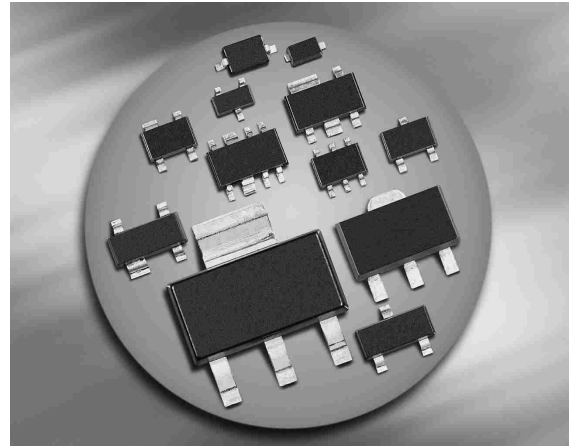


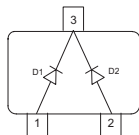
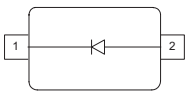
Silicon PIN Diodes

- 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 ¹⁾	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

¹For calculation of R_{thJA} please refer to Application Note Thermal Resistance

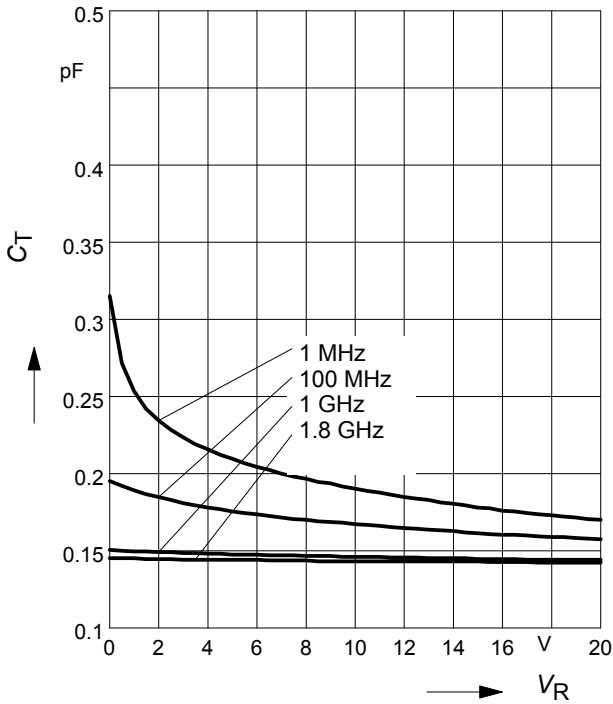
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
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 Ω
$V_R = 0\text{ V}, f = 100\text{ MHz}$		-	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				Ω
$I_F = 0.5\text{ mA}, f = 100\text{ MHz}$		-	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	τ_{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_1	-	56	-	μm
Insertion loss ¹⁾	$ 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 ¹⁾	$ 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	-	

