

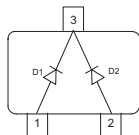
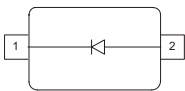
**Silicon PIN Diodes**

- Current-controlled RF resistor  
for switching and attenuating applications
- Frequency range above 10 MHz up to 6 GHz
- Especially useful as antenna switch  
in mobile communication
- Very low capacitance at zero volt reverse bias  
at frequencies above 1 GHz (typ. 0.15 pF)
- Low forward resistance
- Very low harmonics



**BAR50-02L**  
**BAR50-02V**  
**BAR50-03W**

**BAR50-05**



Type	Package	Configuration	$L_S$ (nH)	Marking
BAR50-02L*	TSLP-2-1	single, leadless	0.4	AB
BAR50-02V	SC79	single	0.6	a
BAR50-03W	SOD323	single	1.4	blue A
BAR50-05*	SOT23	common cathode	1.8	OCs

\* Preliminary

**Maximum Ratings** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Value	Unit
Diode reverse voltage	$V_R$	50	V
Forward current	$I_F$	100	mA
Total power dissipation	$P_{tot}$		mW
BAR50-02L, $T_S \leq 130^\circ\text{C}$		250	
BAR50-02V, $T_S \leq 120^\circ\text{C}$		250	
BAR50-03W, $T_S \leq 116^\circ\text{C}$		250	
BAR50-05, $T_S \leq 60^\circ\text{C}$		250	
Junction temperature	$T_j$	150	$^\circ\text{C}$
Operating temperature range	$T_{op}$	-55 ... 125	
Storage temperature	$T_{stg}$	-55 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$		K/W
BAR50-02L		≤ 80	
BAR50-02V		≤ 120	
BAR50-03W		≤ 135	
BAR50-05		≤ 360	

**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**DC Characteristics**

Reverse current $V_R = 50\text{ V}$	$I_R$	-	-	50	nA
Forward voltage $I_F = 50\text{ mA}$	$V_F$	-	0.95	1.1	V

<sup>1</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

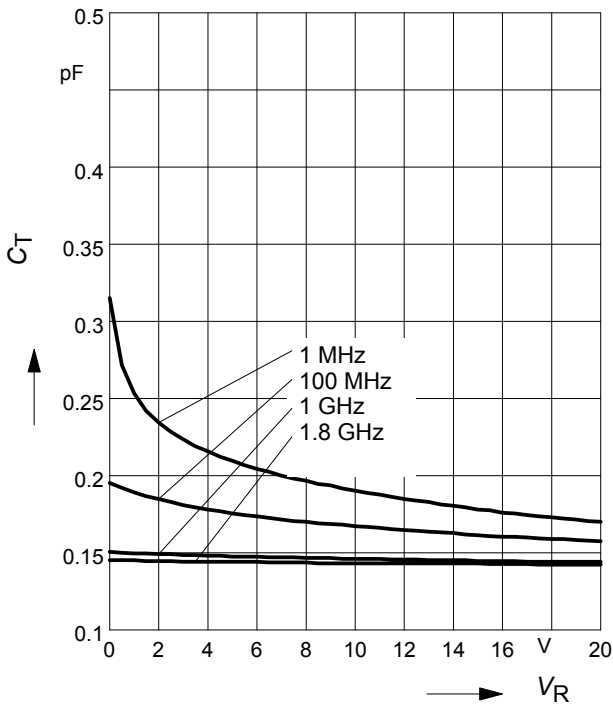
**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b>					
Diode capacitance	$C_T$				pF
$V_R = 1\text{ V}, f = 1\text{ MHz}$		-	0.24	0.5	
$V_R = 5\text{ V}, f = 1\text{ MHz}$		-	0.2	0.4	
$V_R = 0\text{ V}, f = 100\text{ MHz}$		-	0.2	-	
$V_R = 0\text{ V}, f = 1\dots 1.8\text{ GHz}, \text{BAR50-02L}$		-	0.1	-	
$V_R = 0\text{ V}, f = 1\dots 1.8\text{ GHz}, \text{all other}$	-	0.15	-		
Reverse parallel resistance	$R_P$				k $\Omega$
$V_R = 0\text{ V}, f = 100\text{ MHz}$		-	25	-	
$V_R = 0\text{ V}, f = 1\text{ GHz}$		-	6	-	
$V_R = 0\text{ V}, f = 1.8\text{ GHz}$	-	5	-		
Forward resistance	$r_f$				$\Omega$
$I_F = 0.5\text{ mA}, f = 100\text{ MHz}$		-	25	40	
$I_F = 1\text{ mA}, f = 100\text{ MHz}$		-	16.5	25	
$I_F = 10\text{ mA}, f = 100\text{ MHz}$	-	3	4.5		
Charge carrier life time	$\tau_{rr}$	-	1100	-	ns
$I_F = 10\text{ mA}, I_R = 6\text{ mA}, \text{measured at } I_R = 3\text{ mA}, R_L = 100\ \Omega$					
I-region width	$W_I$	-	56	-	$\mu\text{m}$
Insertion loss <sup>1)</sup>	$ S_{21} ^2$				dB
$I_F = 3\text{ mA}, f = 1.8\text{ GHz}$		-	-0.56	-	
$I_F = 5\text{ mA}, f = 1.8\text{ GHz}$		-	-0.4	-	
$I_F = 10\text{ mA}, f = 1.8\text{ GHz}$	-	-0.27	-		
Isolation <sup>1)</sup>	$ S_{21} ^2$				
$V_R = 0\text{ V}, f = 0.9\text{ GHz}$		-	-24.5	-	
$V_R = 0\text{ V}, f = 1.8\text{ GHz}$		-	-20	-	
$V_R = 0\text{ V}, f = 2.45\text{ GHz}$		-	-18	-	
$V_R = 0\text{ V}, f = 5.6\text{ GHz}$	-	-12	-		

