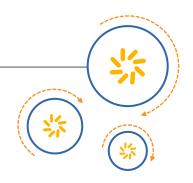


RF360 Europe GmbH

A Qualcomm - TDK Joint Venture



SAW Components

SAW Duplexer

WCDMA Band 4/ CDMA 1x AWS Band

Series/type: B8524

Ordering code: B39212B8524P810

Date: July 12, 2013

Version: 2.0

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SAW Duplexer

WCDMA Band 4/ CDMA 1x AWS Band

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SAW Duplexer

1732.5 / 2132.5 MHz

Data Sheet



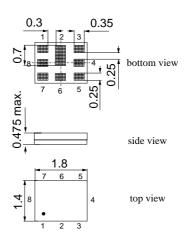
Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band 4 / CDMA 1x AWS systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 45 MHz
- Single-ended to balanced transformation in Antenna-Rx path
- Impedance transformation 50Ω to 100Ω in Antenna-Rx path
- High isolation between Tx and Rx



Features

- Package size 1.8 x 1.4 mm², package height 0.475 mm max.
- RoHS compatible
- Approx. weight 0.005g
- Package for Surface Mount Technology (SMT)
- Ni, Au-plated terminals
- Balanced Rx port, unbalanced Tx port
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3



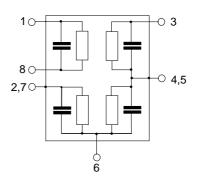
Pin configuration

■ 3 Tx input, unbalanced

■ 1,8 Rx output, balanced

■ 6 Antenna

■ 2, 4, 5, 7 To be grounded





1732.5 / 2132.5 MHz **SAW Duplexer**

Data Sheet



Characteristics for W-CDMA Band 4

Temperature range for specification: $T = -15 ^{\circ}C \text{ to } +80 ^{\circ}C$ Antenna terminating impeda-nce: $Z_{ANT} = 50 \Omega \parallel 2.6 nH$

 $Z_{RX} = 100 \Omega$ (balanced) || 18nH $Z_{TX} = 50 \Omega$ RX terminating impedance:

		B8524		
Characteristics TX - Antenna	min.	typ. @ 25 °C	max.	
Center frequency f _C		1732.5		MHz
Maximum insertion attenuation α				
@f _{Carrier} 1712.4 1752.6 MHz $lpha_{ ext{WCDP}}$	/A ¹⁾	1.1	1.8	dB
Amplitude ripple (p-p) $\Delta\alpha$				
@f $_{ ext{Carrier}}$ 1712.4 1752.6 MHz $_{\Deltalpha_{ ext{WCl}}}$	_{2MA} 1)	0.4	0.9	dB
Error vector magnitude EVM ²				
@f _{Carrier} 1712.4 1752.6 MHz		1.0	2.5	%
Input VSWR (TX port)		1.0	2.0	/0
1710.0 1755.0 MHz		1.6	1.9	
		1.0	1.9	
Output VSWR (ANT port) 1710.0 1755.0 MHz		,	4.0	
1710.0 1799.0 MHZ		1.5	1.9	
Attancettan				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	30	45		dB
	35	45		dВ
728.0 764.0 MHz 851.0 894.0 MHz	35	42		dB
1310.0 1355.0 MHz	24	38		dB
1565.42 1573.374MHz	40	48		dB
1573.374 1577.466MHz	45	50		dB
1577.466 1585.42 MHz	40	51		dB
1597.5515 1605.886MHz	40	47		dB
1805.0 1880.0 MHz	20	46		dB
1930.0 1990.0 MHz	40	46		dB
@f _{Carrier} 2112.4 2152.6 MHz α_{WCDM}	ла ¹⁾ 42	46		dB
2400.0 2500.0 MHz	30	39		dB
2565.0 2677.0 MHz	5	35		dB
3410.0 3510.0 MHz	25	31		dB
5000.0 5120.0 MHz	10	20		dB
5120.0 5350.0 MHz	12	20		dB
5350.0 5725.0 MHz	10	26		dB
5725.0 5850.0 MHz	18	25		dB
5850.0 6000.0 MHz	10	25		dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (10).

