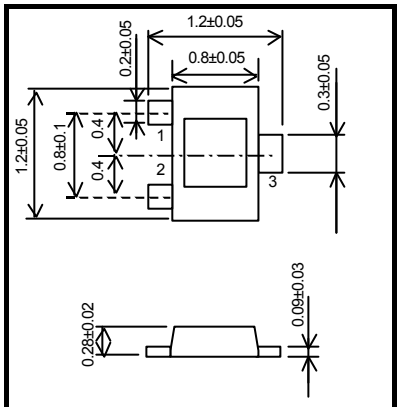
TOSHIBA Field Effect Transistor Silicon N Channel Junction Type

2SK3857TV

For ECM

- Application for Ultra-compact ECM

Unit: mm



1.Drain
2.Source
3.Gate

VESM2

JEDEC	-
JEITA	-
TOSHIBA	2-1H1A

Weight: 0.8mg (typ.)

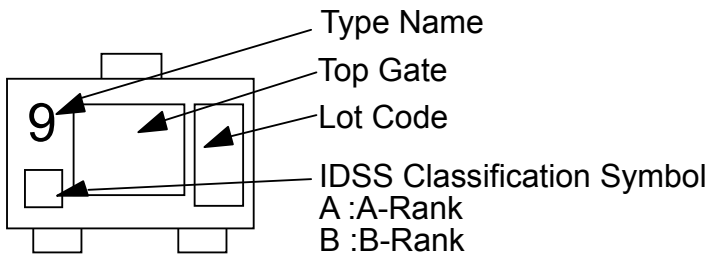
Absolute Maximum Ratings (Ta=25°C)

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	100	mW
Junction Temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

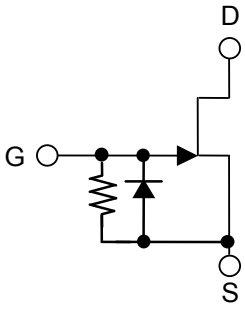
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

IDSS CLASSIFICATION
A-Rank 140~240μA
B-Rank 210~350μA

Marking



Equivalent Circuit



Precaution

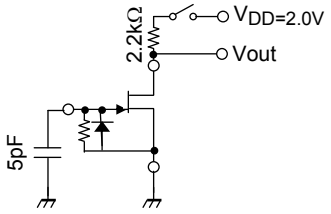
There is a metal plate on the top of package, which has the same electrical potential as the Gate terminal. Don’t use it as a terminal.

Electrical Characteristics (Ta=25°C)

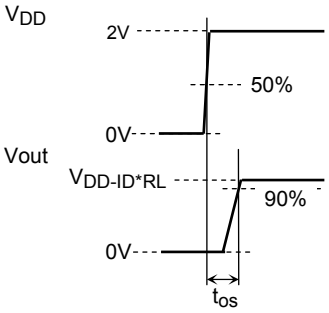
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain Current	I_{DSS}	V_{DS} = 2 V, V_{GS} = 0	140	—	350	μA
Drain Current	I_D	V_{DD} = 2 V, RL= 2.2kΩ,Cg = 5pF	—	—	370	μA
Gate-Source Cut-off Voltage	$V_{GS(OFF)}$	V_{DS} = 2 V, I_D = 1μA	-0.1	—	-1.0	V
Forward transfer admittance	$\|Y_{fs}\|$	V_{DS} = 2 V,V_{GS} = 0V	0.9	1.3	—	mS
Gate-Drain Voltage	$V_{(BR)GDO}$	IG=-10μA	-20	—	—	V
Input capacitance	C_{iss}	V_{DS} = 2 V, V_{GS} = 0, f = 1 MHz	—	3.5	—	pF
Voltage Gain	Gv	V_{DD} = 2V, RL= 2.2kΩ,Cg = 5pF, f = 1kHz,vin=100mV	-3.0	-0.5	—	dB
Delta Voltage Gain	DGv(f)	V_{DD} = 2V, RL= 2.2kΩ,Cg = 5pF,f = 1kHz to 100Hz,vin=100mV	—	0	-1	dB
Delta Voltage Gain	DGv(V)	V_{DD} = 2V to 1.5V, RL= 2.2kΩ,Cg = 5pF,f = 1kHz, vin=100mV	—	-0.8	-2	dB
Noise Voltage	VN	V_{DD} = 2V, RL= 1kΩ,Cg = 10pF,Gv=80dB, A-Curve Filter	—	25	55	mV
Total Harmonic Distortion	THD	V_{DD} = 2V, RL= 2.2kΩ,Cg = 5pF, f = 1kHz, vin=50mV	—	0.7	—	%
Time Output Stability	tos	V_{DD} = 2V, RL= 2.2kΩ,Cg = 5pF	—	100	200	ms