<sup>1</sup>BAR50-02L in series configuration,  $Z = 50\ \Omega$

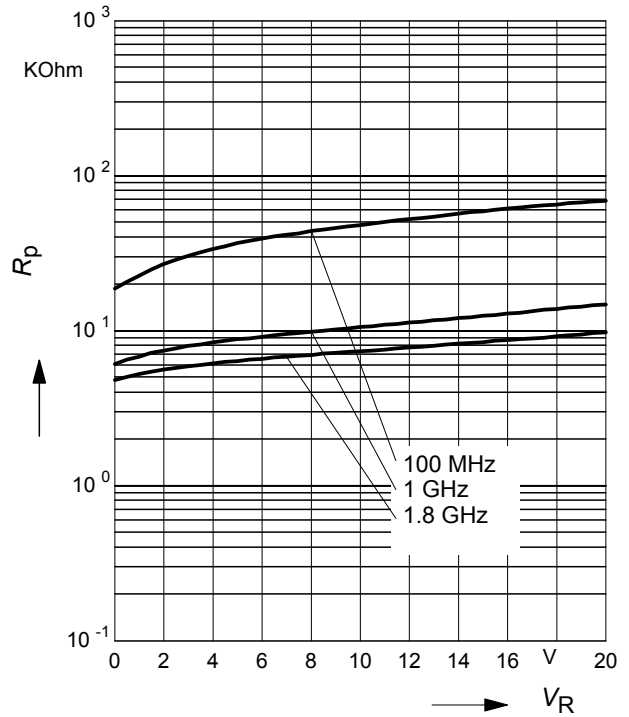
**Diode capacitance  $C_T = f(V_R)$**

$f =$  Parameter



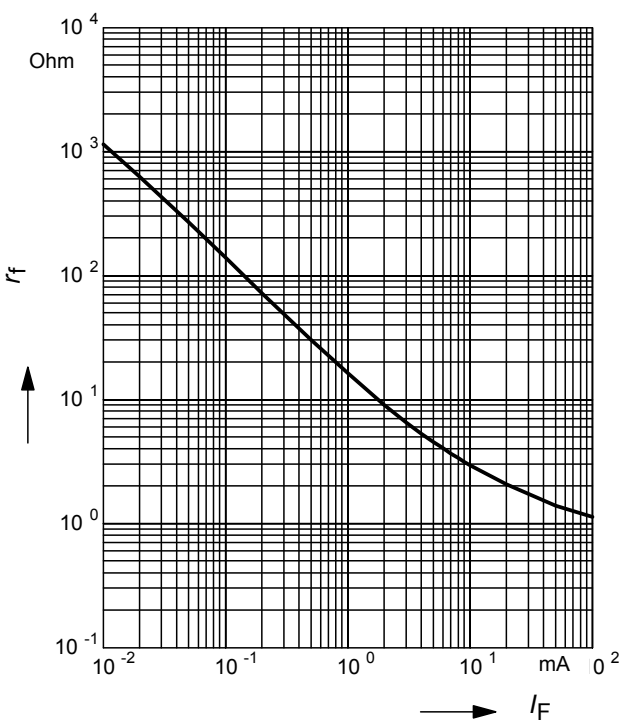
**Reverse parallel resistance  $R_p = f(V_R)$**

