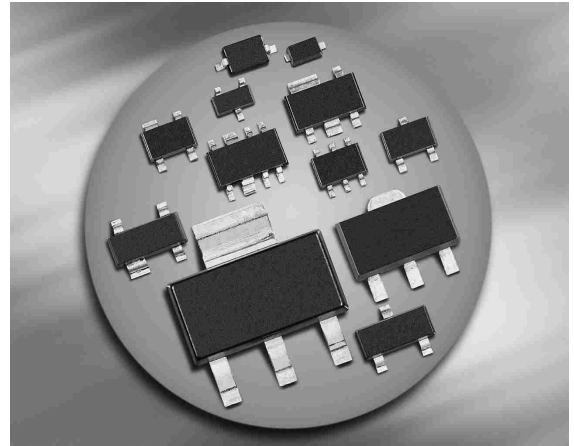


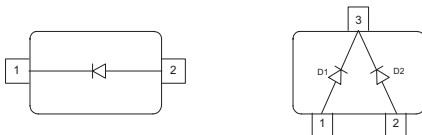
Silicon PIN Diodes

- 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

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

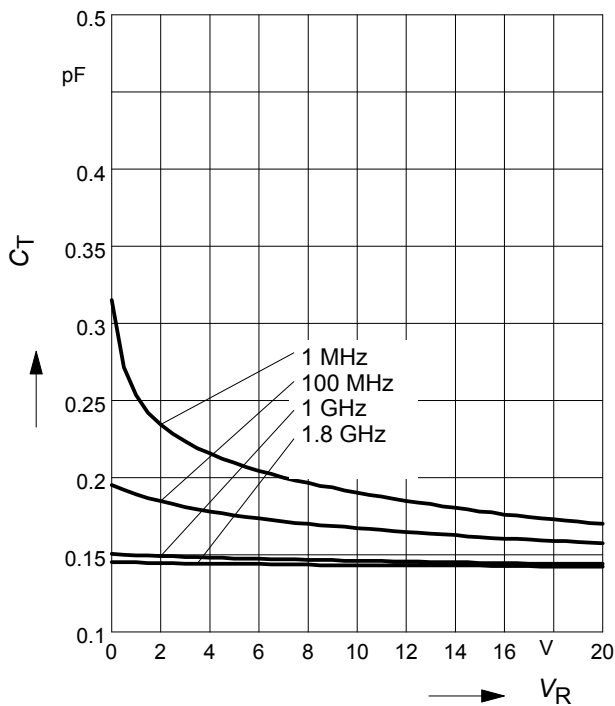
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

