

# 5SDD 24F2800

Old part no. DV 818-2480-28

## Rectifier Diode

### Properties

- ③ Industry standard housing
- ③ Suitable for parallel operation
- ③ High operating temperature
- ③ Low forward voltage drop

### Key Parameters

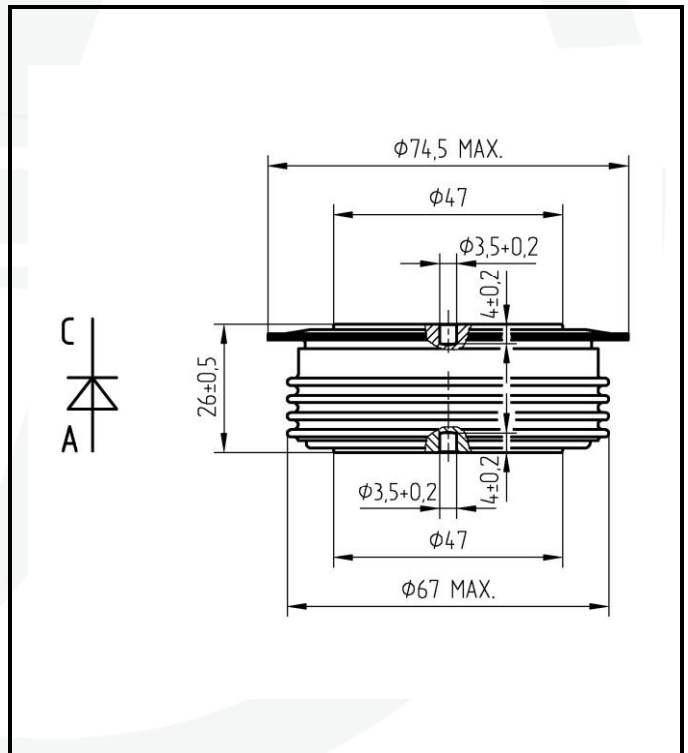
$V_{RRM}$	= 2 800 V
$I_{FAVm}$	= 2 596 A
$I_{FSM}$	= 30 000 A
$V_{TO}$	= 0.906 V
$r_T$	= 0.135 m:

### Types

	$V_{RRM}$
<b>5SDD 24F2800</b>	<b>2 800 V</b>
Conditions: $T_j = -40 \div 160 \text{ }^\circ\text{C}$ , half sine waveform, $f = 50 \text{ Hz}$	

$F_m$	Mounting force	<b>22 ± 2 kN</b>
$m$	Weight	<b>0.49 kg</b>
$D_s$	Surface creepage distance	<b>33 mm</b>
$D_a$	Air st ike distance	<b>20 mm</b>

### Mechanical Data



<b>Maximum Ratings</b>		<b>Maximum Limits</b>	<b>Unit</b>	
<b><math>V_{RRM}</math></b>	<b>Repetitive peak reverse voltage</b> $T_j = -40 \div 160 \text{ }^\circ\text{C}$	<b>2 800</b>	<b>V</b>	
<b><math>I_{FAVm}</math></b>	<b>Average forward current</b> $T_c = 85 \text{ }^\circ\text{C}$	<b>2 596</b>	<b>A</b>	
<b><math>I_{FRMS}</math></b>	<b>RMS forward current</b> $T_c = 85 \text{ }^\circ\text{C}$	<b>4 078</b>	<b>A</b>	
<b><math>I_{RRM}</math></b>	<b>Repetitive reverse current</b> $V_R = V_{RRM}$	<b>50</b>	<b>mA</b>	
<b><math>I_{FSM}</math></b>	<b>Non repetitive peak surge current</b> $V_R = 0 \text{ V, half sine pulse, } T_j = 25 \text{ }^\circ\text{C}$	$t_p = 8.3 \text{ ms}$	<b>38 500</b>	<b>A</b>
		$t_p = 10 \text{ ms}$	<b>36 000</b>	<b>A</b>
	<b>Non repetitive peak surge current</b> $V_R = 0 \text{ V, half sine pulse}$	$t_p = 8.3 \text{ ms}$	<b>32 000</b>	<b>A</b>
		$t_p = 10 \text{ ms}$	<b>30 000</b>	<b>A</b>
<b><math>Pt</math></b>	<b>Limiting load integral</b> $V_R = 0 \text{ V, half sine pulse, } T_j = 25 \text{ }^\circ\text{C}$	$t_p = 8.3 \text{ ms}$	<b>6 137 540</b>	<b>A<sup>2</sup>s</b>
		$t_p = 10 \text{ ms}$	<b>6 480 000</b>	<b>A<sup>2</sup>s</b>
	<b>Limiting load integral</b> $V_R = 0 \text{ V, half sine pulse}$	$t_p = 8.3 \text{ ms}$	<b>4 262 180</b>	<b>A<sup>2</sup>s</b>
		$t_p = 10 \text{ ms}$	<b>4 500 000</b>	<b>A<sup>2</sup>s</b>
<b><math>T_{jmin} - T_{jmax}</math></b>	<b>Operating temperature range</b>	<b>-40 <math>\div</math> 160</b>	<b><math>^\circ\text{C}</math></b>	
<b><math>T_{STG}</math></b>	<b>Storage temperature range</b>	<b>-40 <math>\div</math> 160</b>	<b><math>^\circ\text{C}</math></b>	