$f =$  Parameter



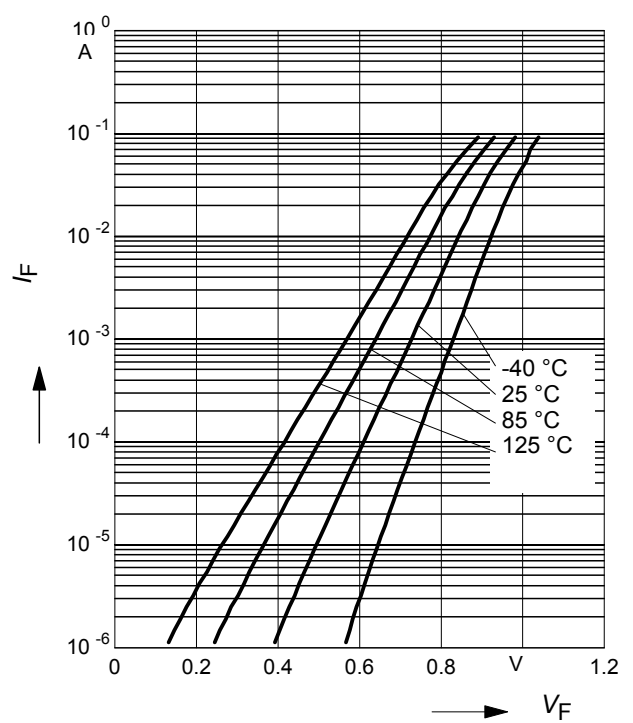
**Forward resistance  $r_f = f(I_F)$**

$f = 100$  MHz



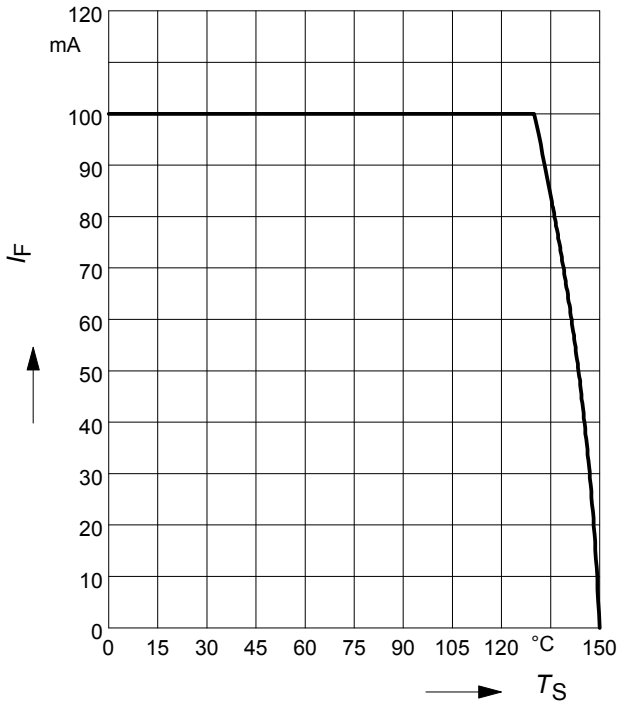
**Forward current  $I_F = f(V_F)$**

$T_A =$  Parameter



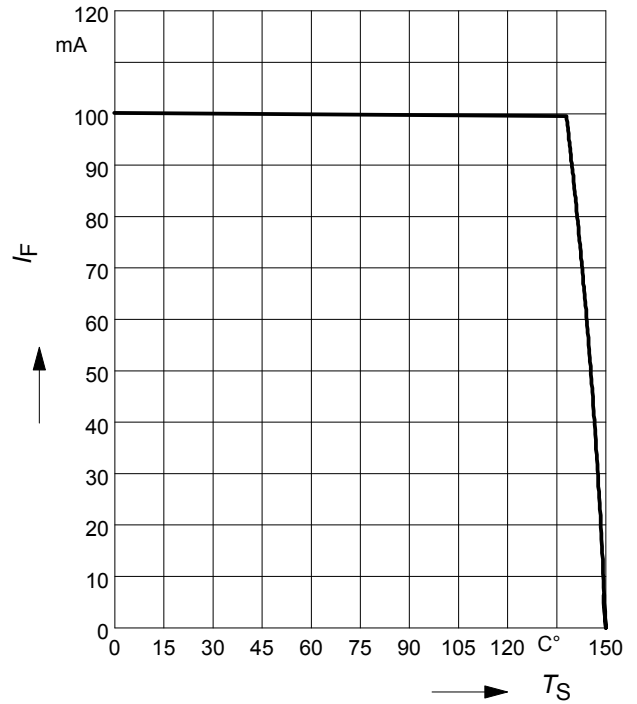