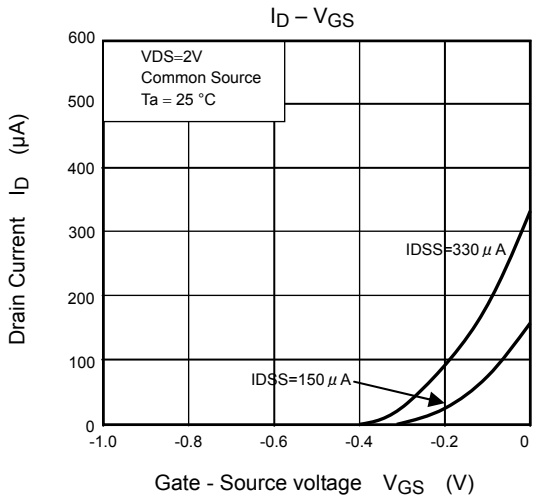
Time Output Stability Test Method

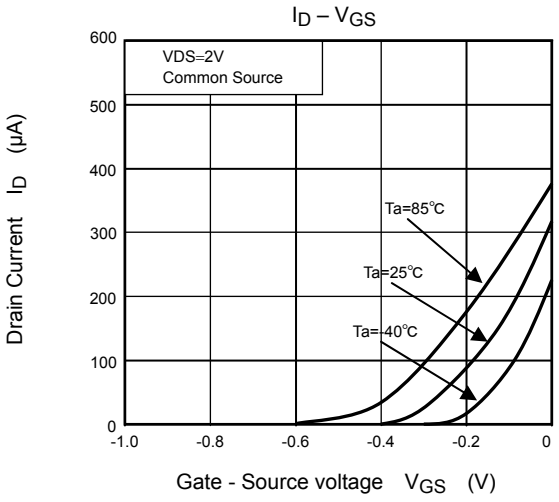
a) TEST CIRCUIT

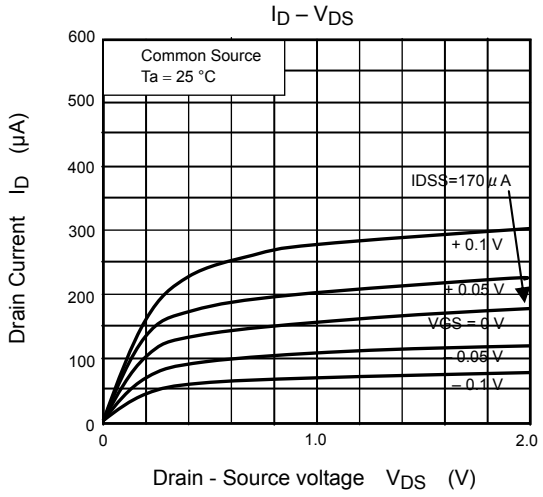


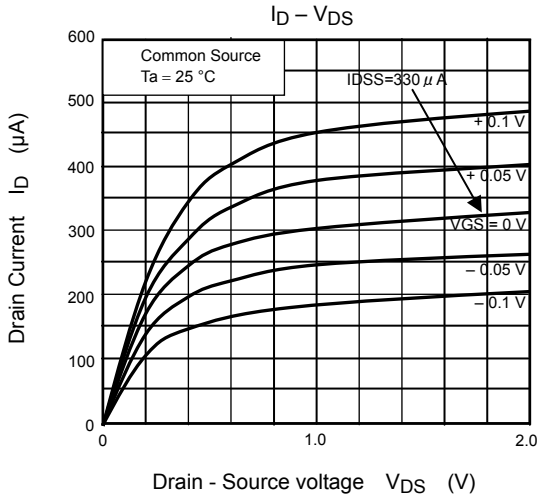
b) TEST SIGNAL

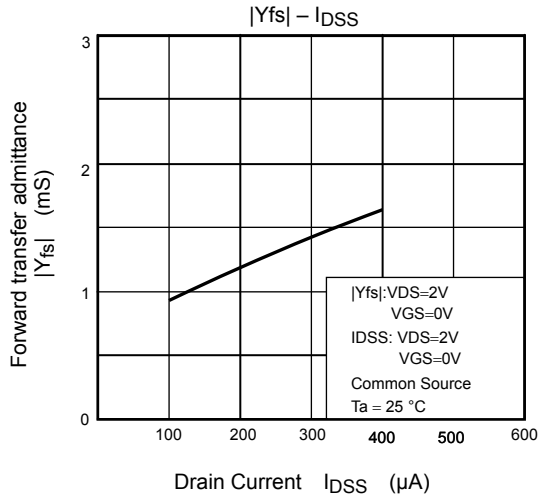


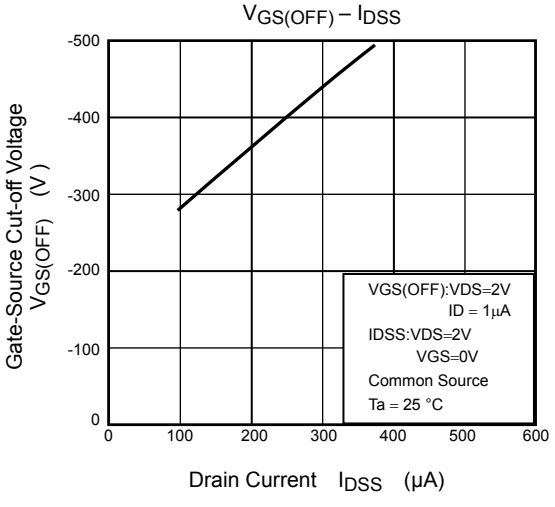

I_D – V_{GS}
VDS=2V
Common Source
Ta = 25 °C
IDSS=330 μA
IDSS=150 μA
Drain Current I_D (μA)
Gate - Source voltage V_{GS} (V)


I_D – V_{GS}
VDS=2V
Common Source
Ta=85℃
Ta=25℃
Ta=-40℃
Drain Current I_D (μA)
Gate - Source voltage V_{GS} (V)

