

TOSHIBA Field Effect Transistor Silicon N Channel Junction Type

## 2SK3376MFV

For ECM

- Application for Ultra-compact ECM

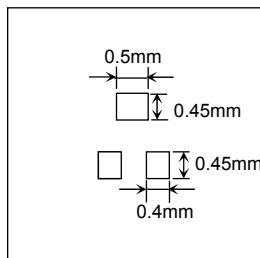
### Absolute Maximum Ratings (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Gate-Drain voltage	$V_{GDO}$	-20	V
Gate Current	$I_G$	10	mA
Drain power dissipation (Ta = 25°C)	$P_D$ (Note 1)	150	mW
Junction Temperature	$T_j$	125	°C
Storage temperature range	$T_{stg}$	-55~125	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

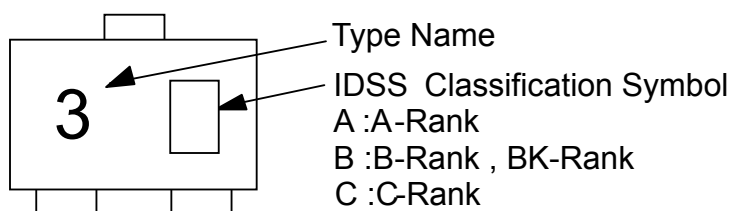
Note 1: Mounted on FR4 board



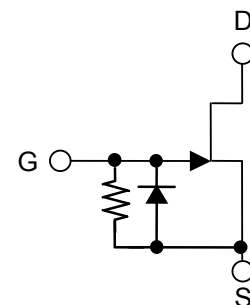
### IDSS CLASSIFICATION

A-Rank	80 to 200μA
B-Rank	170 to 300μA
C-Rank	270 to 480μA
BK-Rank	150 to 350μA

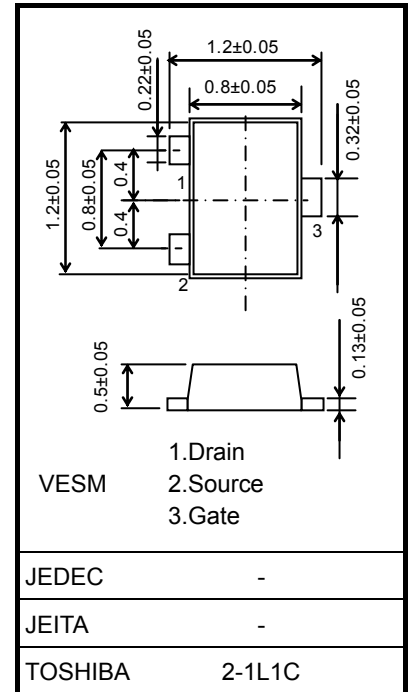
### Marking



### Equivalent Circuit



Unit: mm



Weight: 1.5mg (typ.)

## Electrical Characteristics (A-Rank IDSS Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain Current	$I_{DSS}$	$V_{DS} = 2\text{ V}, V_{GS} = 0$	80	—	200	$\mu\text{A}$
Drain Current	$I_D$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}$	—	—	240	$\mu\text{A}$
Gate-Source Cut-off Voltage	$V_{GS(OFF)}$	$V_{DS} = 2\text{ V}, I_D = 1\text{ }\mu\text{A}$	-0.1	—	-0.8	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 2\text{ V}, V_{GS} = 0\text{ V}$	0.7	1.4	—	mS
Input capacitance	$C_{iss}$	$V_{DS} = 2\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	5.5	—	pF
Voltage Gain	$G_v$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz}$	-13.5	—	-9.0	dB
Delta Voltage Gain	$DG_v(f)$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz to }100\text{ Hz}$	—	—	-2.0	dB
Delta Voltage Gain	$DG_v(V)$	$V_{DD} = 2\text{ V to }1\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz}$	—	—	-4.0	dB
Noise Voltage	$V_N$	$V_{DD} = 2\text{ V}, R_L = 1\text{ k}\Omega, C_g = 3\text{ pF}, G_v = 80\text{ dB}, f = \text{A-Curve Filter}$	—	—	47	mV