**Forward current  $I_F = f(T_S)$**

BAR50-02L



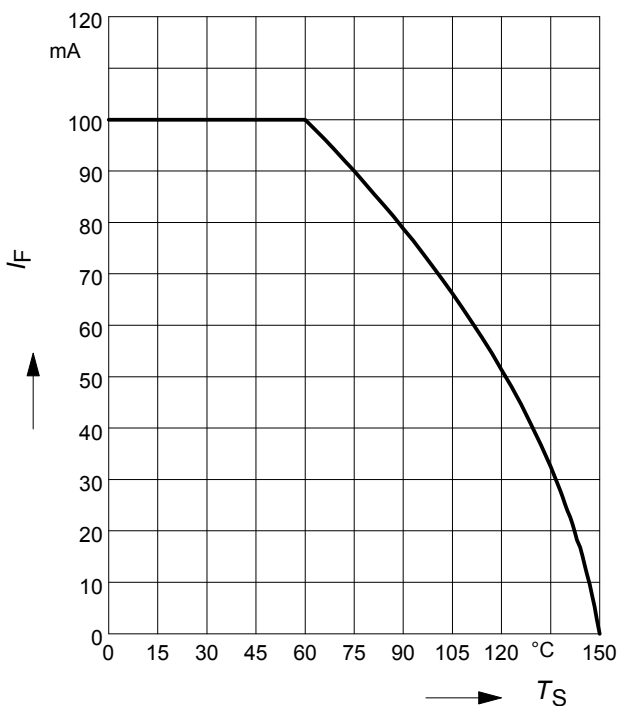
**Forward current  $I_F = f(T_S)$**

BAR50-02V, BAR50-03W



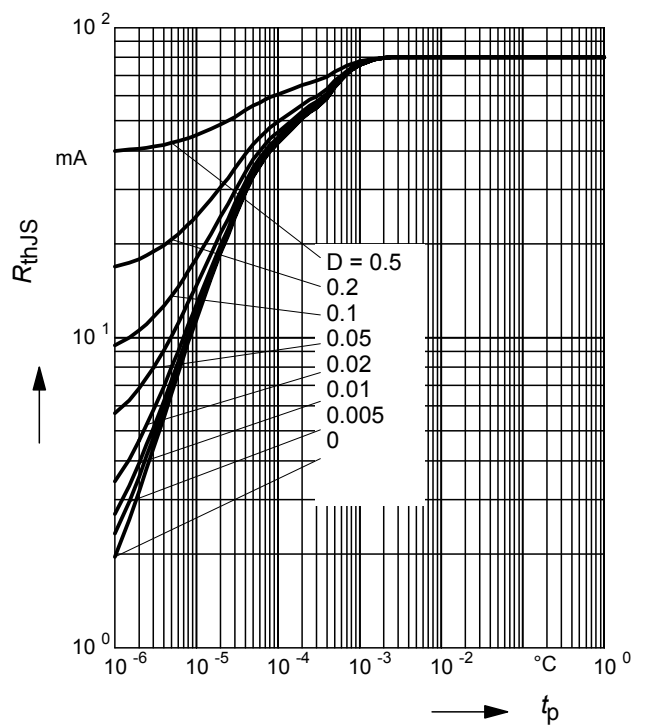
**Forward current  $I_F = f(T_S)$**

BAR50-05



