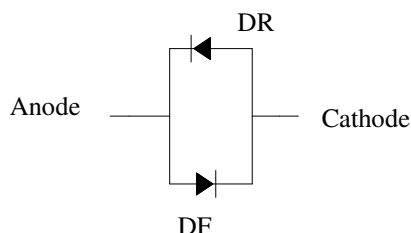


The standard diode model found in Spice (Ver 2) does not correctly model the reverse bias characteristics of Metelics' Schottky diodes. To correct this problem, use the macromodel shown below.



Diode DF models the forward bias curve, capacitance and transit time. Diode DR models the reverse bias curve. The parameters for DF and DR for the catalog part numbers are shown on the pages that follow. Package parasitics are not include in the macromodel. See the outline datasheets for the package parasitics. Spice parameters not included are KF, AF and FC. This model does contain the velocity saturation effect that occurs at high forward bias currents.

Macromodel for MSS30,046

```
.SUBCKT LB_SCH 1 2      1 is Anode   2 is Cathode
D1 1 2 DF
D2 2 1 DR
.MODEL DF D (IS=26.05E-9 N=1.0 RS=10.0 CJO=0.10E-12 VJ=0.7 M=0.2 XTI=2.0 EG=0.5 TT=3.0E-12
  BV=10.0)
.MODEL DR D (IS=37.4E-9 N=20.71 XTI=4.0 EG=33.5 BV=10.0)
.ENDS
```

Example circuit using macromodel

```
.DC V1 .2 .6 .1
.PRINT DC V(2)
V1 1 0 0
R1 1 2 1000
X1 2 0 LB_SCH
.SUBCKT LB_SCH 1 2
D1 1 2 DF
D2 2 1 DR
.MODEL DF D (IS=26.05E-9 N=1.0 RS=10.0CJO=0.10E-12 VJ=0.7 M=0.2 XTI=2.0 EG=0.5 TT=3.0E-12
  BV=10.0)
.MODEL DR D (IS=37.4E-9 N=20.71 XTI=4.0 EG=33.5 BV=10.0)
.ENDS
.END
```

Metelics provides Spice models that may be used and distributed freely, provided they are not changed in any way, resold or included in any other package for resale. These models are furnished on an "as is" basis without warranty of any kind. Metelics reserves the right to make changes to any model without notice. Although the use of models can be a useful tool in evaluating devices for applications, they do not exactly model all device characteristics under all conditions.

Parameters for diode DF			
Part Number	IS	RS ohms	CJO pF
MSS25,047 MSS25,143	20.0E-9 to 1.0E-6	25 to 60	0.07 to 0.10
MSS25,049 MSS25,145	20.0E-9 to 1.0E-6	25 to 47	0.09 to 0.12
MSS25,141	20.0E-9 to 1.0E-6	25 to 60	0.05 to 0.08

N=0.92 to 1.0
 VJ=0.7
 M=0.2
 TT=3.0E-12
 EG=0.22
 XTI=9.5
 BV=20.0

Parameters for diode DR
 IS=680.0E-9
 N=51.0
 XTI=2.0
 EG=20
 BV=20.0
 CJO=0.0
 RS=0.0

Spice Model Parameters for MSS30,000 Series Diodes

Parameters for diode DF			
Part Number	IS	RS ohms	CJO pF
MSS30,046 MSS30,142 MSS30,242 MSS30,346 MSS30,442 MSS30,B46 MSS30,PCR46 MSS30,CR46	9.1nA to 43nA	8 to 12	0.08 to 0.12
MSS30,050 MSS33,148 MSS30,248 MSS30,448	16.5nA to 80nA	4.8 to 7.2	0.12 to 0.17
MSS30,154 MSS30,254 MSS30,454 MSS30,B53 MSS30,PCR53 MSS30,CR53	43nA to 154nA	2.4 to 3.6	0.17 to 0.27

N=1.0
 VJ=0.7
 M=0.2
 TT=3.0E-12
 EG=0.5
 XTI=2.0
 BV=10.0

Parameters for diode DR
 IS=37.4nA
 N=20.71
 XTI=4.0
 EG=33.5
 BV=10.0

Parameters for diode DF

Part Number	IS	RS ohms	CJO pF
MSS39,045	29nA to 59pA	35 to 85	0.07 to 0.10
MSS39,048	40nA to 65pA	35 to 85	0.10 to 0.15
MSS39,144	40nA to 65pA	35 to 85	0.06 to 0.08
MSS39,146	40nA to 65pA	35 to 85	0.07 to 0.10
MSS39,148	40nA to 65pA	35 to 85	0.07 to 0.12
MSS39,152	55nA to 103pA	35 to 85	0.12 to 0.18