¹BAR50-02L in series configuration, $Z = 50\ \Omega$

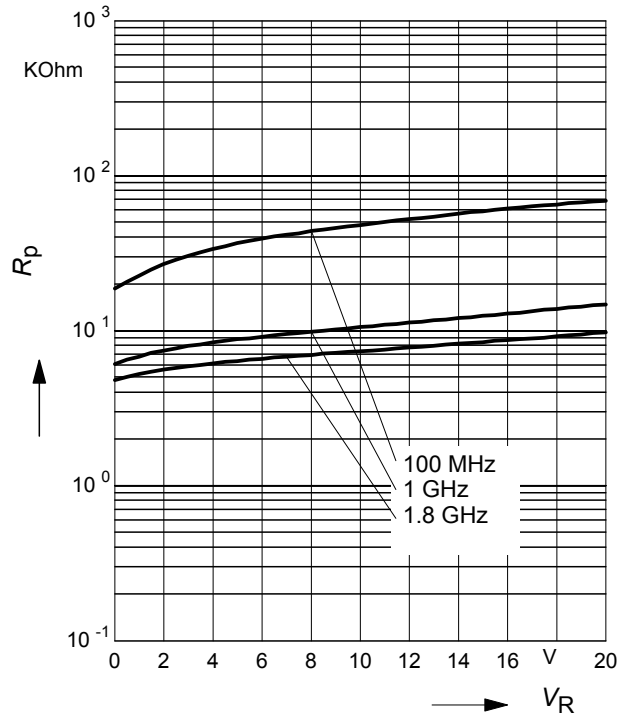
Diode capacitance $C_T = f(V_R)$

$f =$ Parameter



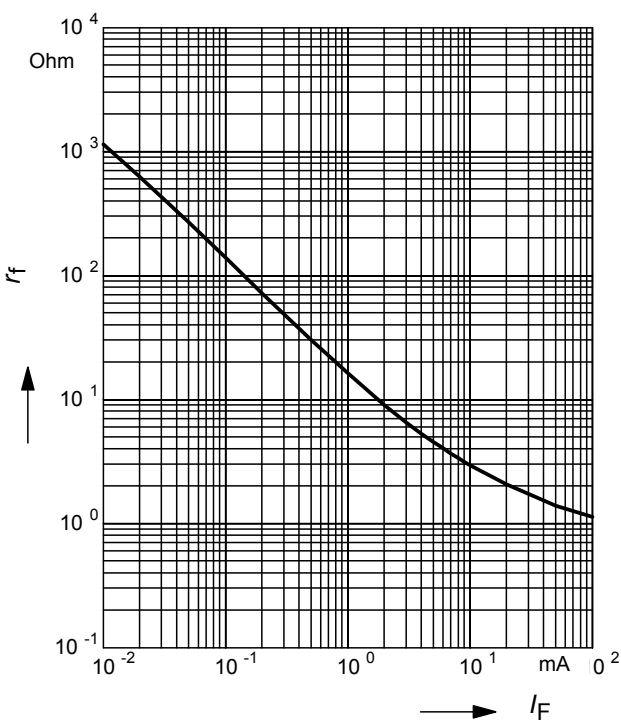
Reverse parallel resistance $R_p = f(V_R)$

