

TOSHIBA Field Effect Transistor Silicon N Channel Junction Type

# 2SK4059TK

For ECM

- Application for compact ECM

## Absolute Maximum Ratings (Ta=25°C)

Characteristic	Symbol	Rating	Unit
Gate-Drain voltage	V <sub>GDO</sub>	-20	V
Gate Current	I <sub>G</sub>	10	mA
Drain power dissipation (Ta = 25°C)	P <sub>D</sub>	100	mW
Junction Temperature	T <sub>j</sub>	125	°C
Storage temperature range	T <sub>stg</sub>	-55~125	°C

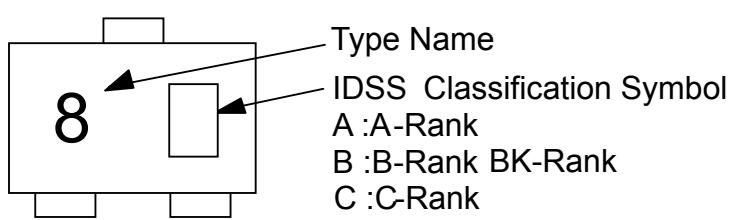
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

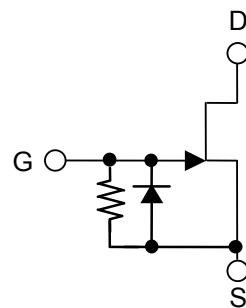
## IDSS CLASSIFICATION

A-Rank	140~240μA
B-Rank	210~350μA
BK-Rank	210~400μA
C-Rank	320~500μA

## Marking



## Equivalent Circuit

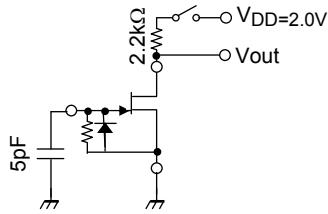


## Electrical Characteristics (Ta=25°C)

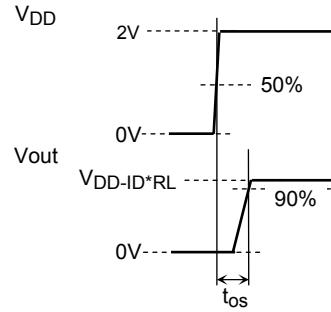
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 2 V, V <sub>GS</sub> = 0	A	140	—	240
			B	210	—	350
			BK	210	—	400
			C	320	—	500
Drain Current	I <sub>D</sub>	V <sub>DD</sub> = 2 V, RL = 2.2kΩ, C <sub>g</sub> = 5pF	A	125	—	260
			B	190	—	370
			BK	190	—	420
			C	290	—	500
Gate-Source Cut-off Voltage	V <sub>GS(OFF)</sub>	V <sub>DS</sub> = 2 V, I <sub>D</sub> = 1μA	-0.1	—	-1.0	V
Forward transfer admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 2 V, V <sub>GS</sub> = 0V	1.35	1.85	—	mS
Gate-Drain Voltage	V <sub>(BR)GDO</sub>	I <sub>G</sub> =-10μA	-20	—	—	V
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 2 V, V <sub>GS</sub> = 0, f = 1 MHz	—	4.0	—	pF
Voltage Gain	G <sub>v</sub>	V <sub>DD</sub> = 2V, RL = 2.2kΩ, C <sub>g</sub> = 5pF, f = 1kHz, vin=100mV	A	-1.2	+0.9	—
			B	-0.2	+1.4	—
			BK	-0.2	+1.7	—
			C	+0.5	+1.8	—
Delta Voltage Gain	DG <sub>v</sub> (f)	V <sub>DD</sub> = 2V, RL = 2.2kΩ, C <sub>g</sub> = 5pF, f = 1kHz~100Hz, vin=100mV	—	0	-1	dB
Delta Voltage Gain	DG <sub>v</sub> (V)	V <sub>DD</sub> = 2V~1.5V, RL = 2.2kΩ, C <sub>g</sub> = 5pF, f = 1kHz, vin=100mV	A	—	-0.6	-1.1
			B	—	-0.8	-1.7
			BK	—	-1.1	-2.0
			C	—	-1.4	-3.2
Noise Voltage	V <sub>N</sub>	V <sub>DD</sub> = 2V, RL = 1kΩ, C <sub>g</sub> = 10pF, G <sub>v</sub> =80dB, A-Curve Filter	A	—	33	75
			B	—	38	80
			BK	—	40	85
			C	—	42	90
Total Harmonic Distortion	THD	V <sub>DD</sub> = 2V, RL = 2.2kΩ, C <sub>g</sub> = 5pF, f = 1kHz, vin=50mV	A	—	1.3	—
			B	—	0.6	—
			BK	—	0.5	—
			C	—	0.1	—
Time Output Stability	tos	V <sub>DD</sub> = 2V, RL = 2.2kΩ, C <sub>g</sub> = 5pF	—	100	200	ms