²⁾ Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.



1732.5 / 2132.5 MHz **SAW Duplexer**

Data Sheet

Characteristics for W-CDMA Band 4

 $T = -15 ^{\circ}C \text{ to } +80 ^{\circ}C$ Temperature range for specification: Antenna terminating impedance: $Z_{ANT} = 50 \Omega \parallel 2.6 nH$

 $Z_{RX} = 100 \Omega$ (balanced) || 18nH $Z_{TX} = 50 \Omega$ RX terminating impedance:

				B8524		
Characteristics Antenna - Rx			min.	typ. @ 25 °C	max.	
Center frequency		f _C		2132.5		MHz
Maximum insertion attenuation		α				
@f _{Carrier} 2112.4 2152.6	MHz	$\alpha_{\text{WCDMA}}^{1)}$		1.6	2.3	dB
Amplitude ripple (p-p)		Δα				
@f _{Carrier} 2112.4 2152.6	MHz	$\Delta\alpha_{WCDMA}^{1)}$		0.4	1.0	dB
Error vector magnitude		EVM ²⁾				
@f _{Carrier} 2112.4 2152.6	MHz			1.1	2.5	%
Input VSWR (RX port)						
2110.0 2155.0	MHz			1.5	2.0	
Output VSWR (ANT port)						
2110.0 2155.0	MHz			1.7	2.0	
CMRR $(S_{32}-S_{42} / S_{32}+S_{42})$			002)			
2110.0 2155.0	MHZ		20 ³⁾	29		dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (10).

²⁾ Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

³⁾ A combination of 10 ° phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR.



SAW Duplexer 1732.5 / 2132.5 MHz

Data Sheet



Characteristics for W-CDMA Band 4

Temperature range for specification: $T = -15 ^{\circ}C \text{ to } +80 ^{\circ}C$ Antenna terminating impedance: $Z_{ANT} = 50 \Omega \parallel 2.6 nH$

 $Z_{RX} = 100 \Omega$ (balanced) || 18nH $Z_{TX} = 50 \Omega$ RX terminating impedance:

						B8524		
Characteristics Anter	nna	- Rx			min.	typ. @ 25 °C	max.	
Attenuation				α				
1.0		400.0	MHz		57	> 70		dB
400.0		1310.0	MHz		40	67		dB
1310.0		1355.0	MHz		43	65		dB
1355.0		1710.0	MHz		35	49		dB
@f _{Carrier} 1712.4		1752.6	MHz	$\alpha_{WCDMA}^{1)}$	45	60		dB
1755.0		1910.0	MHz		15	53		dB
1910.0		1955.0	MHz		35	58		dB
1955.0		2025.0	MHz		15	37		dB
2240.0		2300.0	MHz		15	36		dB
2300.0		2400.0	MHz		30	46		dB
2400.0		2496.0	MHz		40	47		dB
2496.0		2690.0	MHz		40	52		dB
2690.0		3300.0	MHz		35	45		dB
3300.0		3800.0	MHz		45	51		dB
3820.0		3910.0	MHz		40	50		dB
3910.0		4220.0	MHz		35	50		dB
4220.0		4310.0	MHz		40	49		dB
4310.0		5150.0	MHz		35	47		dB
5150.0		5850.0	MHz		37	46		dB
5850.0		6000.0	MHz		35	42		dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (10).