$f =$ Parameter



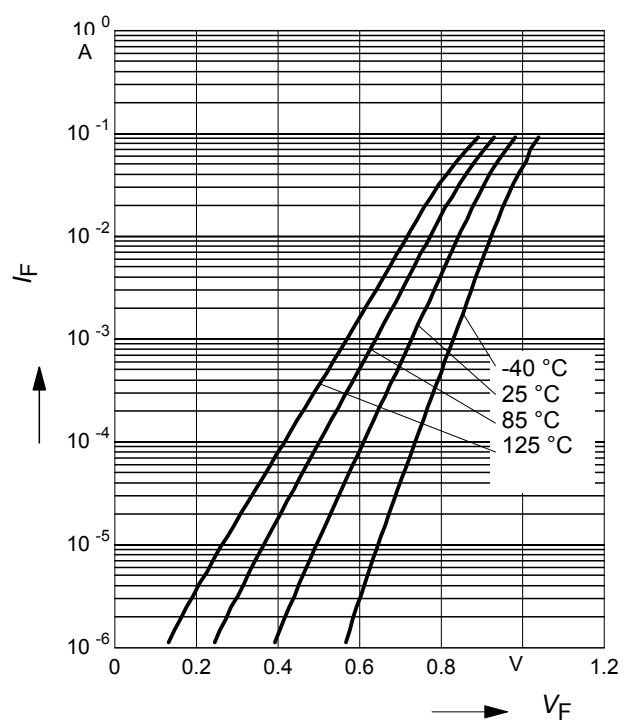
Forward resistance $r_f = f(I_F)$

$f = 100$ MHz



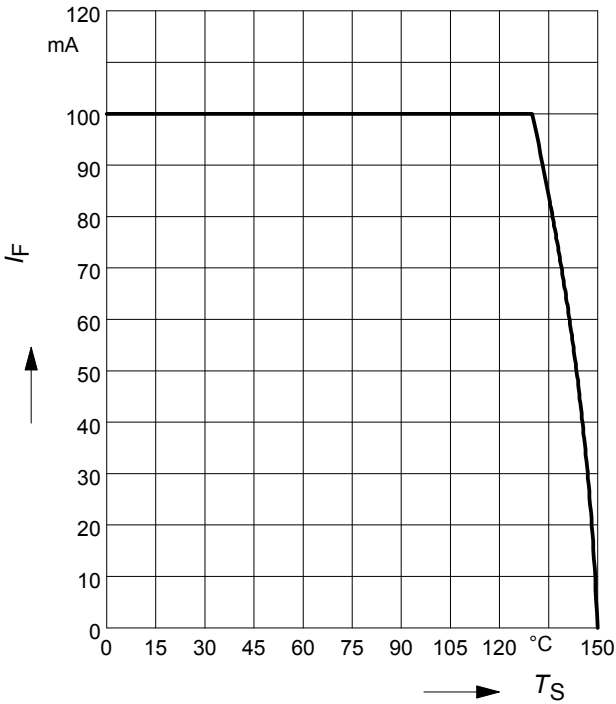
Forward current $I_F = f(V_F)$

$T_A =$ Parameter



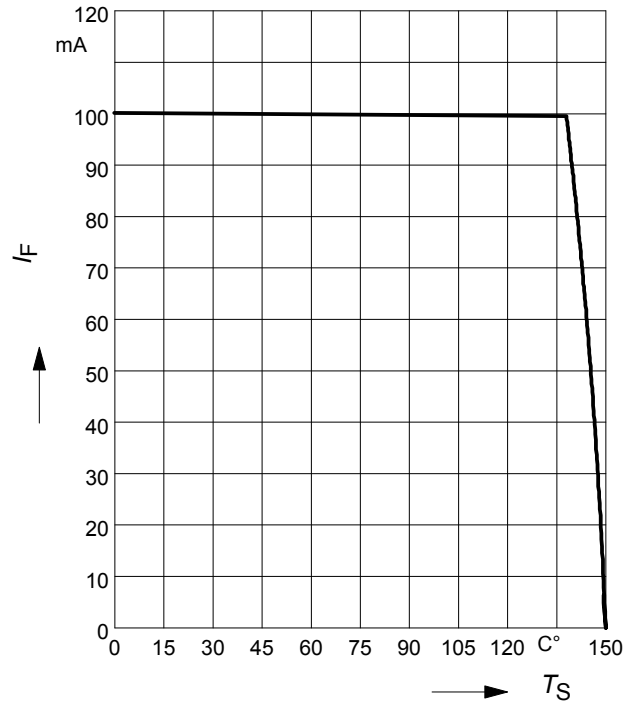
Forward current $I_F = f(T_S)$

BAR50-02L



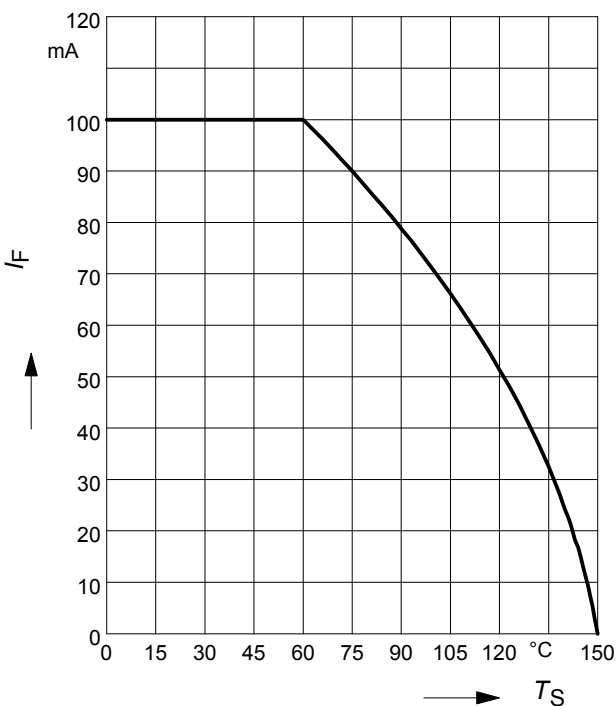