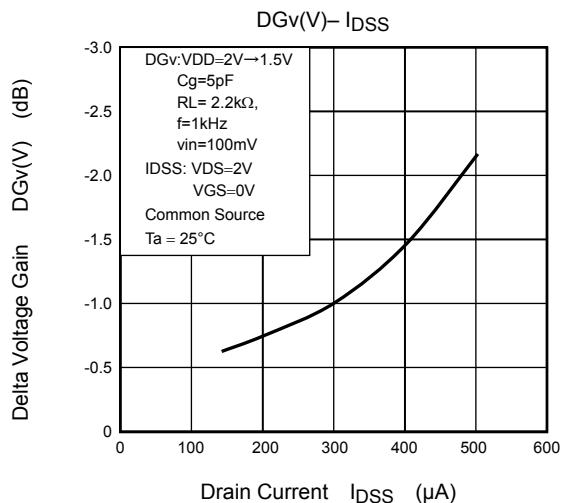
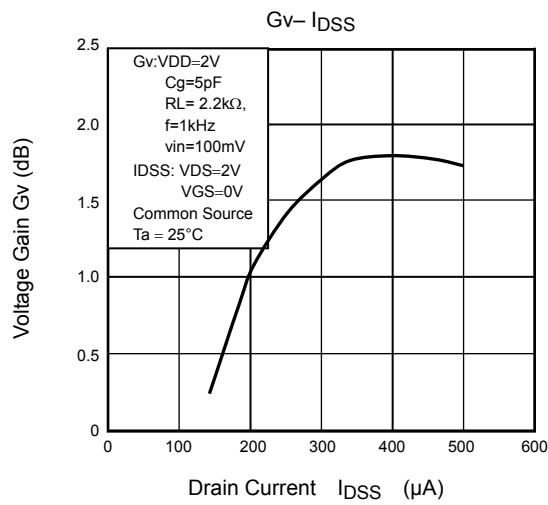
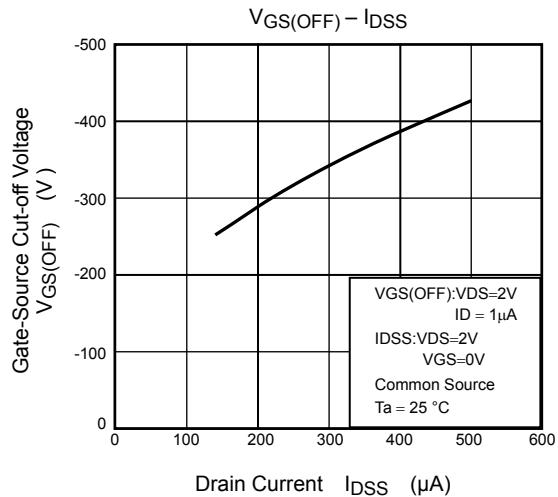
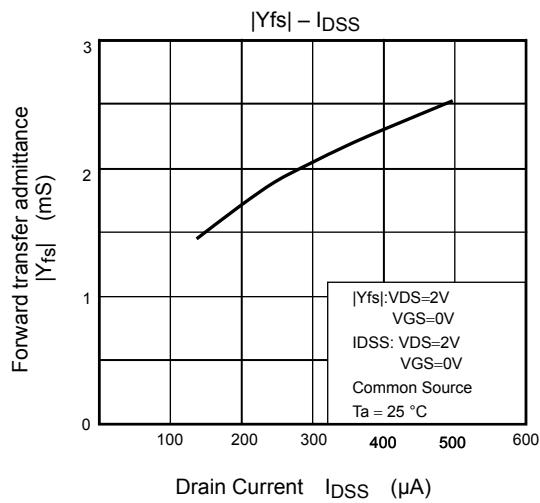
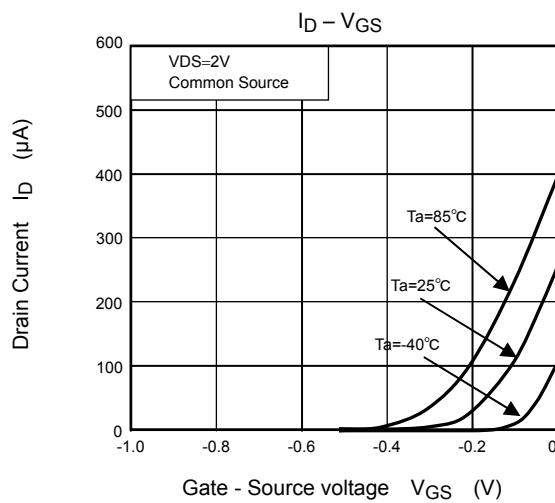
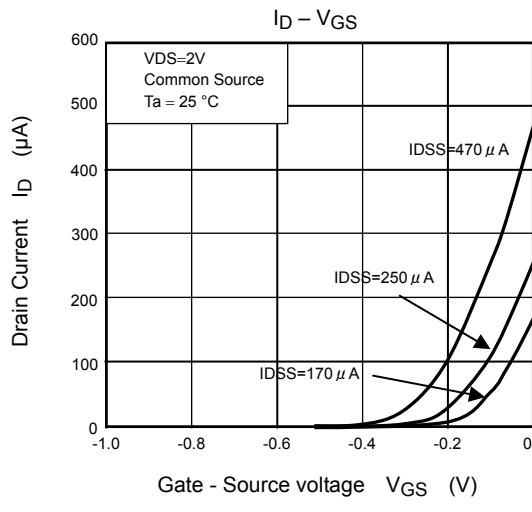
## Time Output Stability Test Method