Unless otherwise specified  $T_j = 160 \text{ }^\circ\text{C}$

<b>Characteristics</b>		<b>Value</b>			<b>Unit</b>
		<i>min</i>	<i>typ</i>	<i>max</i>	
<b><math>V_{TO} r_T</math></b>	<b>Threshold voltage</b>			<b>0.906</b>	<b>V</b>
	<b>Forward slope resistance</b> $I_{F1} = 3\,140 \text{ A, } I_{F2} = 9\,420 \text{ A}$			<b>0.135</b>	<b>m:</b>
<b><math>V_{FM}</math></b>	<b>Maximum forward voltage</b> $I_{FM} = 4\,000 \text{ A}$			<b>1.46</b>	<b>V</b>
<b><math>Q_{rr}</math></b>	<b>Recovered charge</b> $V_R = 100 \text{ V, } I_{FM} = 1000 \text{ A, } di/dt = -30 \text{ A}/\mu\text{s}$		<b>3000</b>	<b>3500</b>	<b><math>\mu\text{C}</math></b>

Unless otherwise specified  $T_j = 160 \text{ }^\circ\text{C}$

Thermal Parameters			Value	Unit
$R_{thjc}$	Thermal resistance junction to case	double side cooling	15	K/kW
		anode side cooling	24	
		cathode side cooling	40	
$R_{thch}$	Thermal resistance case to heatsink	double side cooling	4	K/kW
		single side cooling	8	

**Transient Thermal Impedance**

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^5 R_i (1 - \exp(-t/W_i))$$

$i$	1	2	3	4	5
$W_i$ (s)	0.6937	0.2040	0.0452	0.0040	0.0005
$R_i$ (K/kW)	6.04	3.83	3.76	1.31	0.07

Conditions:  
 $F_m = 22 \pm 2$  kN, Double side cooled

**Correction for periodic waveforms**

180° sine:	1.3 K/kW
180° rectangular:	1.7 K/kW
120° rectangular:	2.9 K/kW
60° rectangular:	4.8 K/kW