## Electrical Characteristics (B-Rank IDSS Ta=25°C)

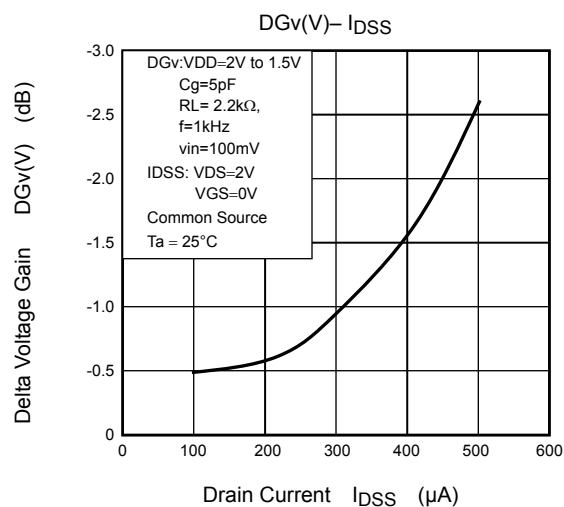
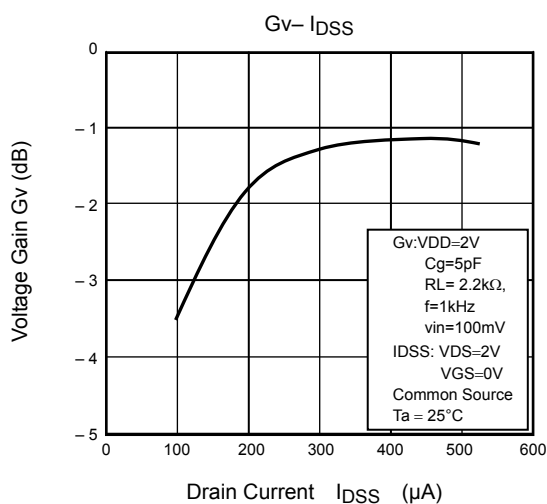
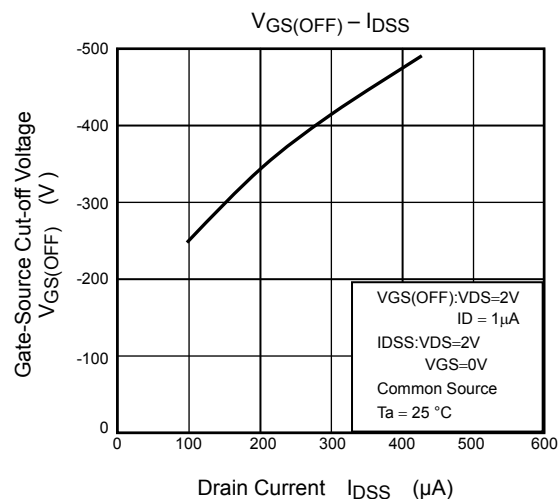
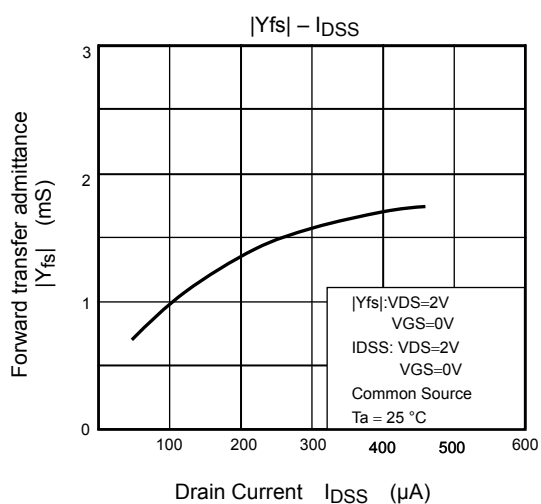
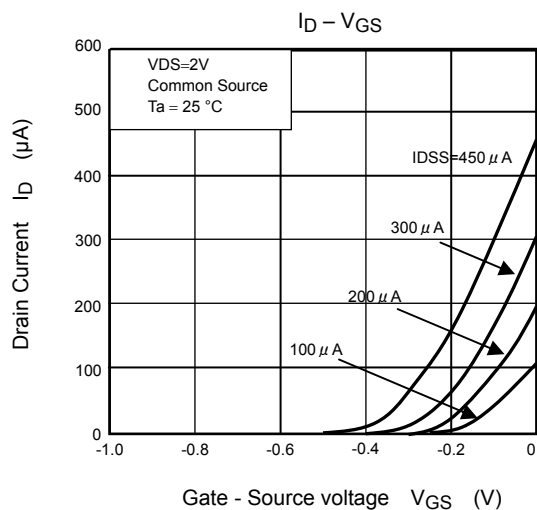
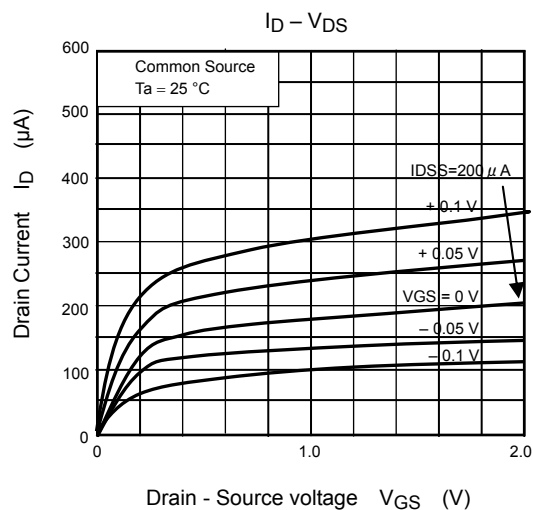
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain Current	$I_{DSS}$	$V_{DS} = 2\text{ V}, V_{GS} = 0$	170	—	300	$\mu\text{A}$
Drain Current	$I_D$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}$	—	—	340	$\mu\text{A}$
Gate-Source Cut-off Voltage	$V_{GS(OFF)}$	$V_{DS} = 2\text{ V}, I_D = 1\text{ }\mu\text{A}$	-0.15	—	-1.0	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 2\text{ V}, V_{GS} = 0\text{ V}$	0.7	1.4	—	mS
Input capacitance	$C_{iss}$	$V_{DS} = 2\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	5.5	—	pF
Voltage Gain	$G_v$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz}$	-11.5	—	-8.0	dB
Delta Voltage Gain	$DG_v(f)$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz to }100\text{ Hz}$	—	—	-2.0	dB
Delta Voltage Gain	$DG_v(V)$	$V_{DD} = 2\text{ V to }1\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz}$	—	—	-7.0	dB
Noise Voltage	$V_N$	$V_{DD} = 2\text{ V}, R_L = 1\text{ k}\Omega, C_g = 3\text{ pF}, G_v = 80\text{ dB}, f = \text{A-Curve Filter}$	—	—	50	mV