Forward current $I_F = f(T_S)$

BAR50-02V, BAR50-03W



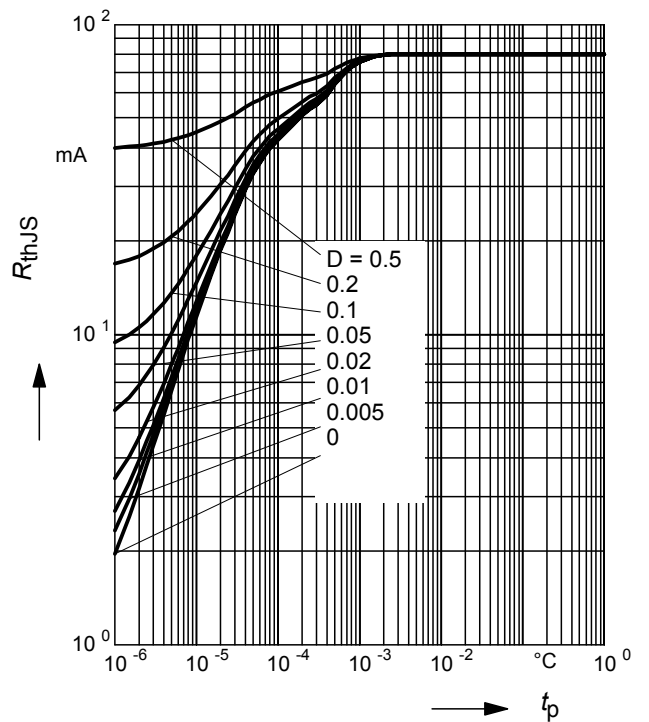
Forward current $I_F = f(T_S)$

BAR50-05



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

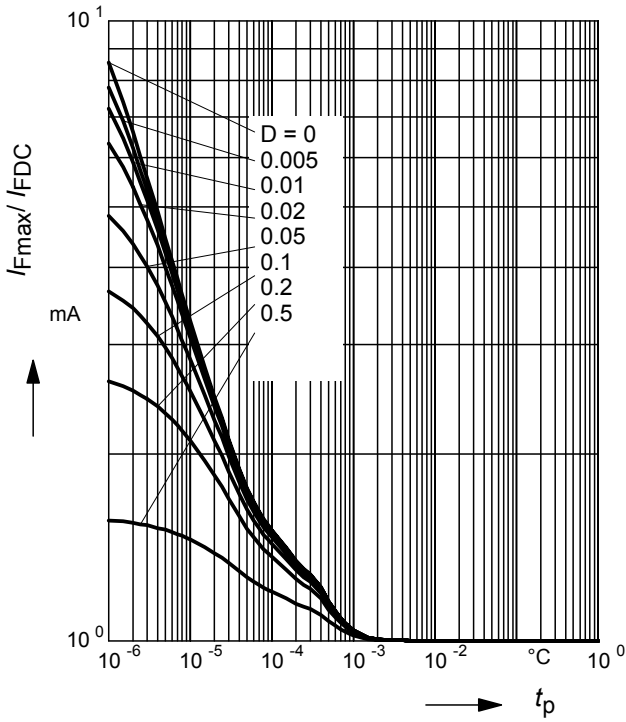
BAR50-02L



Permissible Pulse Load

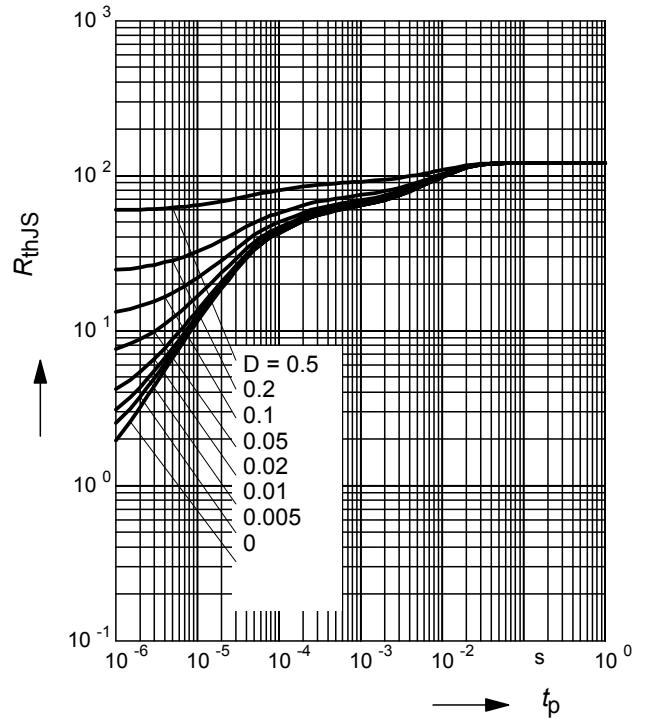