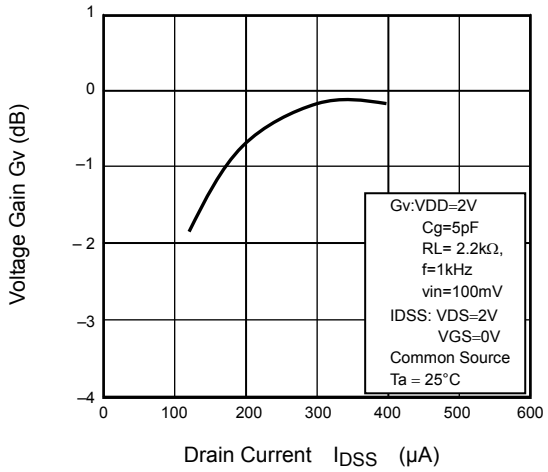

I_D – V_{DS}
Common Source
Ta = 25 °C
IDSS=170 μA
+ 0.1 V
+ 0.05 V
VGS = 0 V
– 0.05 V
– 0.1 V
Drain Current I_D (μA)
Drain - Source voltage V_{DS} (V)


I_D – V_{DS}
Common Source
Ta = 25 °C
IDSS=330 μA
+ 0.1 V
+ 0.05 V
VGS = 0 V
– 0.05 V
– 0.1 V
Drain Current I_D (μA)
Drain - Source voltage V_{DS} (V)

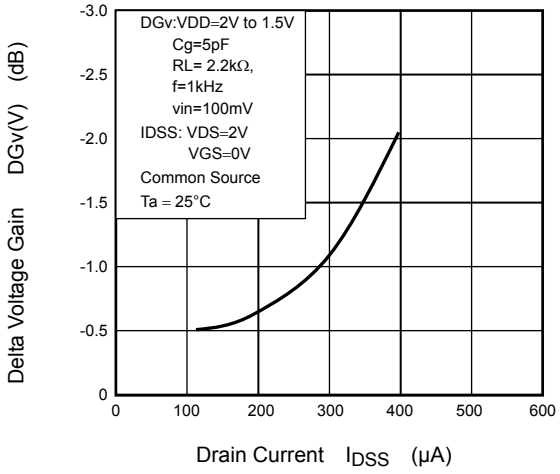

|Yfs| – I_{DSS}
|Yfs|:VDS=2V
VGS=0V
IDSS: VDS=2V
VGS=0V
Common Source
Ta = 25 °C
Forward transfer admittance |Yfs| (mS)
Drain Current I_{DSS} (μA)