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

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

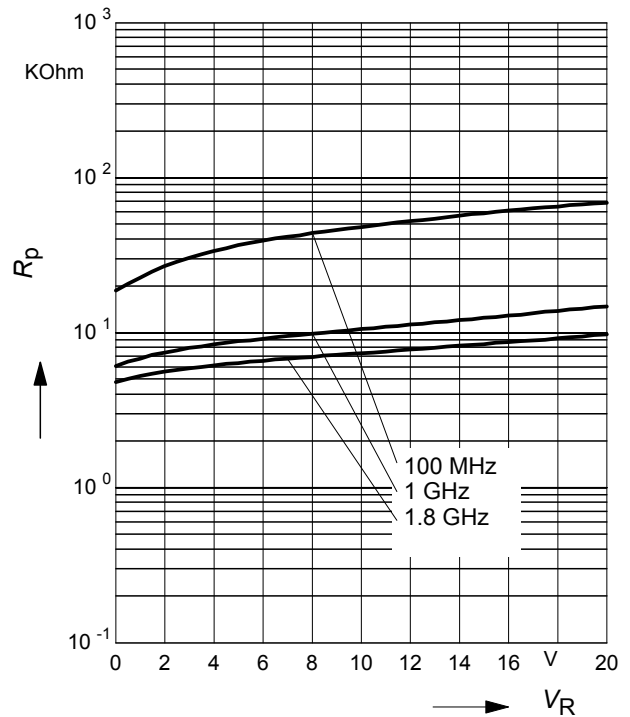
Diode capacitance $C_T = f(V_R)$

f = Parameter



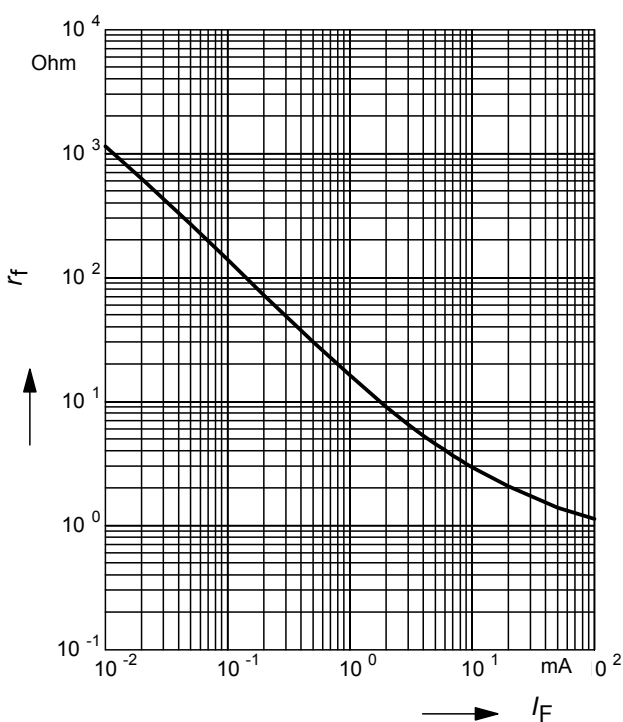
Reverse parallel resistance $R_P = f(V_R)$

