

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

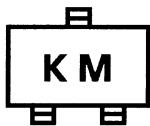
2SK2009

High Speed Switching Applications

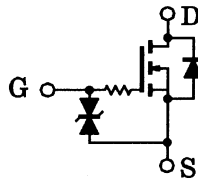
Analog Switch Applications

- High input impedance.
- Low gate threshold voltage: $V_{th} = 0.5$ to 1.5 V
- Excellent switching times: $t_{on} = 0.06$ μ s (typ.)
 $t_{off} = 0.12$ μ s (typ.)
- Low drain-source ON resistance: $R_{DS(ON)} = 1.2$ Ω (typ.)
- Small package
- Enhancement-mode

Marking



Equivalent Circuit



Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

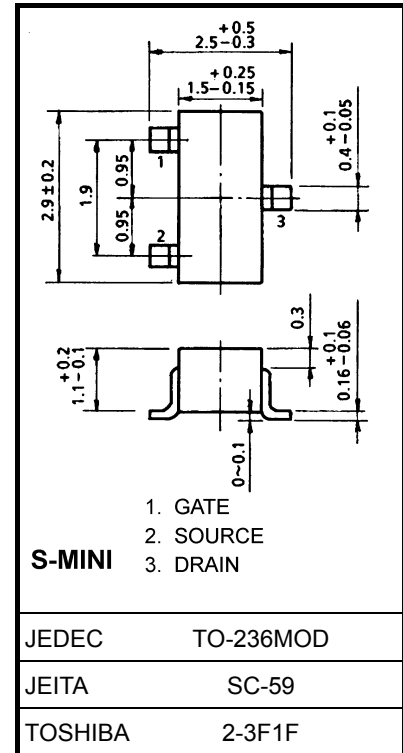
Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GSS}	± 20	V
DC drain current	I_D	200	mA
Drain power dissipation	P_D	200	mW
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

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: This transistor is electrostatic sensitive device. Please handle with caution.

Unit: mm



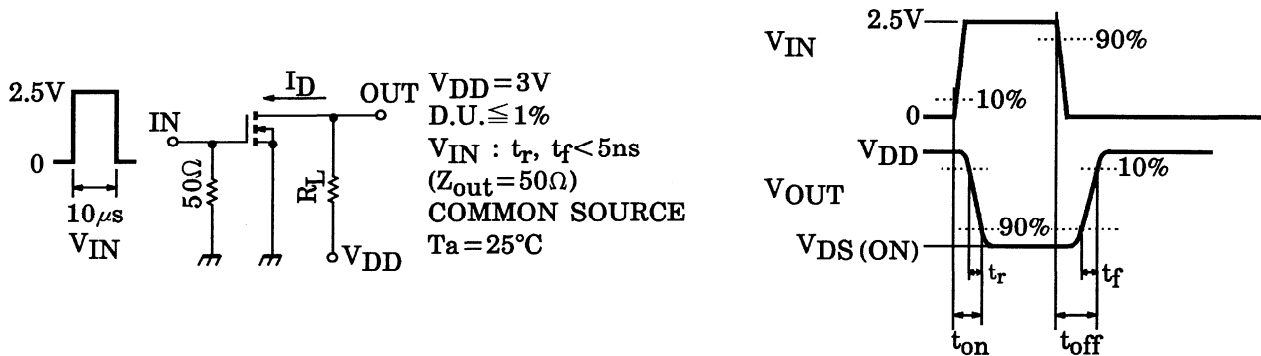
Weight: 0.012 g (typ.)