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR50-02L



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

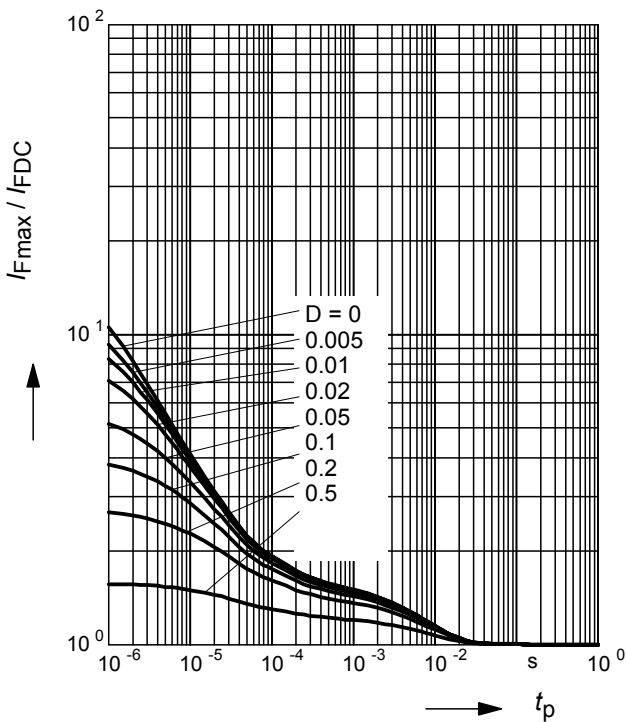
BAR50-02V



Permissible Pulse Load

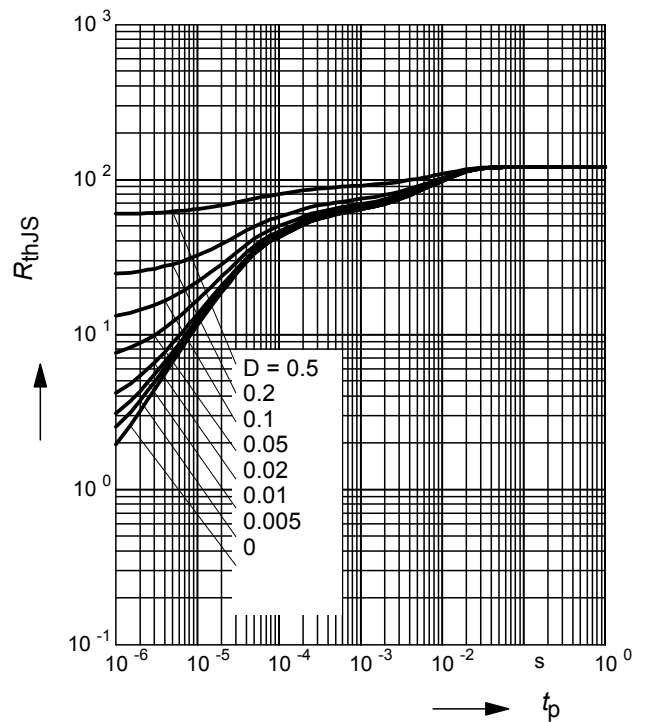
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR50-02V