N=1.0
 VJ=0.7
 M=0.2
 TT=3.0E-12
 EG=0.65
 XTI=2.0
 BV=10.0

Parameters for diode DR

Part Number	IS	N	XTI	EG	BV
MSS39,045 MSS39,048	34.8nA	33.96	4.0	10.0	10.0
MSS39,144 MSS39,146 MSS39,148 MSS39,152	35.9nA	23.93	4.0	10.0	10.0

Parameters for diode DF				
Part Number	IS	RS ohms	CJO pF	
MSS40,045 MSS40,341	3nA to 4.5pA	5.6 to 8.4	0.07 to 0.11	N=1.0 VJ=0.7 M=0.2 TT=3.0E-12 EG=0.6 XTI=2.0 BV=10.0
MSS40,048 MSS40,148 MSS40,248 MSS40,448	5.5nA to 11pA	5.6 to 8.4	0.09 to 0.14	
MSS40,141 MSS40,244	3.5nA to 4.9pA	8 to 12	0.05 to 0.07	
MSS40,155 MSS40,255 MSS40,455	9.5nA to 26.5pA	4 to 6	0.2 to 0.3	
MSS40,B46 MSS40,CR46 MSS40,PCR46	0.7pA to 1nA	8 to 20	0.07 to 0.125	
MSS40,B53 MSS40,CR53 MSS40,PCR53	3.2pA to 2.5nA	5 to 10	0.1 to 0.25	

Spice Model Parameters for MSS50,000 Series Diodes

Parameters for diode DF				
Part Number	IS	RS ohms	CJO pF	
MSS50,048	250pA to 110fA	5.6 to 8.4	0.09 to 0.14	N=1.0 VJ=0.7 M=0.2 TT=3.0E-12 EG=0.76 XTI=2.0 BV=10.0
MSS50,062	205pA to 90fA	1.6 to 2.4	0.4 to 0.6	
MSS50,146	146pA to 47fA	7.2 to 10.8	0.05 to 0.09	
MSS50,244,341,448	146pA to 47fA	5.8 to 7.2	0.16 to 0.24	
MSS50,B46,CR46,PCR46	130pA to 115fA	8 to 15	0.07 to 0.125	
MSS50,B53,CR53,PCR53	250pA to 110fA	5 to 10	0.1 to 0.25	

Parameters for diode DR					
Part Number	IS	N	XTI	EG	BV
MSS50,048	35.9nA	23.93	4.0	8.0	10.0
MSS50,062,146,244,341,448	34.8nA	33.96	4.0	8.0	10.0
MSS50,B46,CR46,PCR46 MSS50,B53,CR53,PCR53	37.4nA	20.71	4.0	8.0	10.0

Spice Model Parameters for MSS60,000 Series Diodes

Parameters for diode DF				
Part Number	IS	RS ohms	CJO pF	N=1.0 VJ=0.7 M=0.2 TT=3.0E-12 EG=0.88 XTI=2.0 BV=10.0
MSS60,144 MSS60,244 MSS60,444 MSS60,341	319fA to 8.3fA	10 to 20	0.06 to 0.1	
MSS60,148 MSS60,248 MSS60,448	265fA to 6.8fA	7 to 13	0.09 to 0.15	
MSS60,153 MSS60,253 MSS60,453	220fA to 5.6fA	3 to 7	0.15 to 0.25	
MSS60,B46	2.2pA to 0.07fA	10 to 20	0.06 to 0.125	
MSS60,B53	5pA to 0.3fA	7 to 13	0.1 to 0.25	
MSS60,CR46,PCR46	9pA to 0.6fA	10 to 20	0.06 to 0.125	
MSS60,CR53,PCR53	13pA to 1.2fA	7 to 13	0.1 to 0.25	

Parameters for diode DR
IS=35.9nA N=23.93 XTI=4.0 EG=7.0 BV=10.0

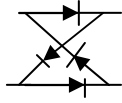
Surface Mount Schottkys

Part Number	Spice Model
SMST3012	MSS30,050
SMST4012	MSS40,048
SMST6012	MSS60,148
SMST3004	
SMST4004	
SMST6004	
SMSD3012	MSS30,050
SMSD4012	MSS40,048
SMSD6012	MSS60,148

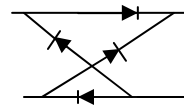
Single



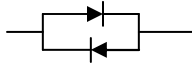
Crossover Ring



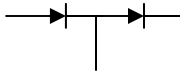
Crossover Bridge



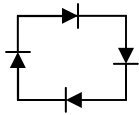
Anti Parallel Pair



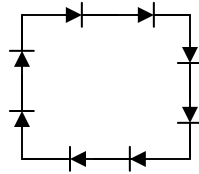
Series Tee



Ring Quad - four junction



Ring Quad - eight junction



Bridge Quad - four junction