**Permissible Puls Load  $R_{thJS} = f(t_p)$**

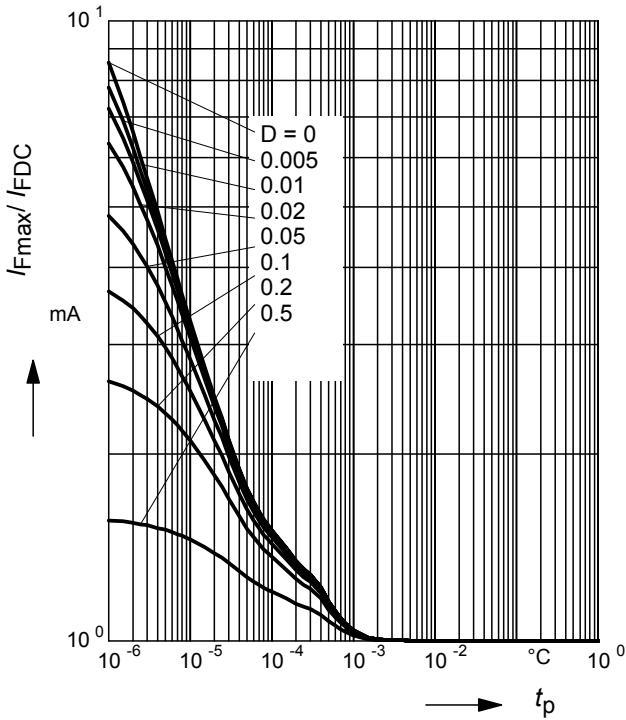
BAR50-02L



**Permissible Pulse Load**

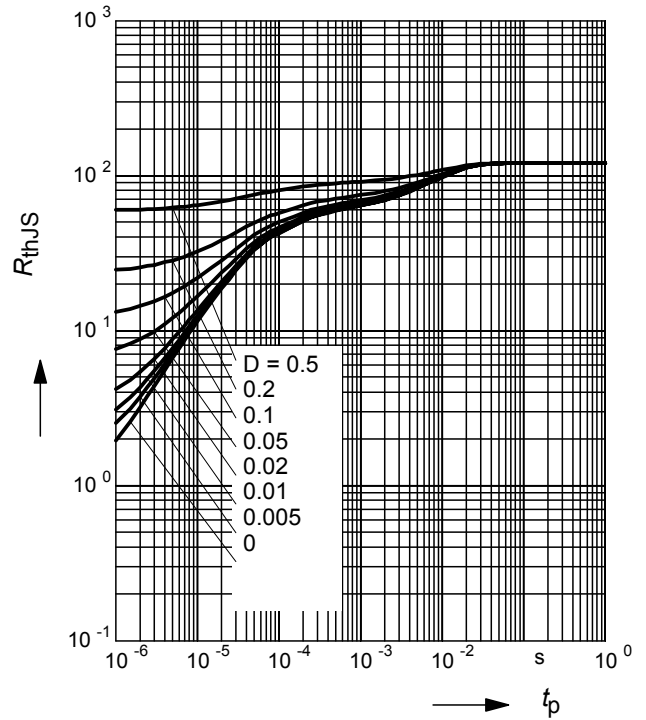
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR50-02L