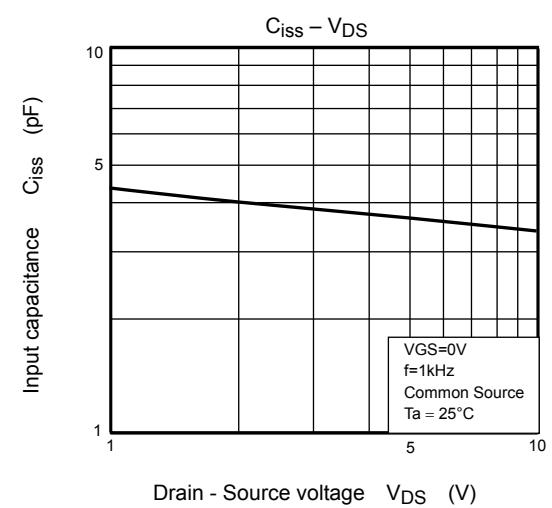
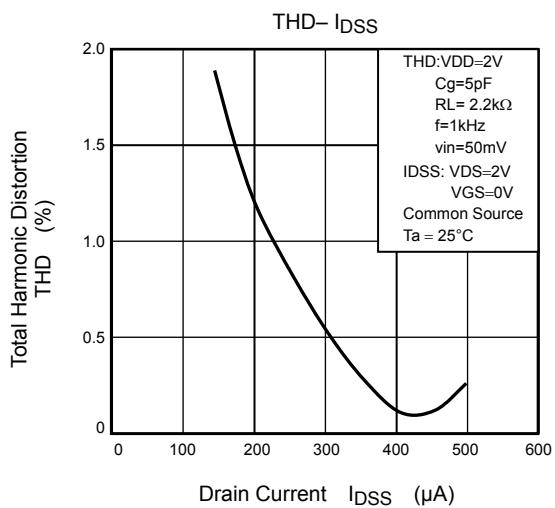
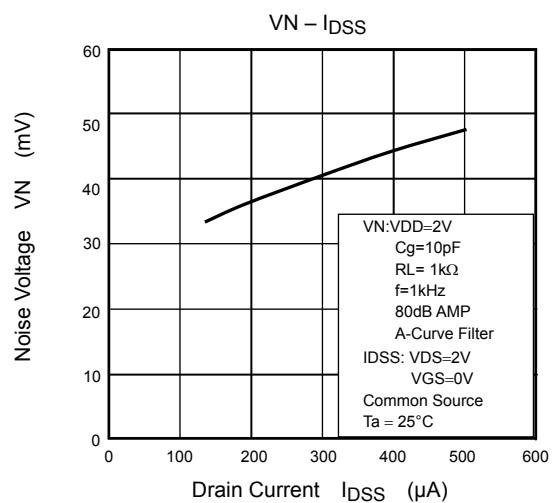
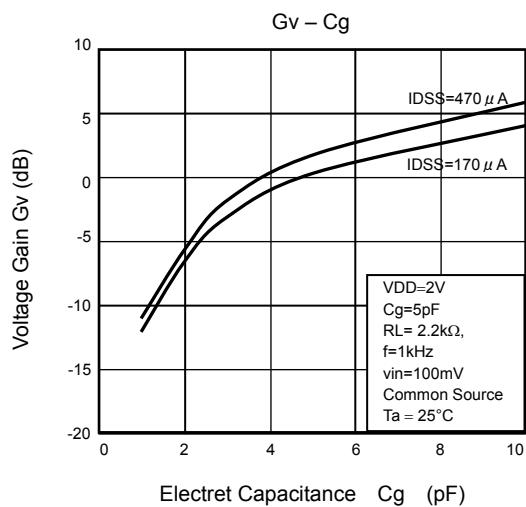
a) TEST CIRCUIT



b) TEST SIGNAL







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20070701-EN GENERAL

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