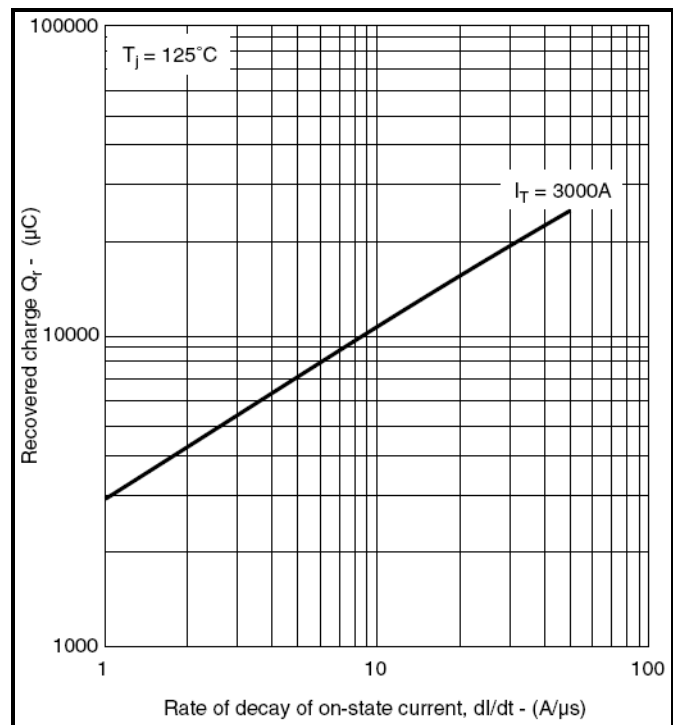


Fig.5 Recovered charge

V_{TM} Equation: $V_{TM} = A + B \cdot \ln(I_T) + C \cdot I_T + D \cdot \sqrt{I_T}$ where:

$A = 0.6180535$
 $C = 4.75E-5$

$B = 7.965E-3$
 $D = 4.003E-3$

$T_j = 125^\circ\text{C}$ for I_T 200A to 10000A

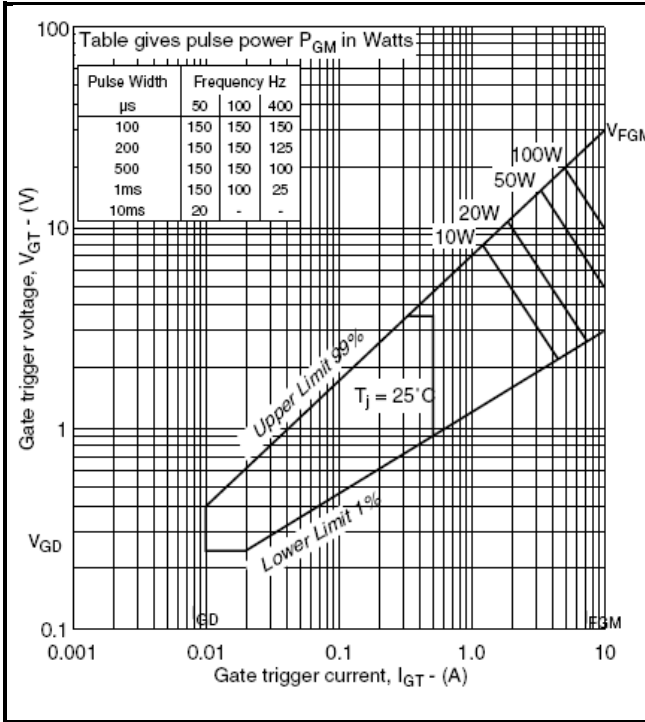


Fig.6 Gate characteristics

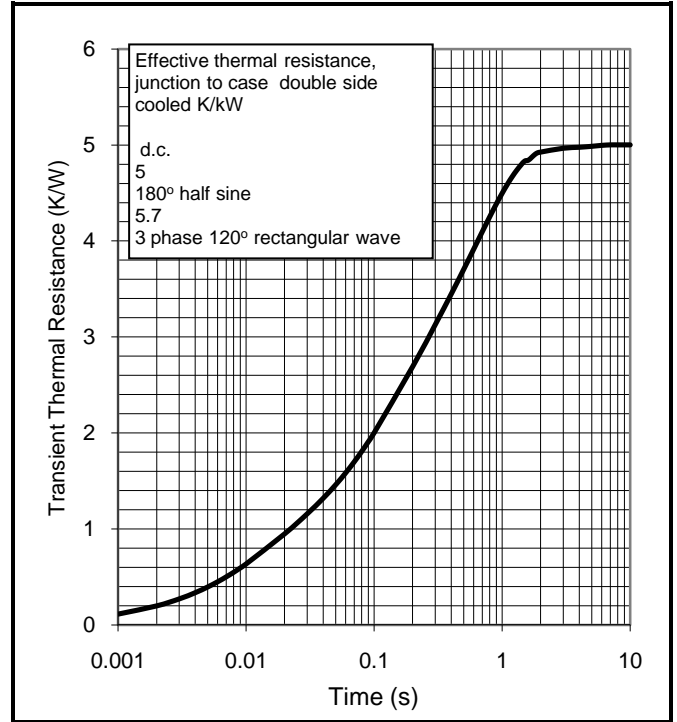


Fig.7 Maximum (limit) transient thermal impedance- junction to case ($^\circ C/W$)

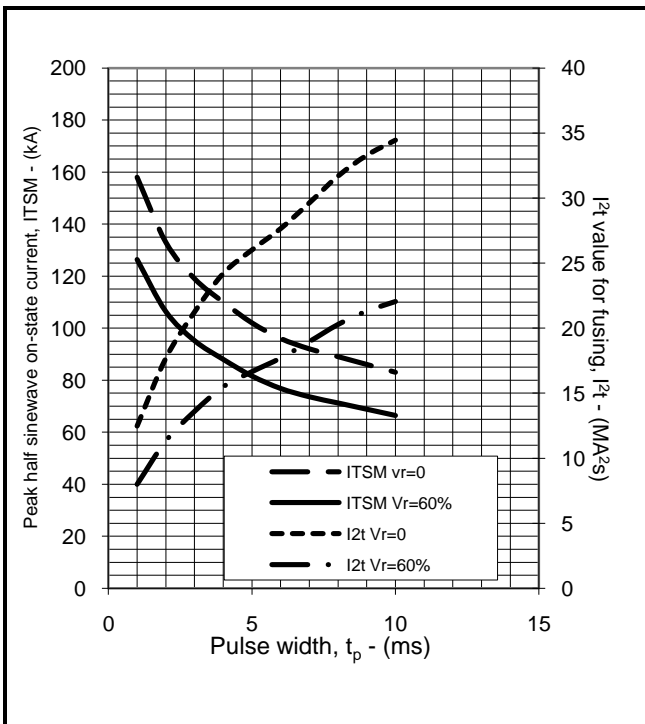


Fig.8 Sub-cycle surge current

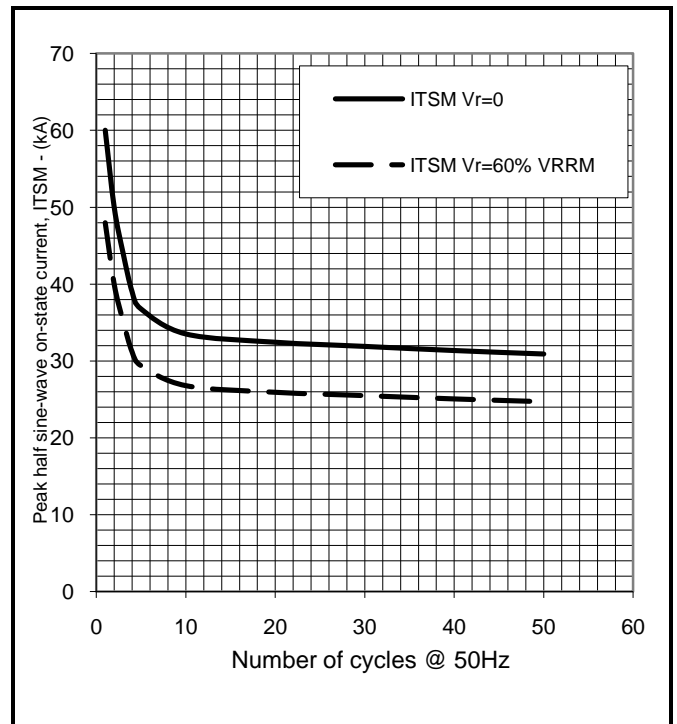


Fig.9 Multi-cycle surge current

PACKAGE DETAILS

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise. DO NOT SCALE.