SAW Duplexer 1732.5 / 2132.5 MHz

Data Sheet

Characteristics for W-CDMA Band 4

Temperature range for specification: $T = -15 ^{\circ}C \text{ to } +80 ^{\circ}C$ Antenna terminating impedance: $Z_{ANT} = 50 \Omega \parallel 2.6 nH$

 $Z_{RX} = 100 \Omega$ (balanced) || 18nH $Z_{TX} = 50 \Omega$ RX terminating impedance:

			B8524		
Characteristics Tx - Rx	min.	typ. @ 25 °C	max.		
Differential Mode Isolation	α				
1574.0 1577.0	MHz	40	68		dB
@f _{Carrier} 1712.4 1752.6	MHz $\alpha_{WCDMA}^{1)}$	55	59		dB
@f _{Carrier} 2112.4 2152.6	MHz $\alpha_{WCDMA}^{1)}$	50	57		dB
3410.0 3520.0	MHz	20	60		dB
5120.0 5275.0	MHz	20	55		dB
Common Mode Isolation	α				
@f _{Carrier} 1712.4 1752.6	MHz $\alpha_{WCDMA}^{1)}$	46	51		dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (10).



SAW Duplexer 1732.5 / 2132.5 MHz

Data Sheet



Characteristics for CDMA 1x AWS Band

Temperature range for specification: $T = -30 \,^{\circ}\text{C} \text{ to } +85 \,^{\circ}\text{C}$ Antenna terminating impedance: Z_{ANT} = 50 Ω || 2.6nH

 $Z_{RX} = 100 \Omega$ (balanced) || 18nH $Z_{TX} = 50 \Omega$ RX terminating impedance:

		B8524		
Characteristics TX - Antenna	min.	typ. @ 25 °C	max.	
Center frequency f _C		1732.5		MHz
Maximum insertion attenuation α				
1710.0 1755.0 MHz		1.3	2.0	dB
Amplitude ripple (p-p) $\Delta\alpha$				
1710.0 1755.0 MHz		0.5	1.2	dB
Input VSWR (TX port)				
1710.0 1755.0 MHz		1.6	1.9	
Output VSWR (ANT port)				
1710.0 1755.0 MHz		1.5	1.9	
11 10.0 17 00.0		1.5	1.5	
Attenuation α				
1.0 728.0 MHz	30	45		dB
728.0 764.0 MHz	35	45		dB
851.0 894.0 MHz	35	42		dB
1310.0 1355.0 MHz	24	38		dB
1565.42 1573.374MHz	40	48		dB
1573.374 1577.466MHz	45	50		dB
1577.466 1585.42 MHz	40	51		dB
1597.5515 1605.886MHz	40	47		dB
1805.0 1880.0 MHz	20	46		dB
1930.0 1990.0 MHz	40	46		dB
2110.0 2155.0 MHz	42	46		dB
2400.0 2500.0 MHz	30	39		dB
2565.0 2677.0 MHz	5	35		dB
3410.0 3510.0 MHz	25	31		dB
5000.0 5120.0 MHz	10	20		dB
5120.0 5350.0 MHz	12	20		dB
5350.0 5725.0 MHz	10	26		dB
5725.0 5850.0 MHz	18	25		dB
5850.0 6000.0 MHz	10	25		dB



SAW Duplexer 1732.5 / 2132.5 MHz

Data Sheet

Characteristics for CDMA 1x AWS Band

Temperature range for specification: $T = -30 \,^{\circ}\text{C} \text{ to } +85 \,^{\circ}\text{C}$ Antenna terminating impedance: $Z_{ANT} = 50 \Omega \parallel 2.6 \text{nH}$

 $Z_{RX} = 100 \Omega$ (balanced) || 18nH $Z_{TX} = 50 \Omega$ RX terminating impedance:

			B8524		
Characteristics Antenna - Rx		min.	typ. @ 25 °C	max.	
Center frequency	f _C		2132.5		MHz
Maximum insertion attenuation	α				
2110.0 2155.0 MHz			1.7	2.3	dB
Amplitude ripple (p-p)	Δα				
2110.0 2155.0 MHz			0.4	1.0	dB
Input VSWR (RX port)					
2110.0 2155.0 MHz	:		1.5	2.0	
Output VSWR (ANT port)			1.0	2.0	
2110.0 2155.0 MHz			1.7	2.0	
	,		1.7	2.0	
CMRR $(S_{32}-S_{42} / S_{32}+S_{42})$ 2110.0 2155.0 MHz		001\	00		ID.
2110.0 2199.0 MHz	•	201)	29		dB
Attamastica					
Attenuation 1.0 400.0 MHz	α	57	. 70		dB
1.0 400.0 MHz 400.0 1310.0 MHz		57 40	> 70 67		dВ
1310.0 1355.0 MHz		43	65		dB
1355.0 1710.0 MHz		35	49		dB
1710.0 1755.0 MHz		45	60		dB
1755.0 1910.0 MHz		15	53		dB
1910.0 1955.0 MHz		35	58		dB
1955.0 2025.0 MHz	:	15	37		dB
2240.0 2300.0 MHz	:	15	36		dB
2300.0 2400.0 MHz		30	46		dB
2400.0 2496.0 MHz		40	47		dB
2496.0 2690.0 MHz		40	52		dB
2690.0 3300.0 MHz		35	45		dB
3300.0 3800.0 MHz		45	51		dB
3820.0 3910.0 MHz		40	50		dB
3910.0 4220.0 MHz		35	50		dB
4220.0 4310.0 MHz		40	49		dB
4310.0 5150.0 MHz		35	47		dB
5150.0 5850.0 MHz		37	46		dB
5850.0 6475.0 MHz		35	42		dB

¹⁾ A combination of 10 ° phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR.



SAW Duplexer 1732.5 / 2132.5 MHz

Data Sheet

Characteristics for CDMA 1x AWS Band

Temperature range for specification: $T = -30 \,^{\circ}\text{C} \text{ to } +85 \,^{\circ}\text{C}$ Antenna terminating impedance:

 Z_{ANT} = 50 Ω || 2.6nH Z_{RX} = 100 Ω (balanced) || 18nH Z_{TX} = 50 Ω RX terminating impedance:

			B8524		
Characteristics Tx - Rx		min.	typ. @ 25 °C	max.	
Differential Mode Isolation	α				
1574.0 1577.0	MHz	40	68		dB
1710.0 1755.0	MHz	55	58		dB
2110.0 2155.0	MHz	50	56		dB
3410.0 3520.0	MHz	20	60		dB
5120.0 5275.0	MHz	20	55		dB
Common Mode Isolation	α				
1710.0 1755.0	MHz	46	51		dB



SAW Duplexer

1732.5 / 2132.5 MHz

Data Sheet



Annotation for characteristics section

Attenuation of WCDMA signal ("Powertransferfunction", $\alpha_{\text{WCDMA}})$ is determined by

$$\int_{\infty}^{\infty} \left| S_{ds21}(f) H_{RRC}(f - f_{Carrier}) \right|^2 df$$

 $f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS-Passband, $f_{Carrier}$ ranges from 882.4 MHz (lowest Tx channel) to 912.6 MHz (highest Tx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



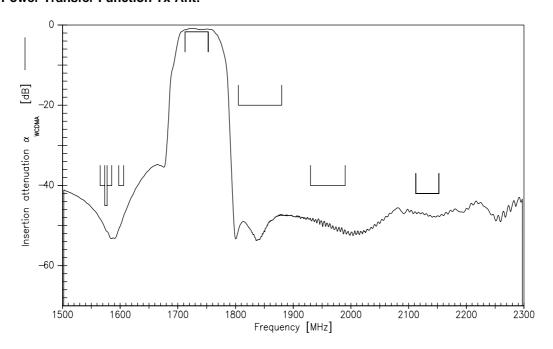
SAW Components				B8524
SAW Duplexer				1732.5 / 2132.5 MHz
Data Sheet		=ME	2	
Maximum Ratings				
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V_{DC}	51)	V	
ESD voltage	V_{ESD}	50 ²⁾	V	machine model, 10 pulses
Input power at	P_{IN}			source and load impedance 50 Ω
1710.0 1755.0 MHz		29	dBm	γ continuous wave
elsewhere		10	dBm	∫ 50°C, 5.000 h