**Permissible Puls Load  $R_{thJS} = f(t_p)$**

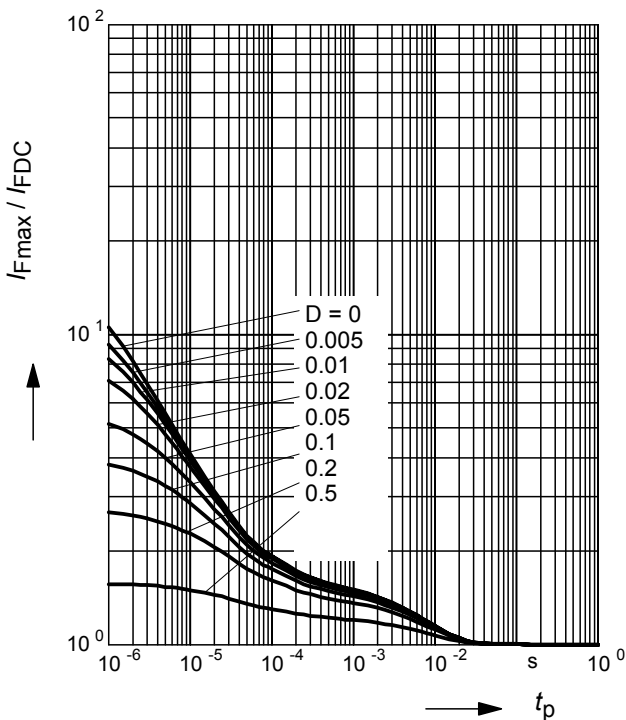
BAR50-02V



**Permissible Pulse Load**

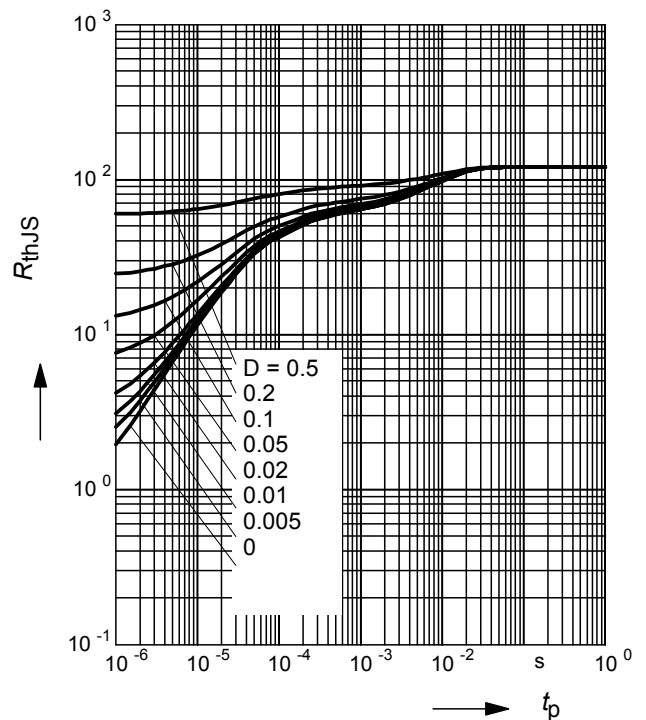
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR50-02V