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

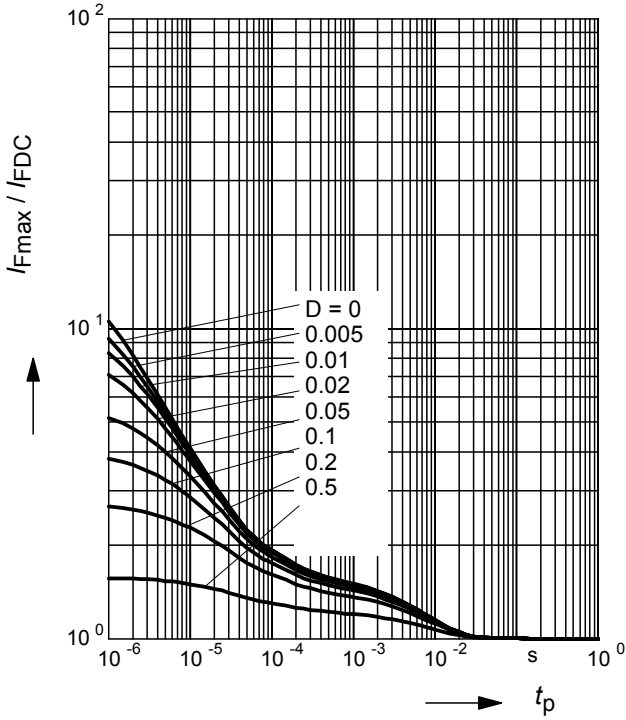
BAR50-02W



Permissible Pulse Load

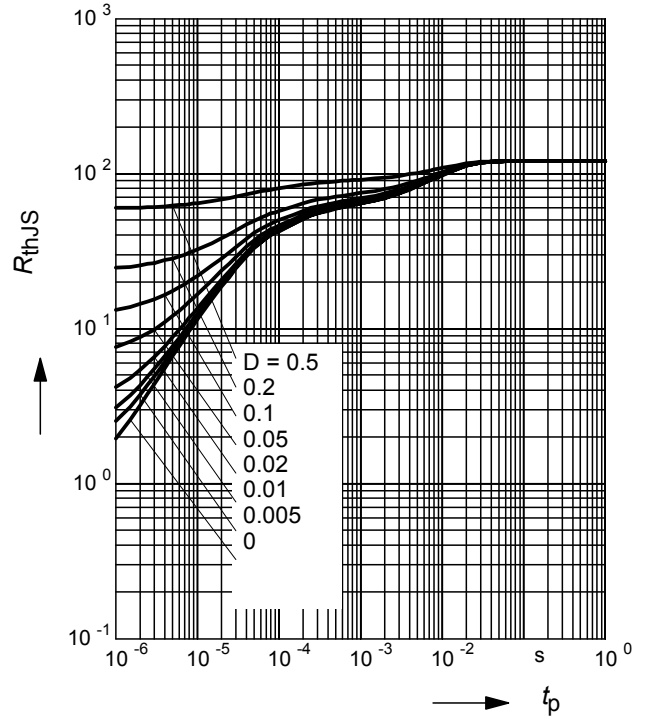
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR50-02W