Fig. 2 Dependence transient thermal impedance junction to case on square pulse

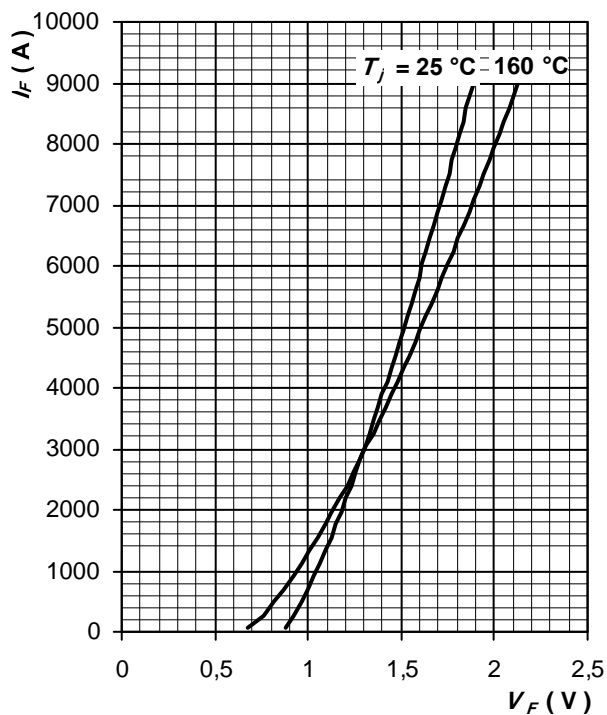


Fig. 3 Maximum forward voltage drop characteristics

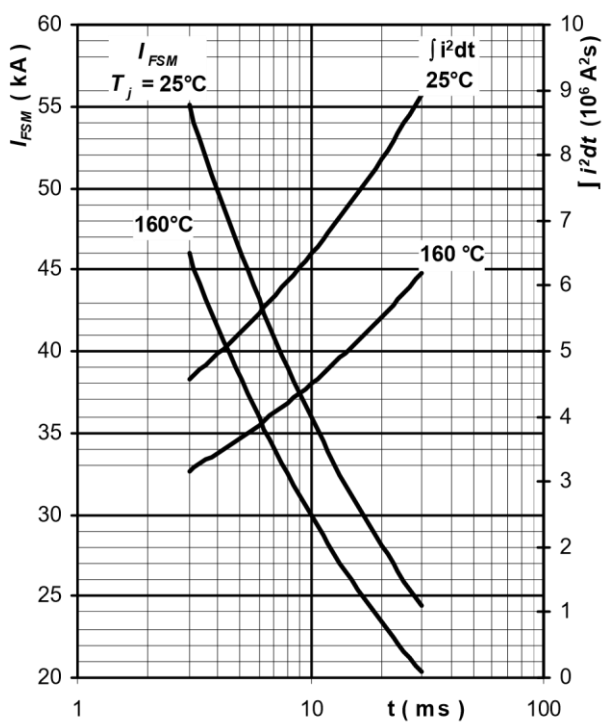


Fig. 4 Surge forward current vs. pulse length, sine wave, single pulse,  $V_R = 0 \text{ V}$ ,  $T_j = T_{jmax}$