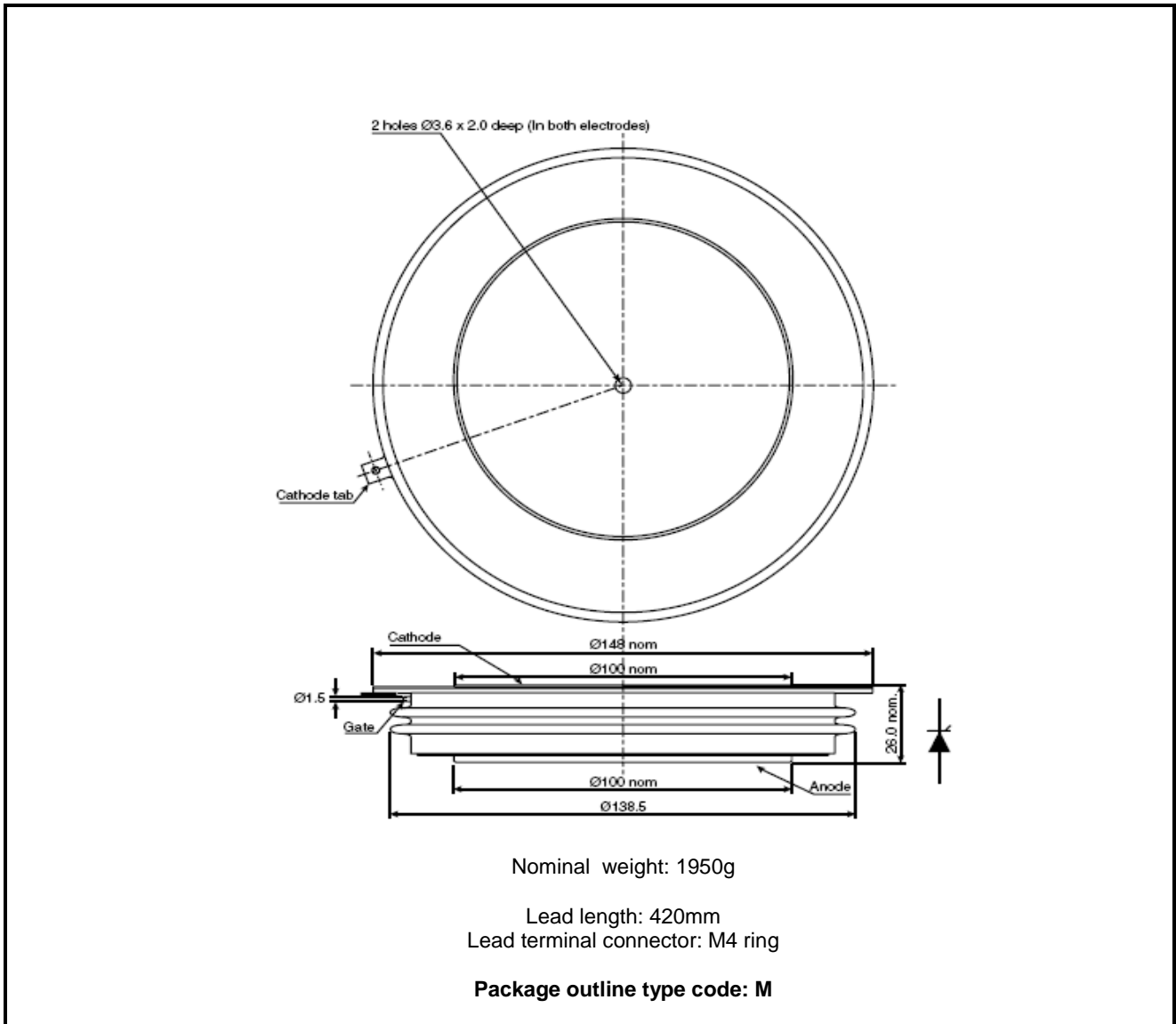


Fig.10 Package outline

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Due to the diversity of product applications, the information contained herein is provided as a guide only and does not constitute any guarantee of suitability for use in a specific application. The user must evaluate the suitability of the product and the completeness of the product data for the application. The user is responsible for product selection and ensuring all safety and any warning requirements are met. Should additional product information be needed please contact Customer Service.

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The products must not be touched when operating because there is a danger of electrocution or severe burning. Always use protective safety equipment such as appropriate shields for the product and wear safety glasses. Even when disconnected any electric charge remaining in the product must be discharged and allowed to cool before safe handling using protective gloves.

Extended exposure outside the product ratings may affect reliability leading to premature product failure. Use outside the product ratings is likely to cause permanent damage to the product. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture, a large current to flow or high voltage arcing, resulting in fire or explosion. Appropriate application design and safety precautions should always be followed to protect persons and property.

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Preliminary Information: The product design is complete and final characterisation for volume production is in progress. The datasheet represents the product as it is now understood but details may change.

No Annotation: The product has been approved for production and unless otherwise notified by Dynex any product ordered will be supplied to the **current version of the data sheet prevailing at the time of our order acknowledgement.**

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