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

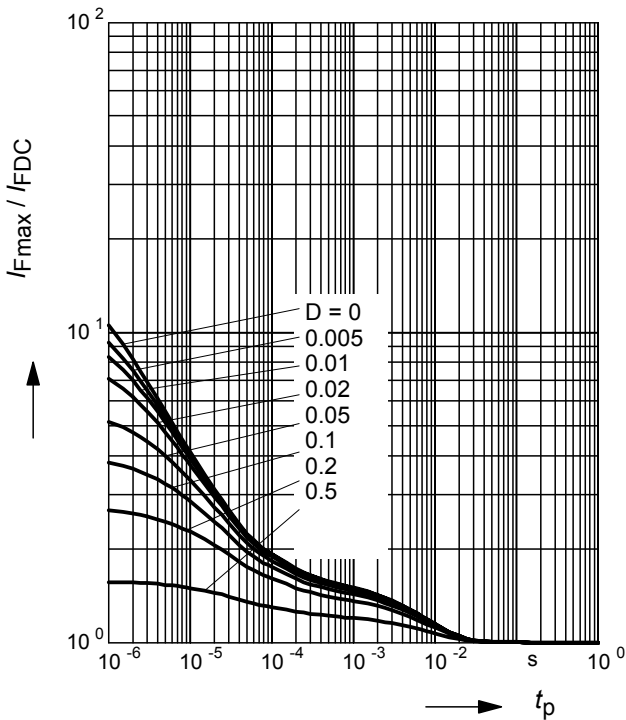
BAR50-03W



Permissible Pulse Load

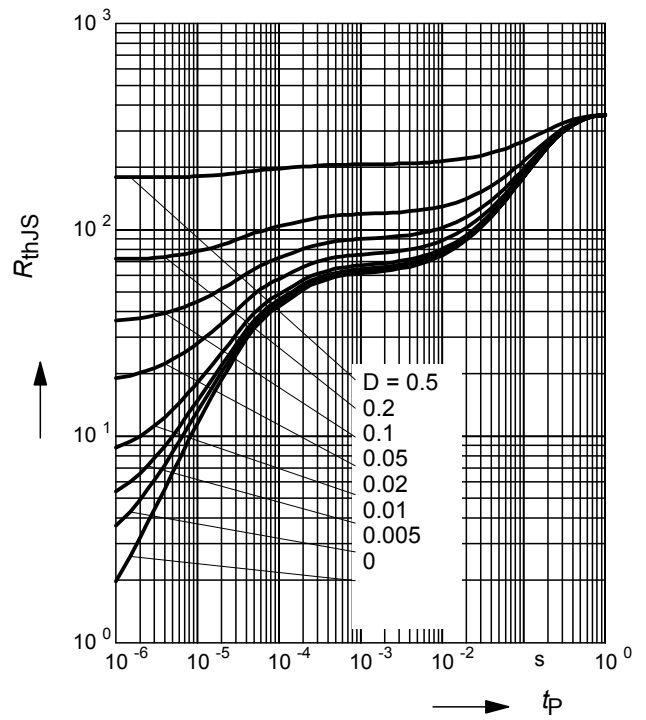
$I_{Fmax} / I_{FDC} = f(t_p)$

BAR50-03W



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

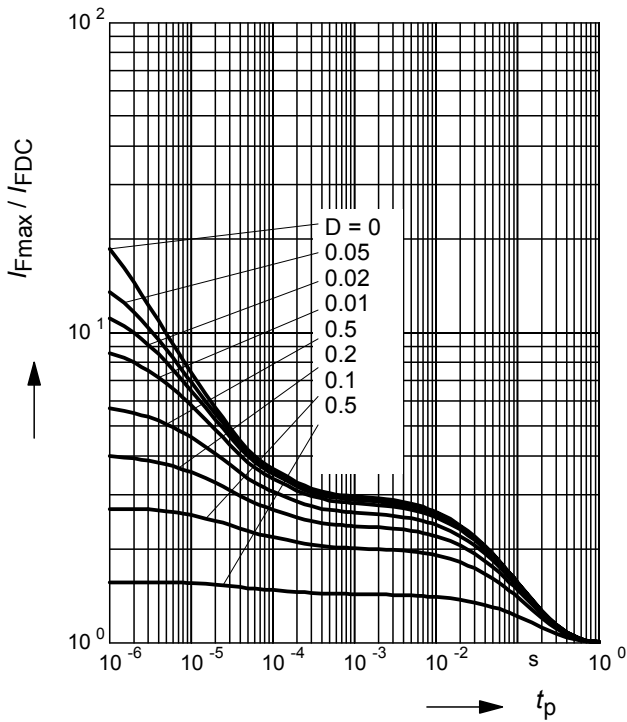
BAR50-05



Permissible Pulse Load

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