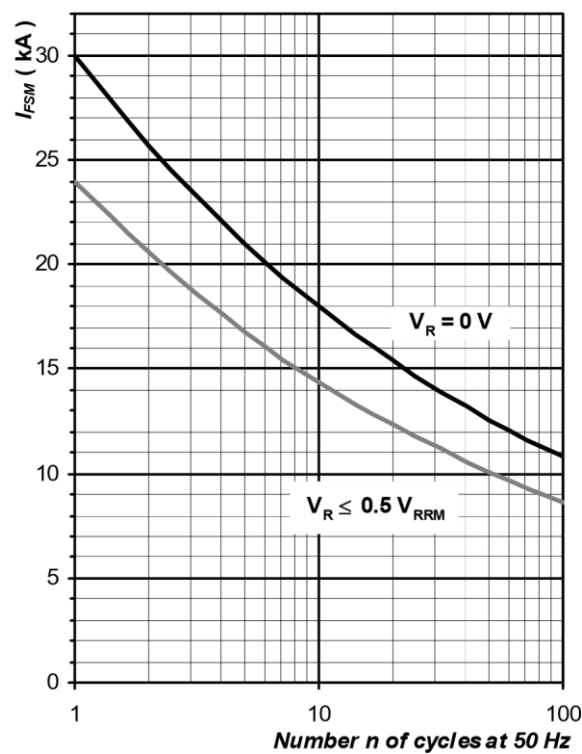
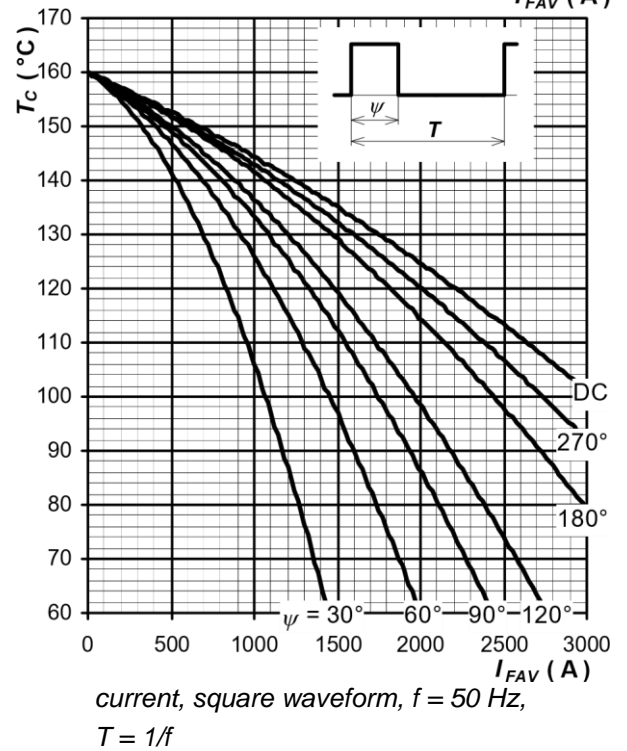
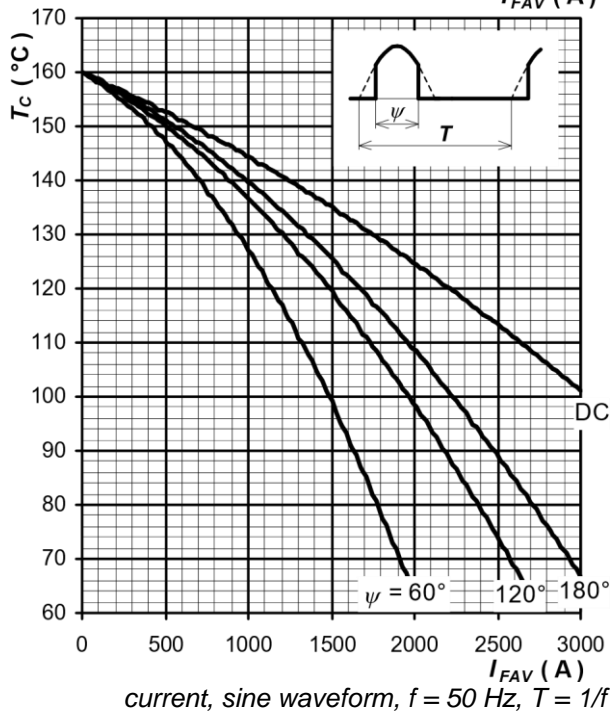
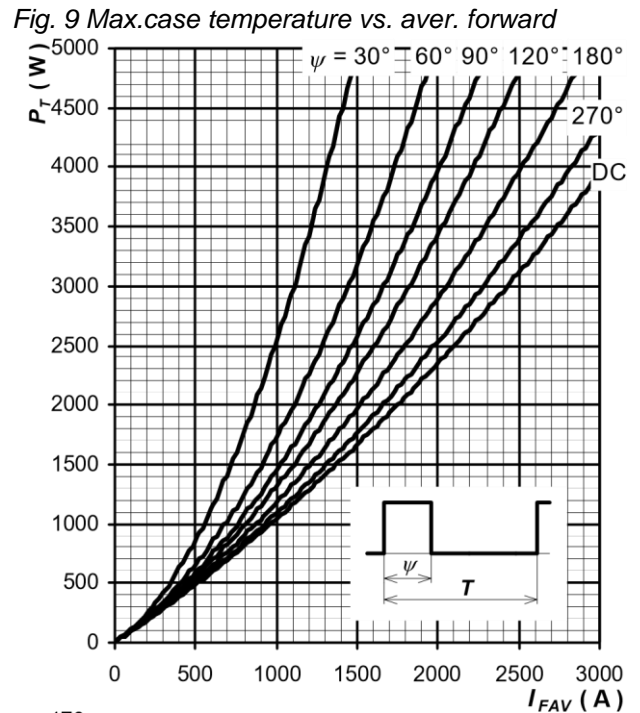
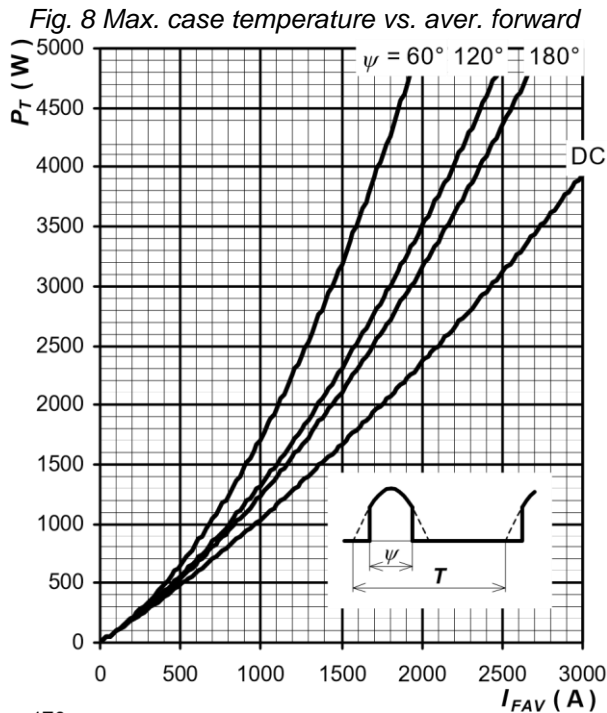


