ESM4120

Fast Recovery Diode

Replaces March 1998 version, DS4141-3.4

DS4141-4.0 January 2000

APPLICATIONS

- Induction Heating
- A.C. Motor Drives
- Inverters And Choppers
- Welding
- High Frequency Rectification
- UPS

KEY PARAMETERS

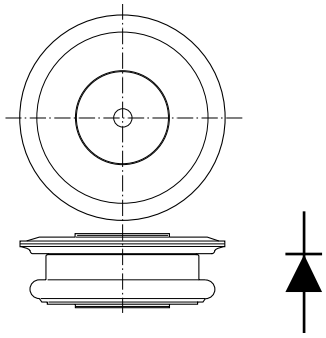
V_{RRM}	1000V
$I_{F(AV)}$	334A
I_{FSM}	4000A
Q_r	15μC
t_{rr}	0.8μs

FEATURES

- Double Side Cooling
- High Surge Capability
- Low Recovery Charge

VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
ESM4120 10 ESM4120 08 ESM4120 06	1000 800 600	$V_{RSM} = V_{RRM} + 100V$



Outline type code: M771.
See Package Details for further information.

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, T_{case} = 65°C	334	A
$I_{F(RMS)}$	RMS value	T_{case} = 65°C	565	A
I_F	Continuous (direct) forward current	T_{case} = 65°C	490	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, T_{case} = 65°C	210	A
$I_{F(RMS)}$	RMS value	T_{case} = 65°C	360	A
I_F	Continuous (direct) forward current	T_{case} = 65°C	290	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; with 0% $V_{RRM,}$ T_j = 125°C	4.5	kA
I^2t	I^2t for fusing		101×10^3	A^2s
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; with 50% $V_{RRM,}$ T_j = 125°C	3.6	kA
I^2t	I^2t for fusing		64.8×10^3	A^2s

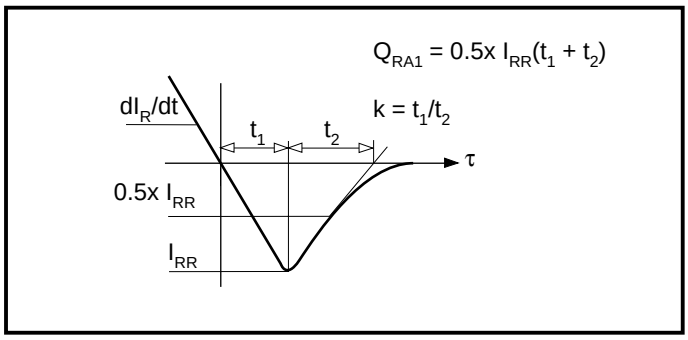
THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.07	°C/W
		Single side cooled	Anode dc	-	0.133	°C/W
			Cathode dc	-	0.147	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 3.5kN with mounting compound	Double side	-	0.02	°C/W
			Single side	-	0.04	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)		-	125	°C
T_{stg}	Storage temperature range			-55	125	°C
-	Clamping force			3.0	4.0	kN

CHARACTERISTICS

Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{FM}	Forward voltage	At 450A peak, T_{case} = 25°C	-	1.7	V
I_{RRM}	Peak reverse current	At V_{RRM}, T_{case} = 125°C	-	100	mA
t_{rr}	Reverse recovery time	I_F = 200A, di_{RR}/dt = 50A/µs T_{case} = 125°C, V_R = 100V	0.8	-	µs
Q_{RA1}	Recovered charge (50% chord)		-	15	µC
I_{RM}	Reverse recovery current		-	34	A
K	Soft factor		-	-	-
V_{TO}	Threshold voltage	At T_{vj} = 125°C	-	1.25	V
r_T	Slope resistance	At T_{vj} = 125°C	-	1.0	mΩ
V_{FRM}	Forward recovery voltage	di/dt = 1000A/µs, T_j = 125°C	-	25	V