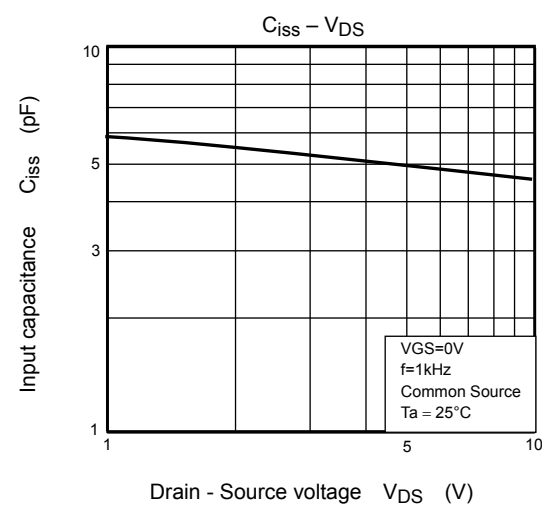
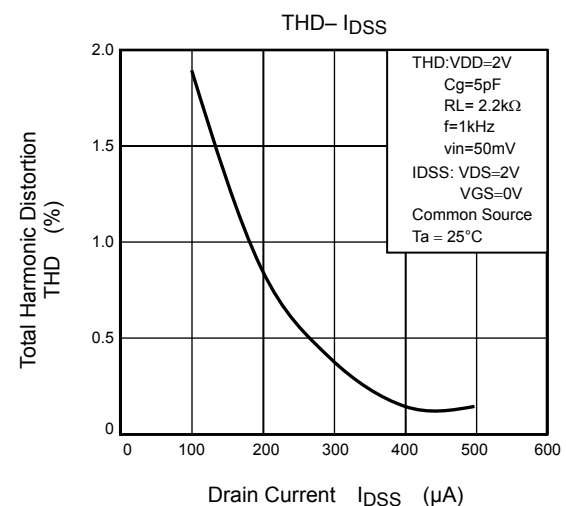
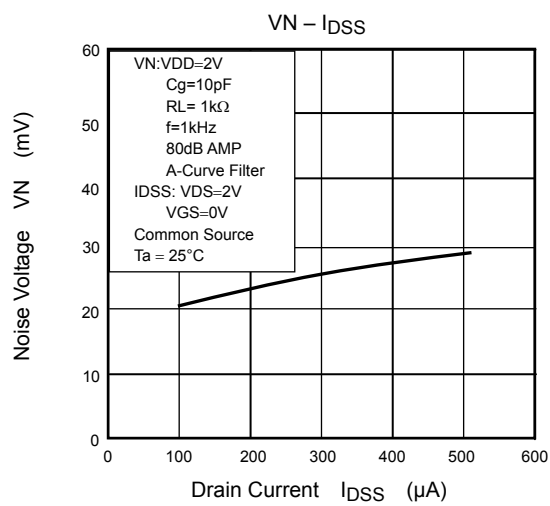
## Electrical Characteristics (C-Rank IDSS Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain Current	$I_{DSS}$	$V_{DS} = 2\text{ V}, V_{GS} = 0$	270	—	480	$\mu\text{A}$
Drain Current	$I_D$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}$	—	—	520	$\mu\text{A}$
Gate-Source Cut-off Voltage	$V_{GS(OFF)}$	$V_{DS} = 2\text{ V}, I_D = 1\text{ }\mu\text{A}$	-0.2	—	-1.2	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 2\text{ V}, V_{GS} = 0\text{ V}$	0.7	1.4	—	mS
Input capacitance	$C_{iss}$	$V_{DS} = 2\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	5.5	—	pF
Voltage Gain	$G_v$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz}$	-10.5	—	-6.75	dB
Delta Voltage Gain	$DG_v(f)$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz to }100\text{ Hz}$	—	—	-2.0	dB
Delta Voltage Gain	$DG_v(V)$	$V_{DD} = 2\text{ V to }1\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz}$	—	—	-20	dB
Noise Voltage	$V_N$	$V_{DD} = 2\text{ V}, R_L = 1\text{ k}\Omega, C_g = 3\text{ pF}, G_v = 80\text{ dB}, f = \text{A-Curve Filter}$	—	—	75	mV