**Permissible Puls Load  $R_{thJS} = f(t_p)$**

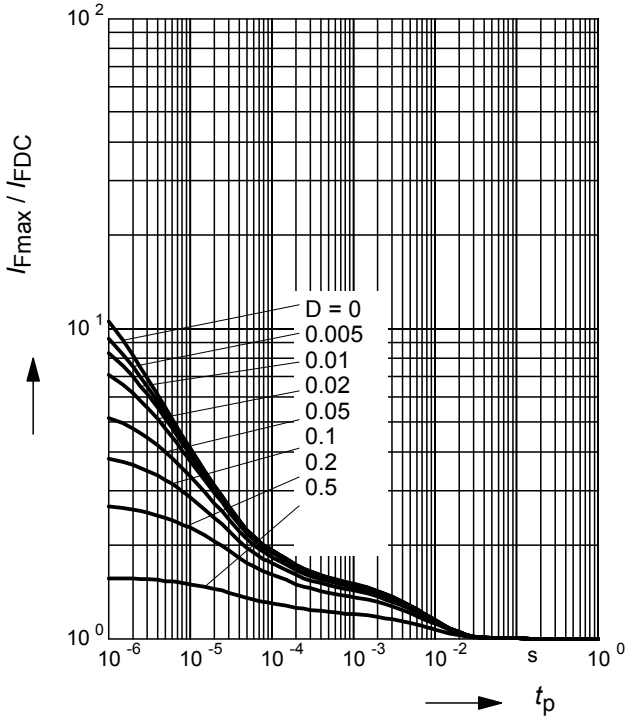
BAR50-02W



**Permissible Pulse Load**

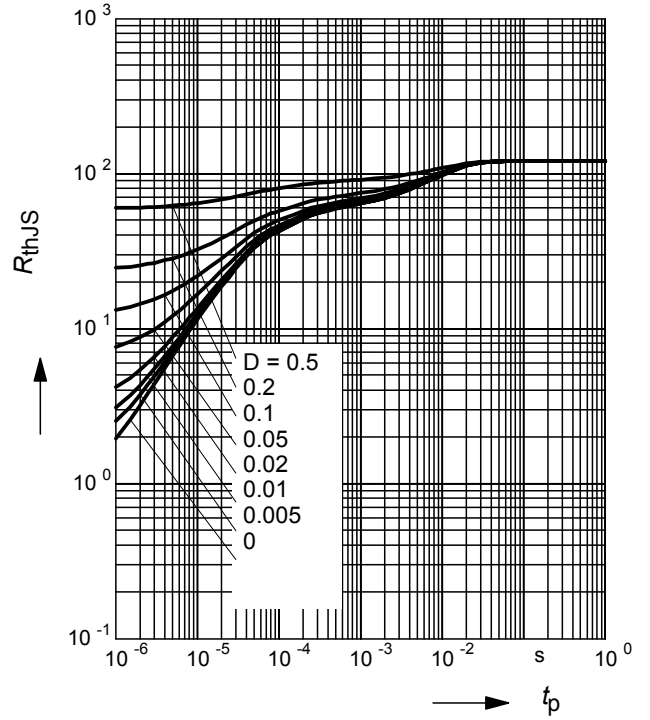
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR50-02W



**Permissible Puls Load  $R_{thJS} = f(t_p)$**

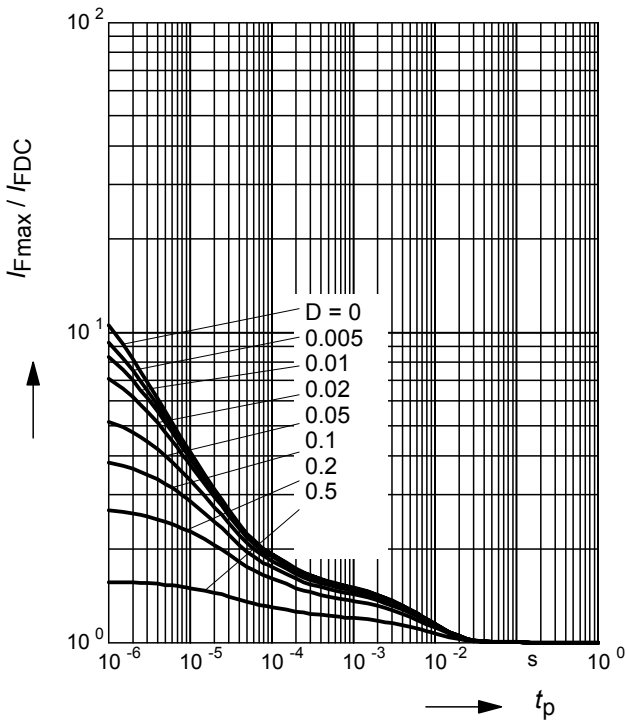
BAR50-03W



**Permissible Pulse Load**

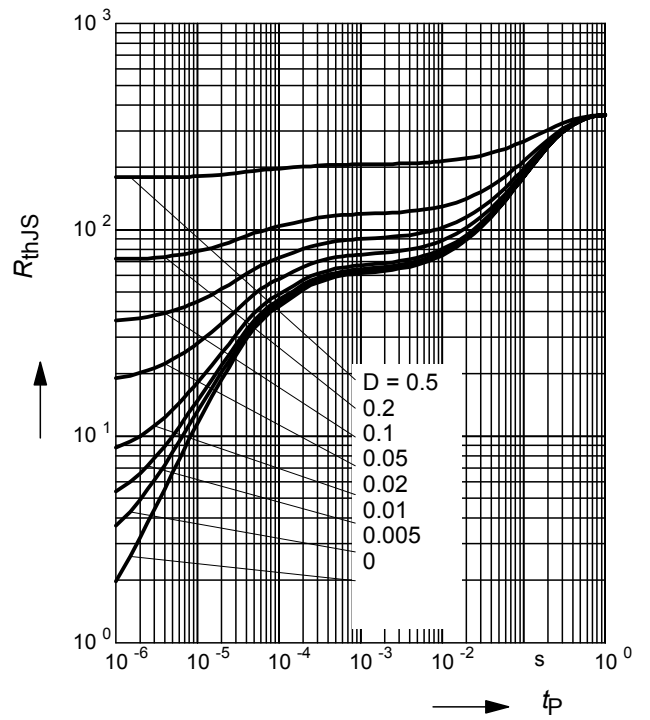
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR50-03W