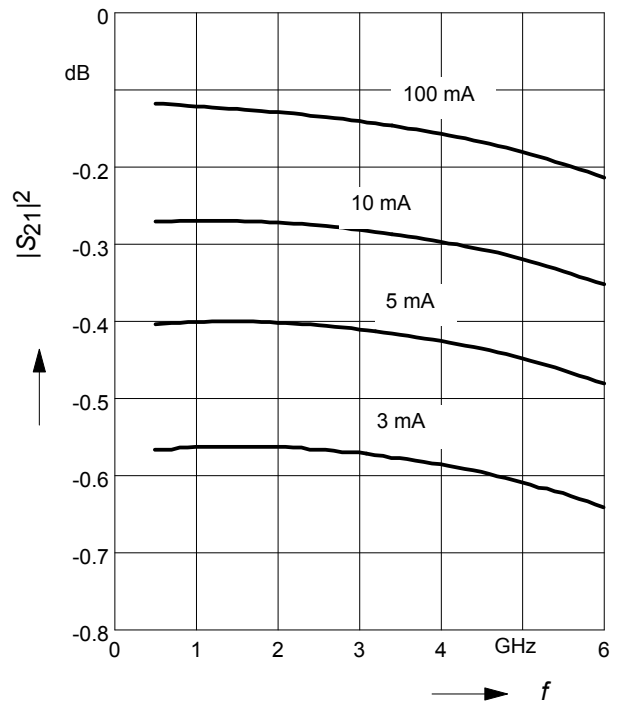
BAR50-05



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

I_F = Parameter

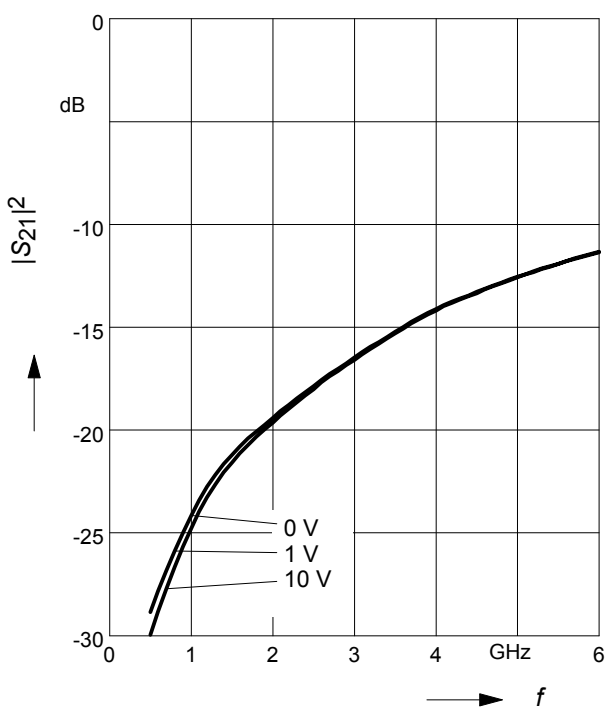
BAR50-02L in series configuration, $Z = 50\Omega$



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

V_R = Parameter

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



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