^{1) 168}h Damp Heat Steady State according to IEC 60068-2-67Cy 2) acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

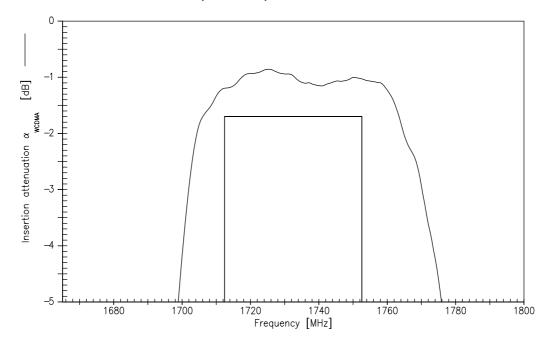




Power Transfer Function Tx-Ant:



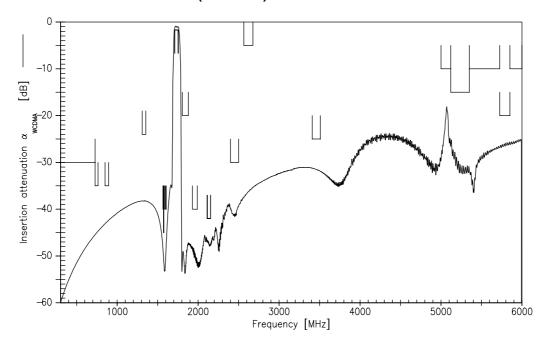
Power Transfer Function Tx-Ant (Passband):



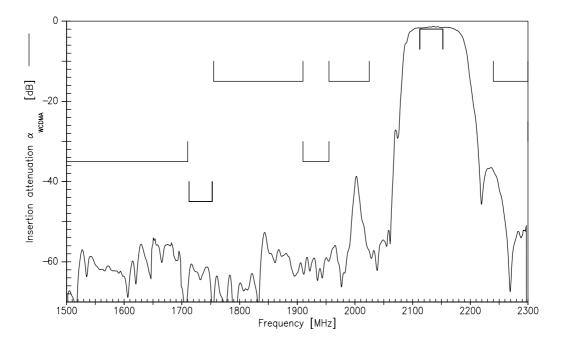


SAW Components B8524 **SAW Duplexer** 1732.5 / 2132.5 MHz **Data Sheet**

Power Transfer Function Tx-Ant (Wideband):



Power Transfer Function Ant-Rx:





SAW Components

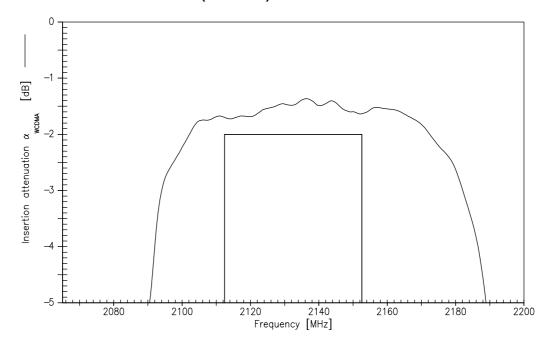
SAW Duplexer

Data Sheet

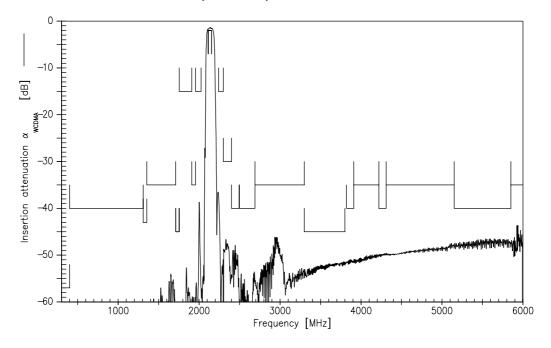
B8524

1732.5 / 2132.5 MHz

Power Transfer Function Ant-Rx (Passband):