**Permissible Puls Load  $R_{thJS} = f(t_p)$**

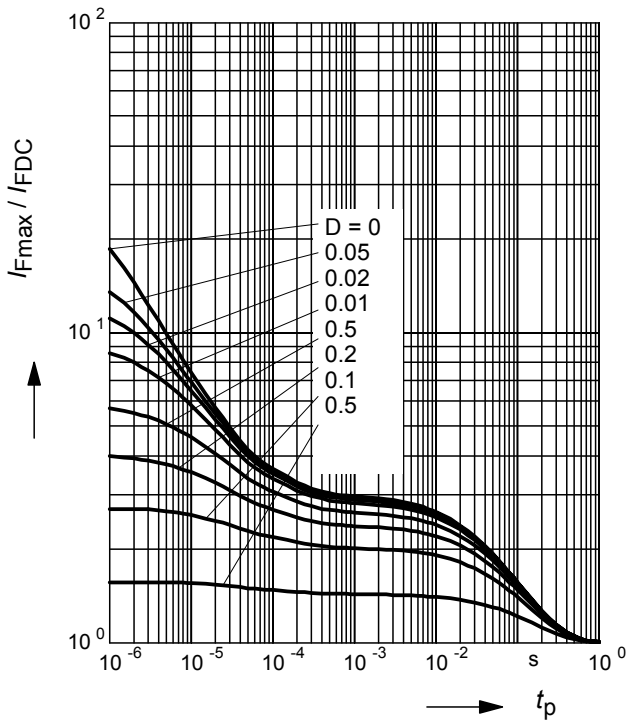
BAR50-05



**Permissible Pulse Load**

$$I_{Fmax} / I_{FDC} = f(t_p)$$

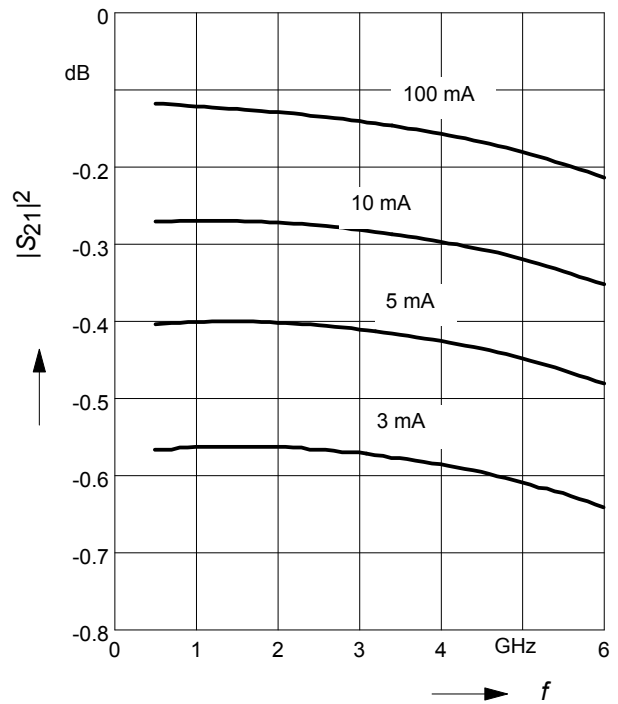
BAR50-05



**Insertion loss  $|S_{21}|^2 = f(f)$**

$I_F$  = Parameter

BAR50-02L in series configuration,  $Z = 50\Omega$



**Isolation  $|S_{21}|^2 = f(f)$**

$V_R$  = Parameter

BAR50-02L in series configuration,  $Z = 50\Omega$