f = Parameter



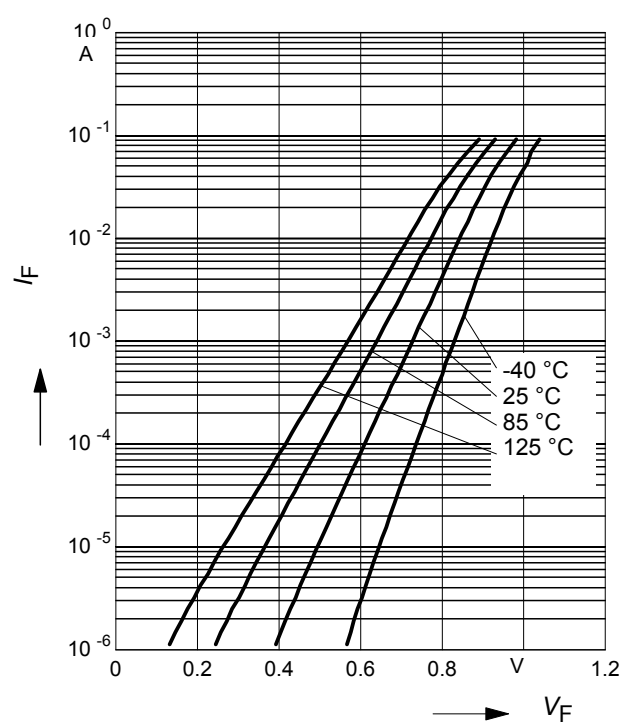
Forward resistance $r_f = f(I_F)$

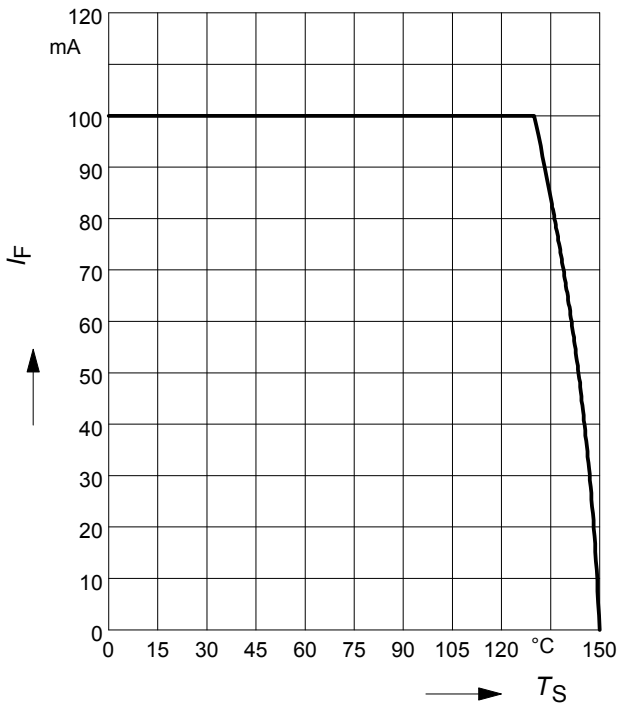
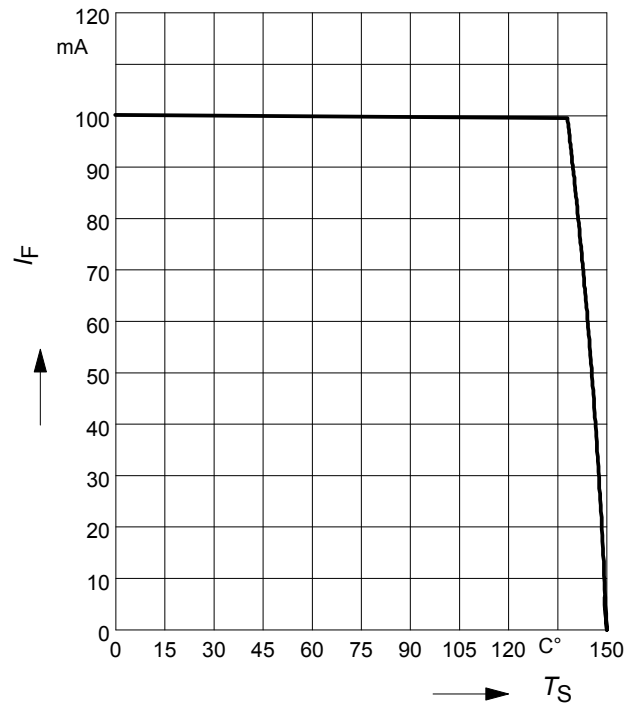
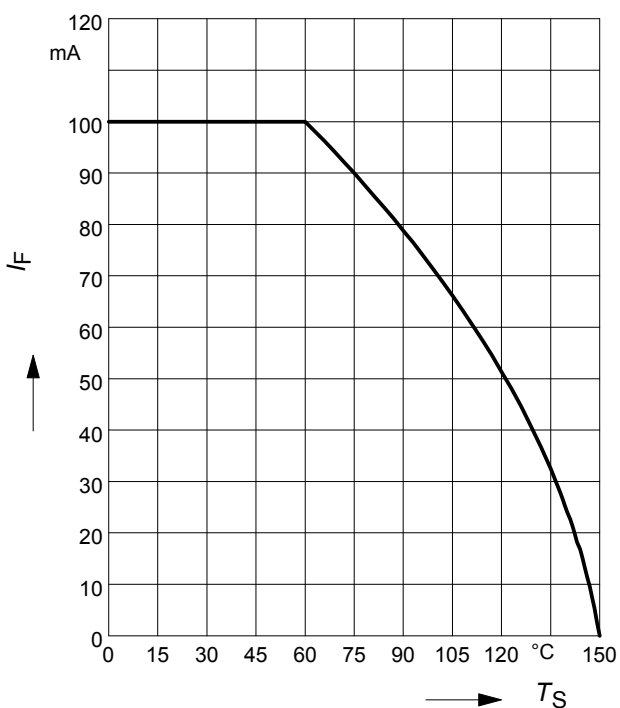
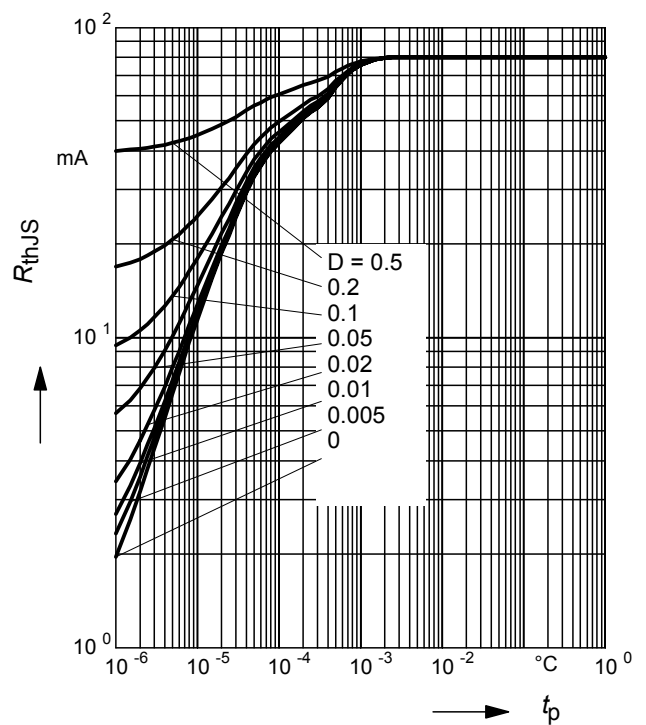
f = 100 MHz