DEFINITION OF K FACTOR AND Q_{RA1}



CURVES

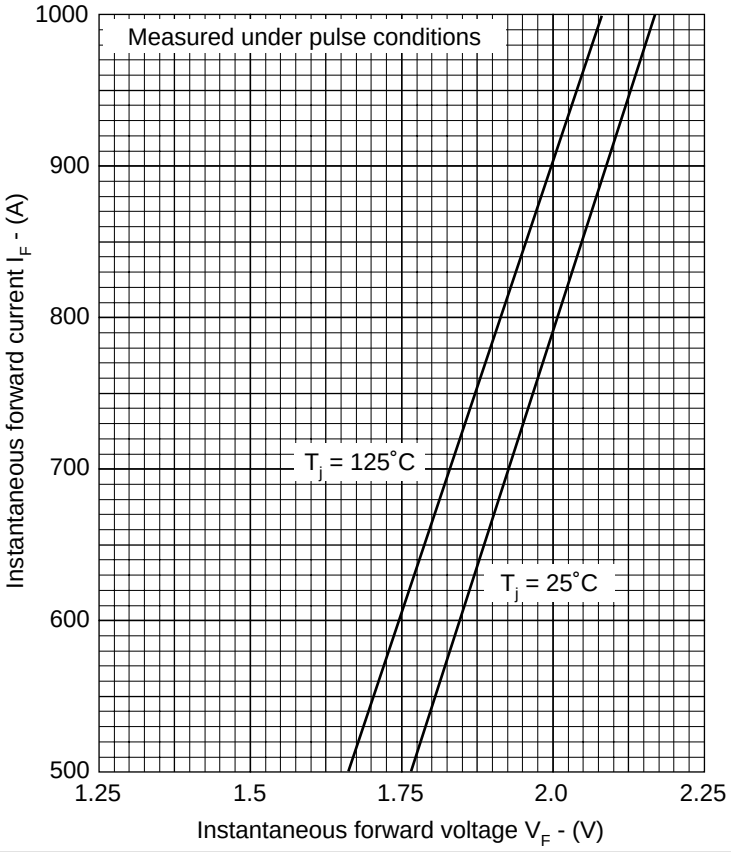


Fig.1 Maximum (limit) forward characteristics

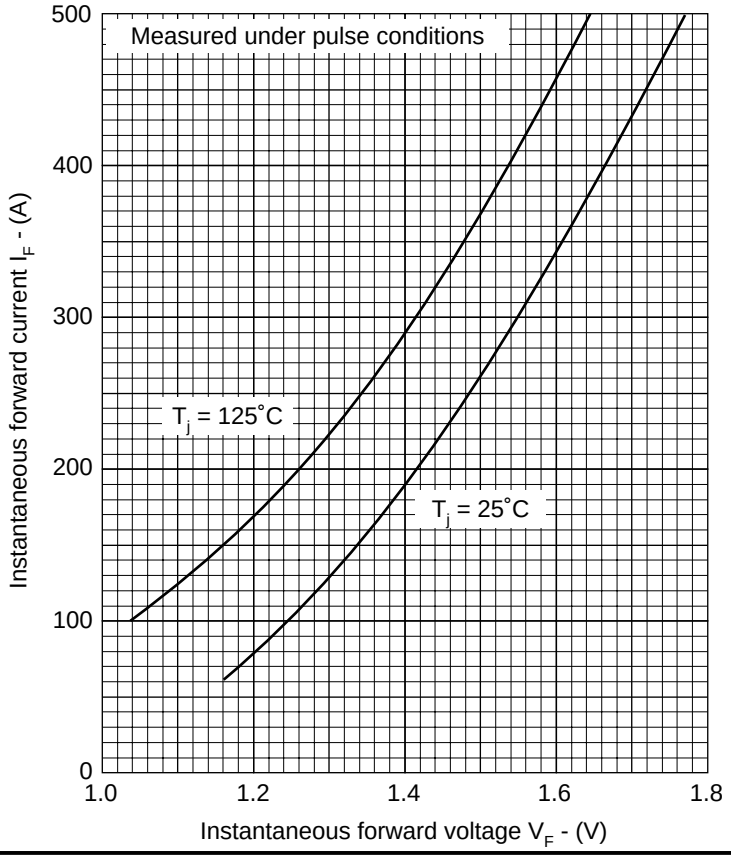


Fig.2 Maximum (limit) forward characteristics

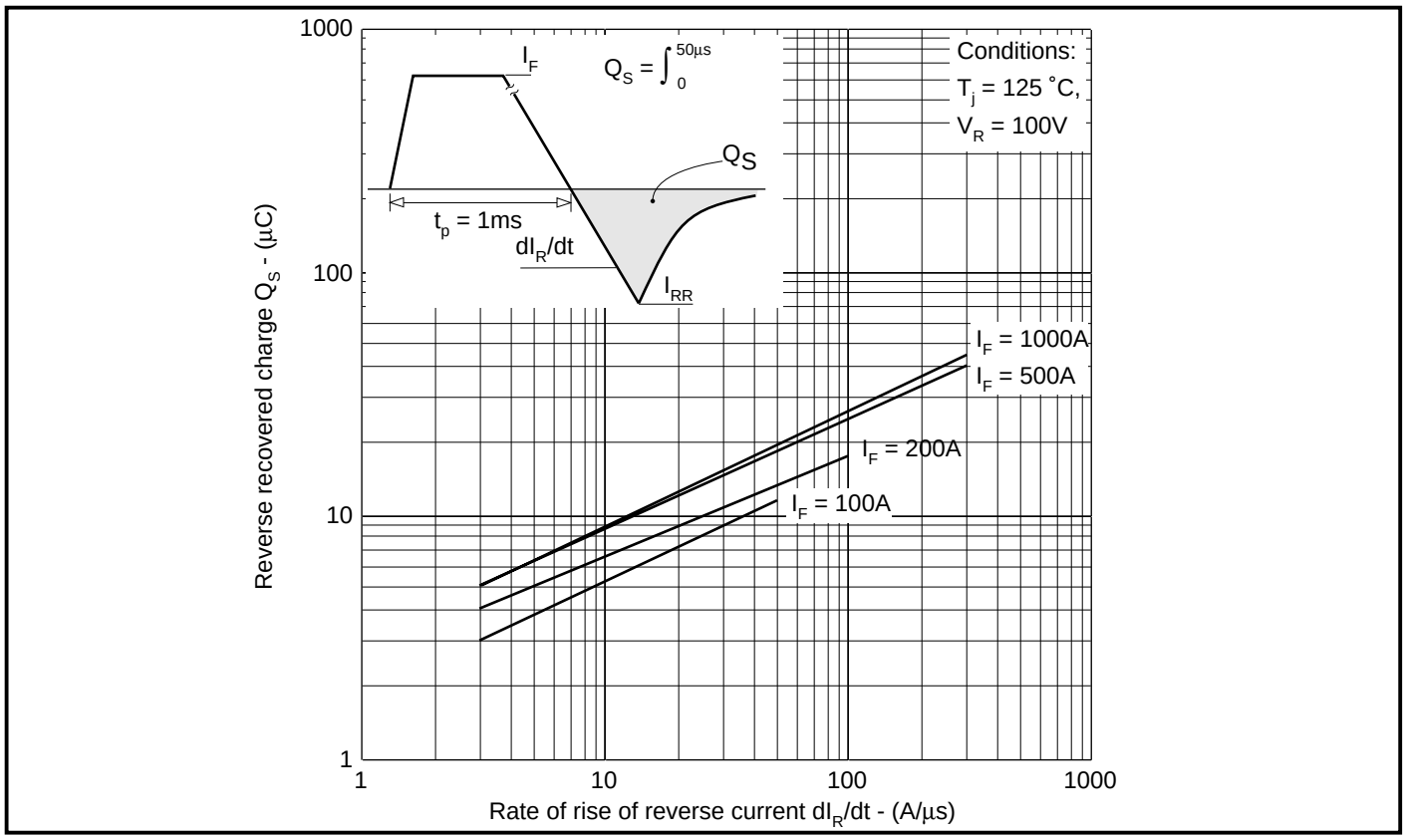


Fig.3 Recovered charge

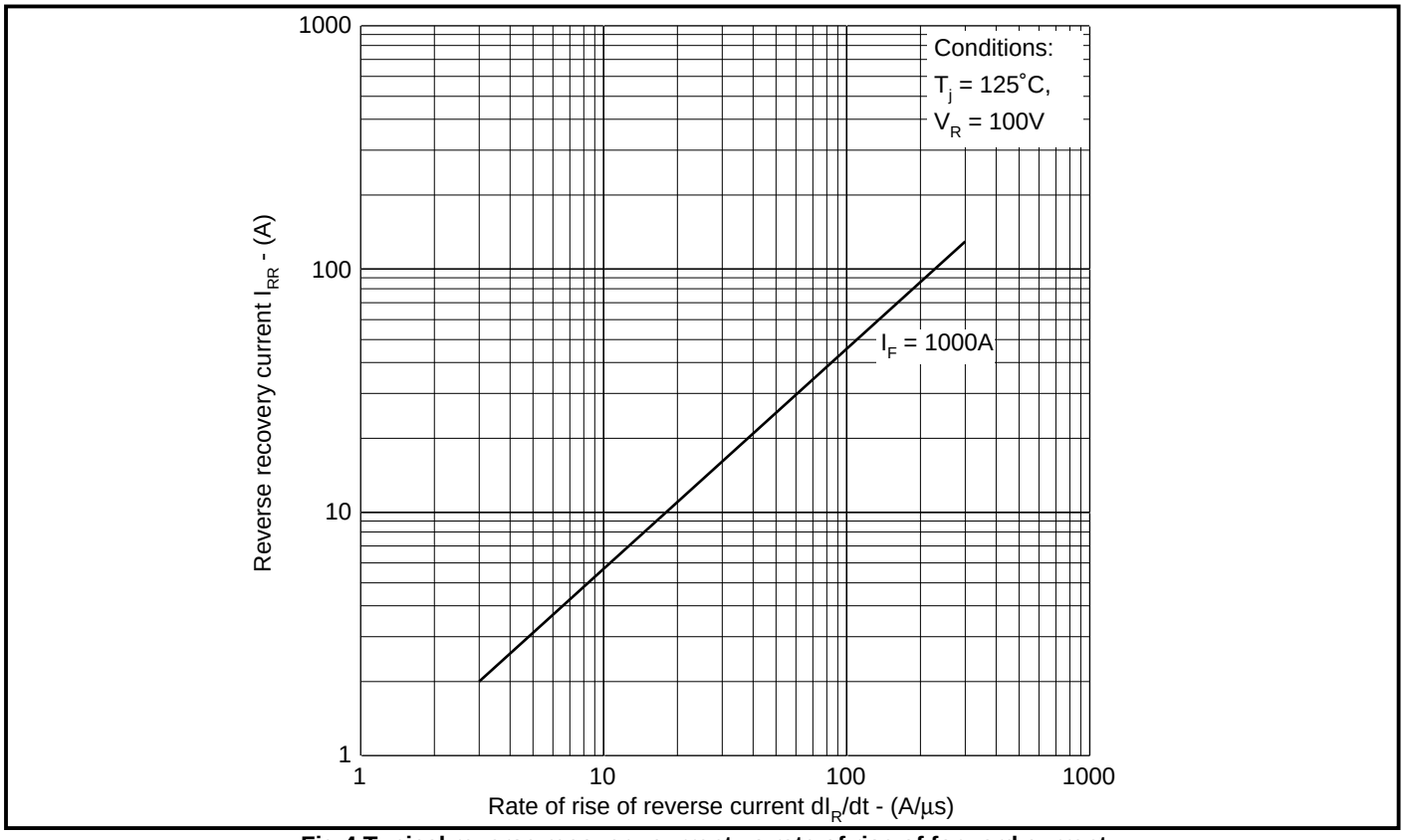


Fig.4 Typical reverse recovery current vs rate of rise of forward current

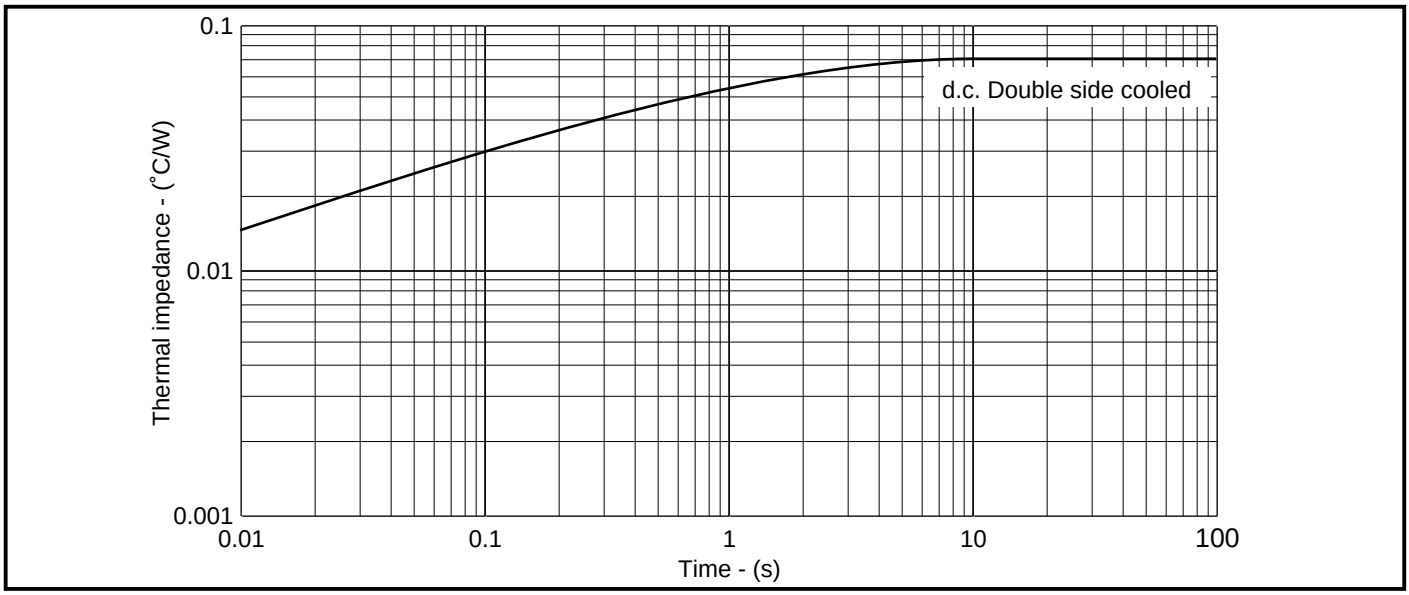
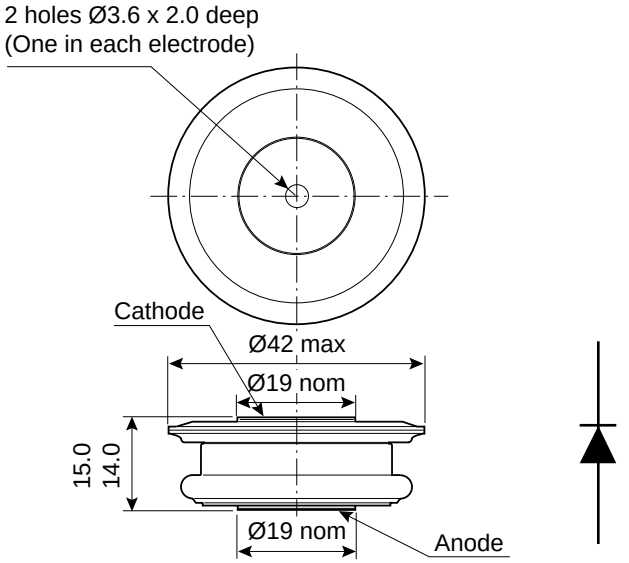


Fig.5 Maximum (limit) transient thermal impedance - junction to case - (˚C/W)

PACKAGE DETAILS

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



Nominal weight: 50g
Clamping force: 5kN ±10%

Package outine type code: M771

POWER ASSEMBLY CAPABILITY

The Power Assembly group was set up to provide a support service for those customers requiring more than the basic semiconductor, and has developed a flexible range of heatsink and clamping systems in line with advances in device voltages and current capability of our semiconductors.

We offer an extensive range of air and liquid cooled assemblies covering the full range of circuit designs in general use today. The Assembly group offers high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

Using the latest CAD methods our team of design and applications engineers aim to provide the Power Assembly Complete Solution (PACs).

HEATSINKS

The Power Assembly group has its own proprietary range of extruded aluminium heatsinks which have been designed to optimise the performance of Dynex semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest sales representative or Customer Services.

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Preliminary Information: The product is in design and development. The datasheet represents the product as it is understood but details may change.

Advance Information: The product design is complete and final characterisation for volume production is well in hand.

No Annotation: The product parameters are fixed and the product is available to datasheet specification.