Fig. 5 Surge forward current vs. number half of pulses, half sine wave,  $T_j = T_{jmax}$

Fig. 6 Forward power loss vs. average forward current, sine waveform,  $f = 50$  Hz,  $T = 1/f$

Fig. 7 Forward power loss vs. average forward current, square waveform,  $f = 50$  Hz,  $T = 1/f$

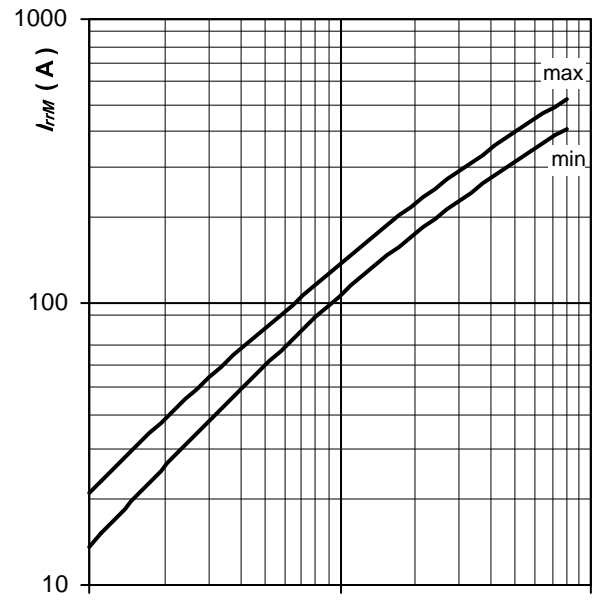
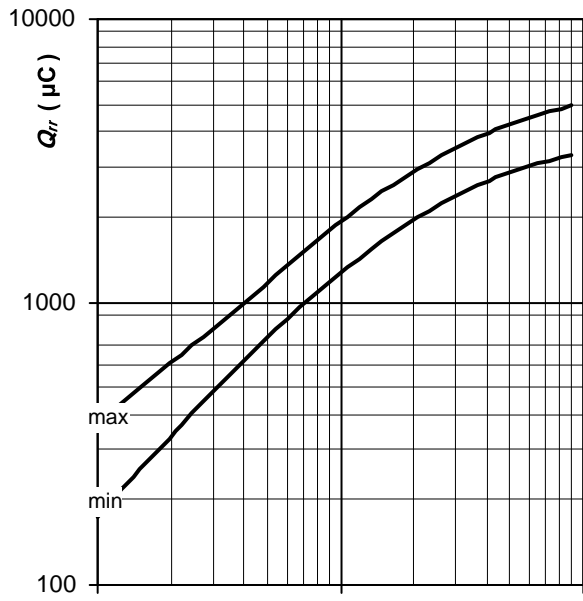


1 10 -  $di_F/dt$  (A/ $\mu$ s) 100

1 10 -  $di_F/dt$  (A/ $\mu$ s) 100

Fig. 10 Recovered charge  $Q_{rr}$

Fig. 11 Reverse recovery maximum current  $I_{rrM}$



vs. rate of fall forward current  $di_F/dt$ , vs. rate of fall forward current  $di_F/dt$ , trapezoid pulse,  
 $I_{FM} = 1\ 000\ \text{A}$ , trapezoid pulse,  $I_{FM} = 1\ 000\ \text{A}$ ,  $V_R = 100\ \text{V}$ ,  $T_j = T_{jmax}$   $V_R = 100\ \text{V}$ ,  $T_j = T_{jmax}$