Forward current $I_F = f(V_F)$

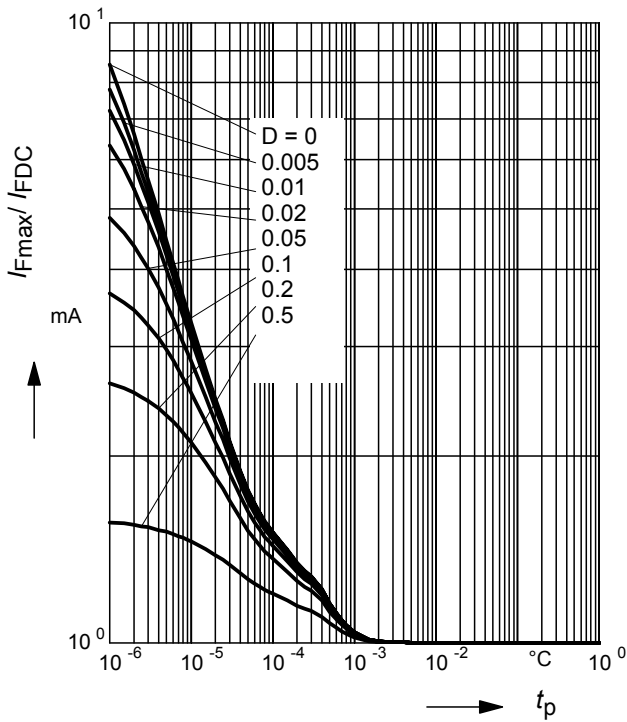
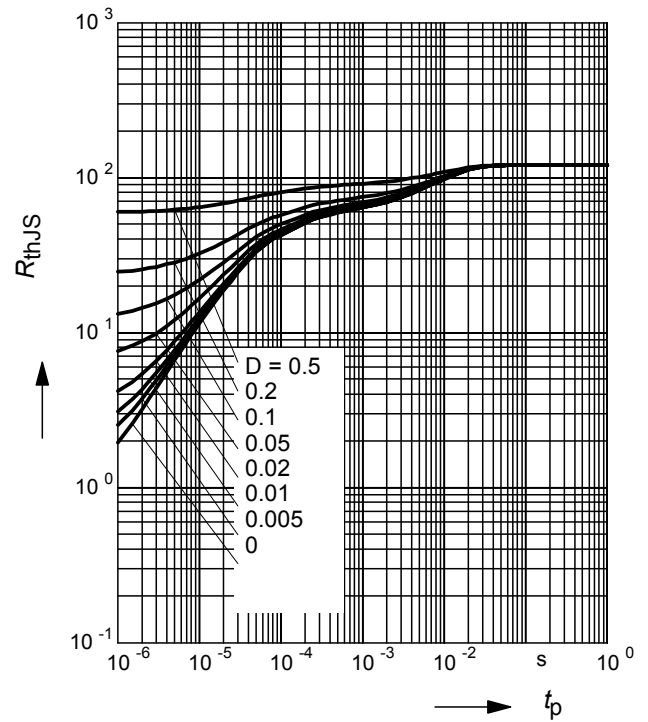
T_A = Parameter