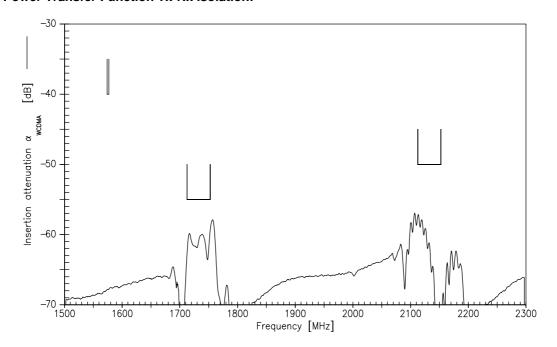
Power Transfer Function Ant-Rx (Wideband):



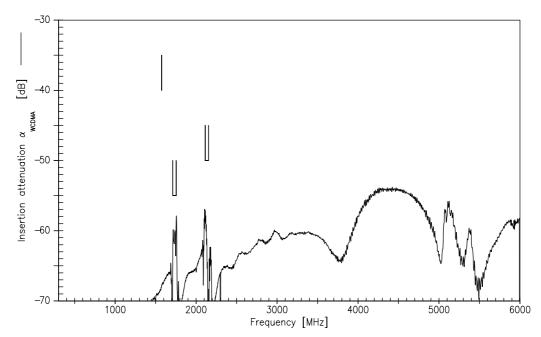




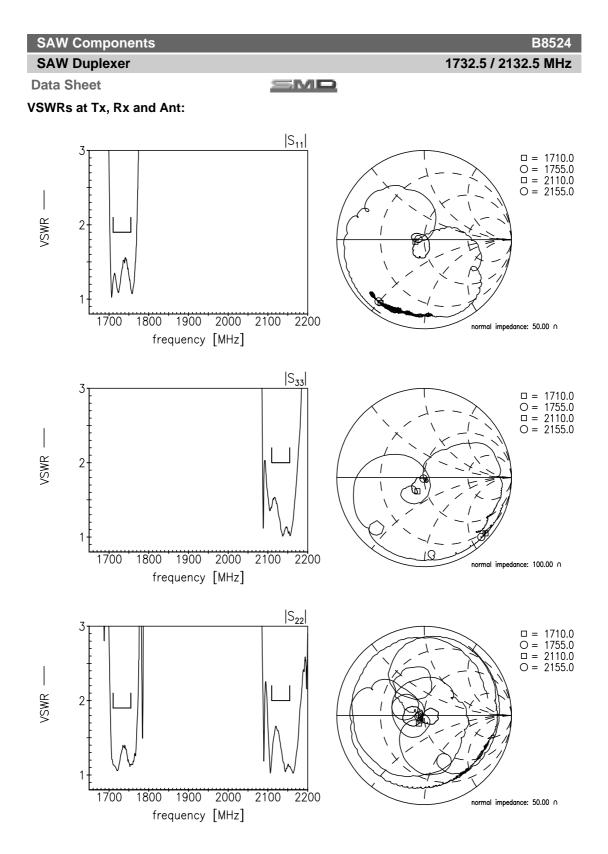
Power Transfer Function Tx-Rx isolation:



Power Transfer Function Tx-Rx isolation (Wideband):









SAW Components		B8524
SAW Duplexer		1732.5 / 2132.5 MHz
Data Sheet	SMD	

References

Туре	B8524
Ordering code	B39212B8524P810
Marking and package	C61157-A8-A72-1-27
Packaging	F61074-V8259-Z000-2-27
Date codes	L_1126
S-parameters	B8524_NB_UN.s4p, B8524_WB_UN.s4p See file header for pin/port assignement.
Soldering profile	S_6001
RoHS compatible	defined as compatible with the following documents: "DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.
Matching coils	See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm

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