$V_{GS(OFF)}$ – I_{DSS}
VGS(OFF):VDS=2V
ID = 1μA
IDSS:VDS=2V
VGS=0V
Common Source
Ta = 25 °C
Gate-Source Cut-off Voltage $V_{GS(OFF)}$ (V)
Drain Current I_{DSS} (μA)

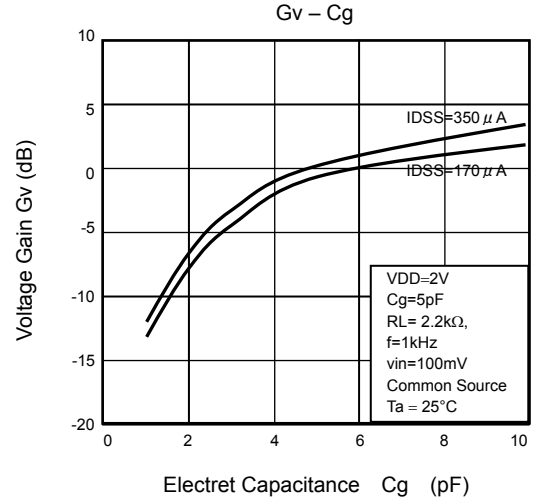
Gv– I_{DSS}



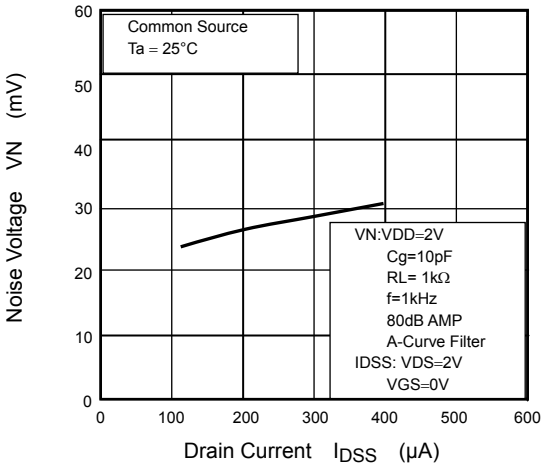
DGv(V)– I_{DSS}



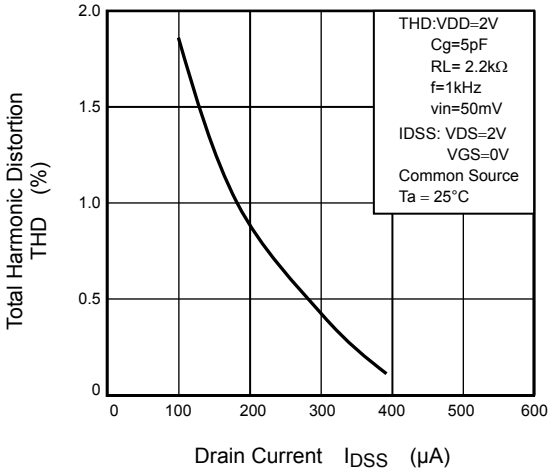
Gv – Cg



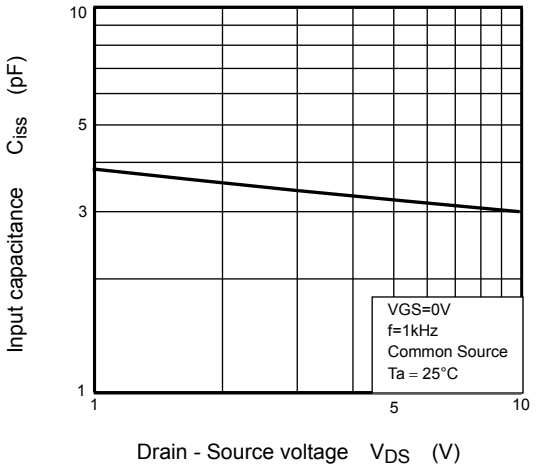
VN – I_{DSS}



THD– I_{DSS}



C_{iss} – V_{DS}



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20070701-EN GENERAL

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