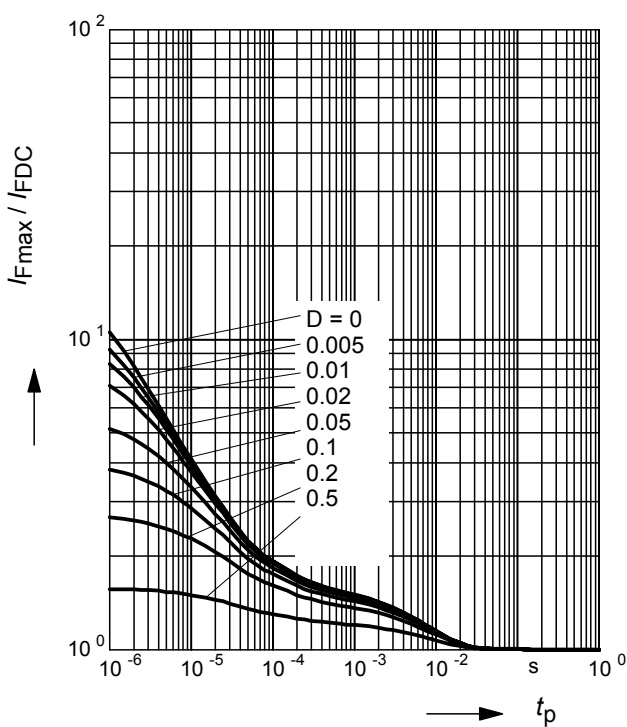
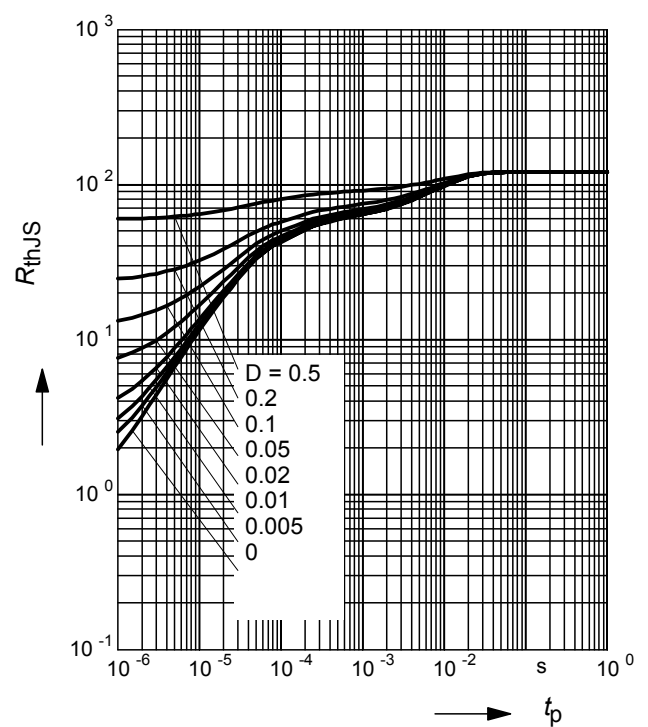
Forward current $I_F = f(T_S)$
BAR50-02L