## Electrical Characteristics (BK-Rank IDSS Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain Current	$I_{DSS}$	$V_{DS} = 2\text{ V}, V_{GS} = 0$	150	—	350	$\mu\text{A}$
Drain Current	$I_D$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}$	—	—	390	$\mu\text{A}$
Gate-Source Cut-off Voltage	$V_{GS(OFF)}$	$V_{DS} = 2\text{ V}, I_D = 1\mu\text{A}$	-0.125	—	-1.1	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 2\text{ V}, V_{GS} = 0\text{ V}$	0.7	1.4	—	mS
Input capacitance	$C_{iss}$	$V_{DS} = 2\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	5.5	—	pF
Voltage Gain	$G_v$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz}$	-12.0	—	-7.50	dB
Delta Voltage Gain	$DG_v(f)$	$V_{DD} = 2\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz to } 100\text{ Hz}$	—	—	-2.0	dB
Delta Voltage Gain	$DG_v(V)$	$V_{DD} = 2\text{ V to } 1\text{ V}, R_L = 2\text{ k}\Omega, C_g = 3\text{ pF}, f = 1\text{ kHz}$	—	—	-13.5	dB
Noise Voltage	$V_N$	$V_{DD} = 2\text{ V}, R_L = 1\text{ k}\Omega, C_g = 3\text{ pF}, G_v = 80\text{ dB}, f = \text{A-Curve Filter}$	—	—	65	mV





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20070701-EN GENERAL

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