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

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

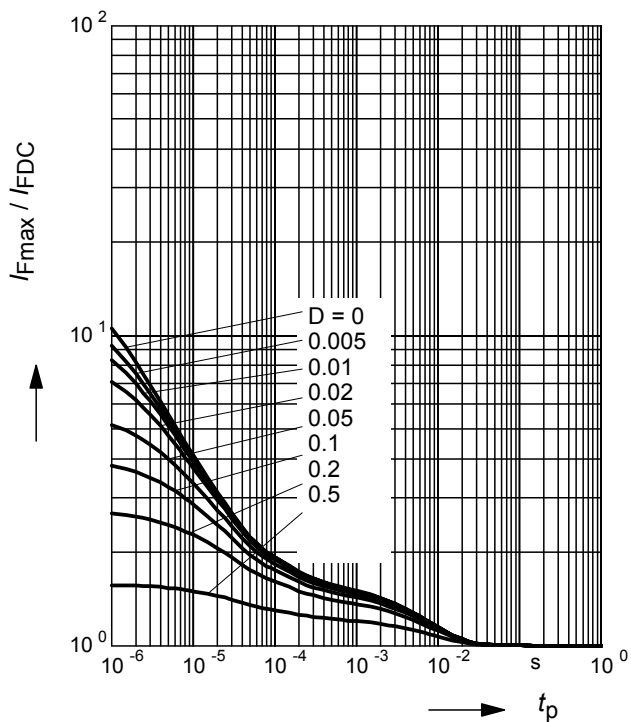
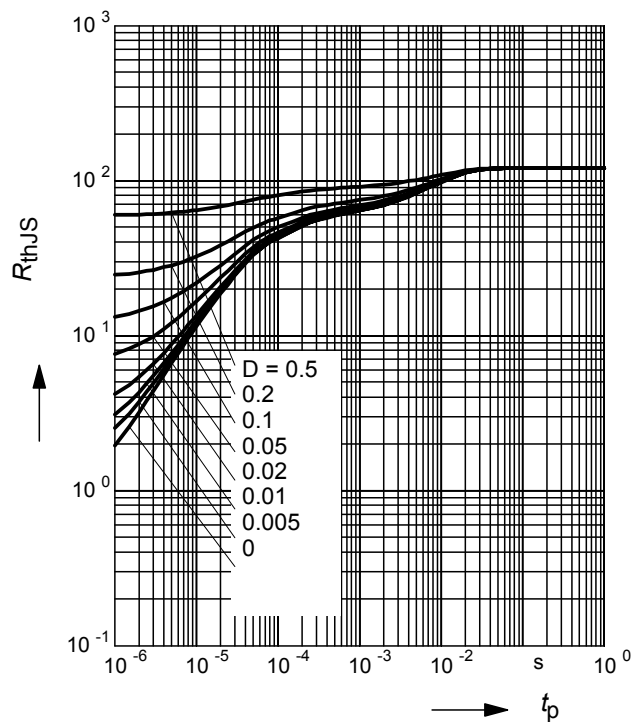
BAR50-02L

Permissible Puls Load $R_{thJS} = f(t_p)$
BAR50-02V

Permissible Pulse Load

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

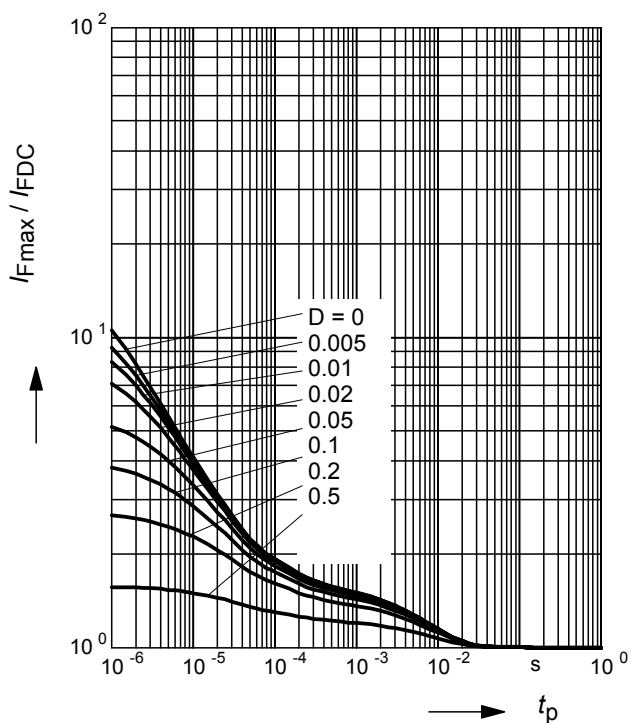
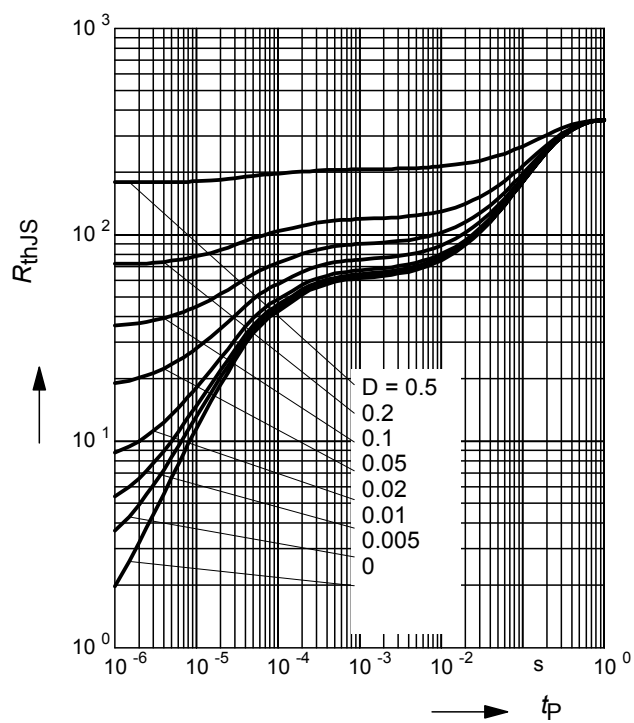
BAR50-02V

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

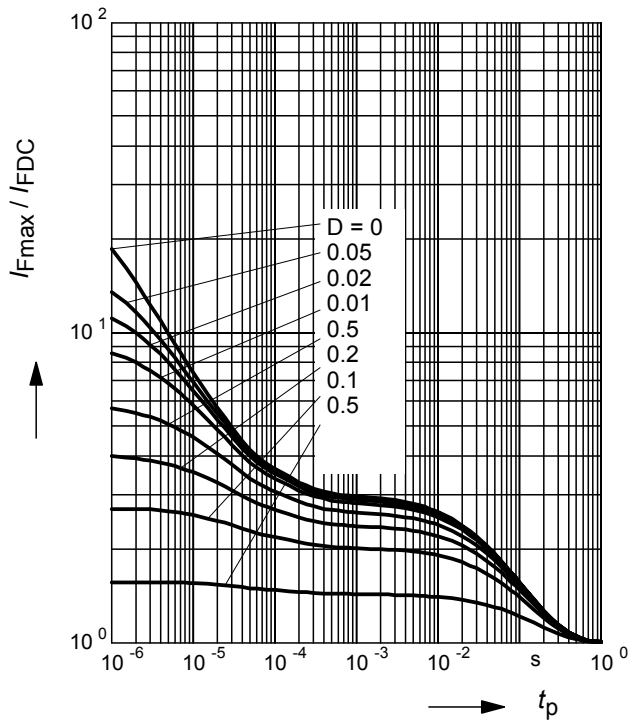
$$I_{Fmax} / I_{FDC} = f(t_p)$$

BAR50-03W

Permissible Puls Load $R_{thJS} = f(t_p)$
BAR50-05


Permissible Pulse Load

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

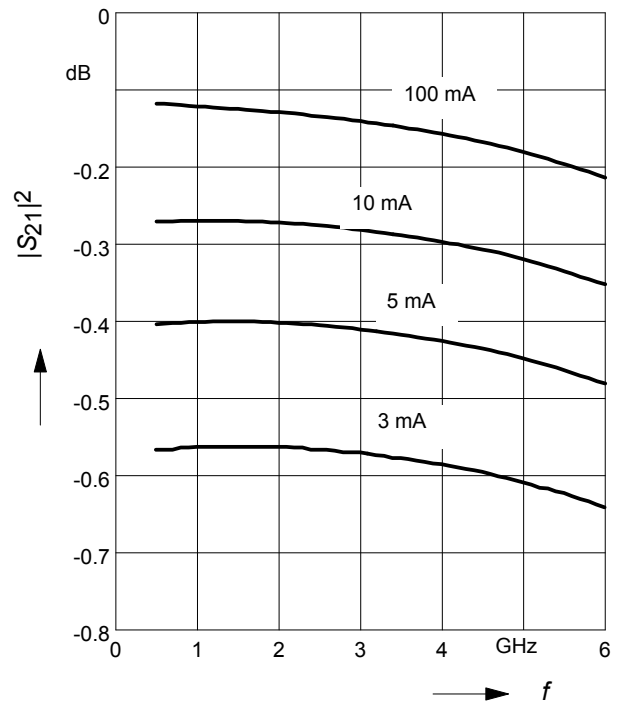
BAR50-05



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, $Z = 50\Omega$