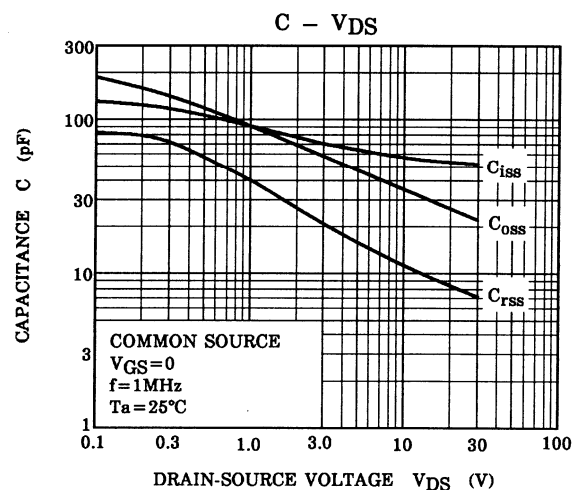
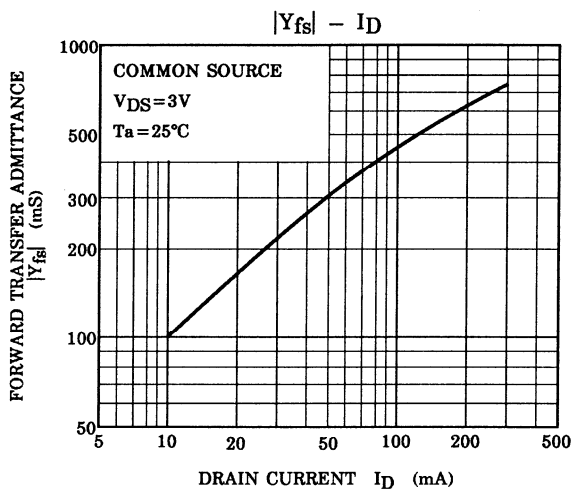
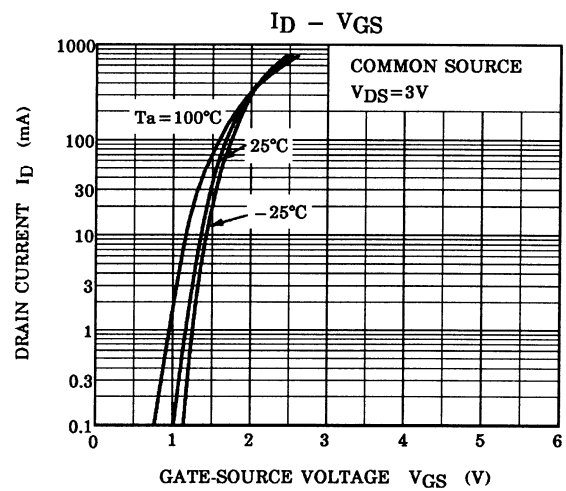
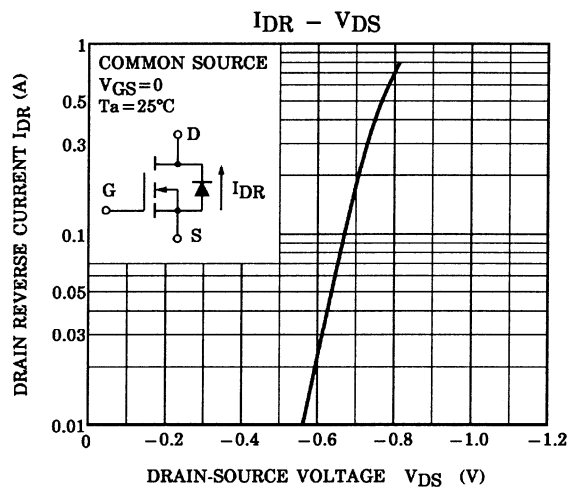
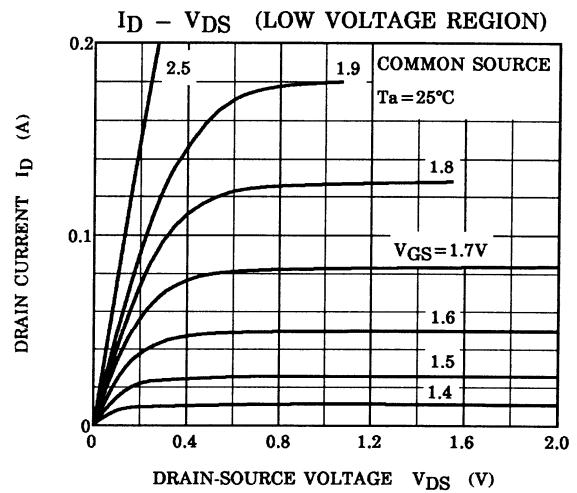
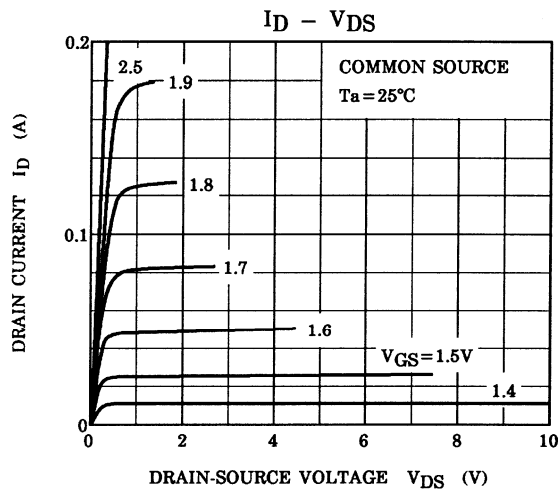
Start of commercial production
1992-04

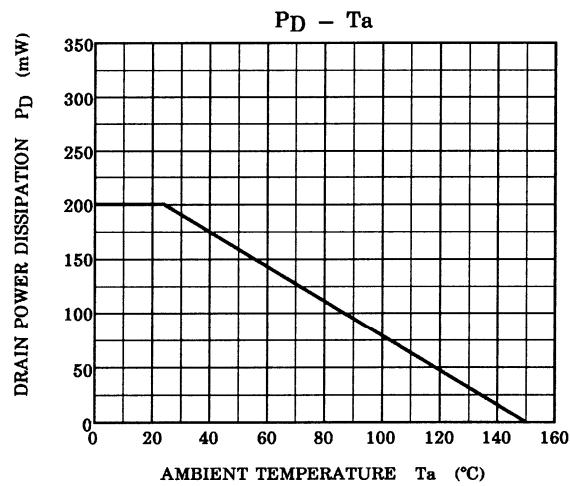
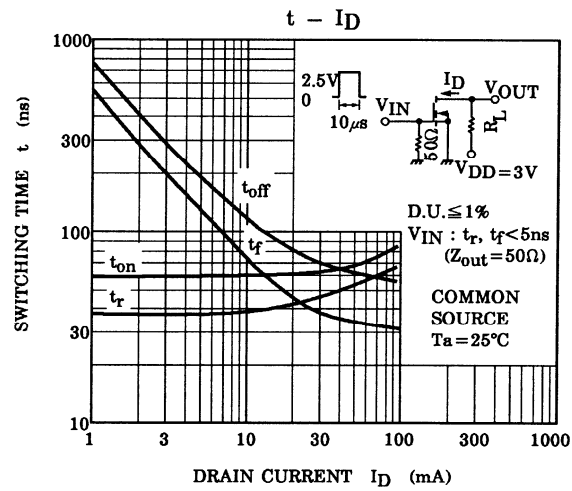
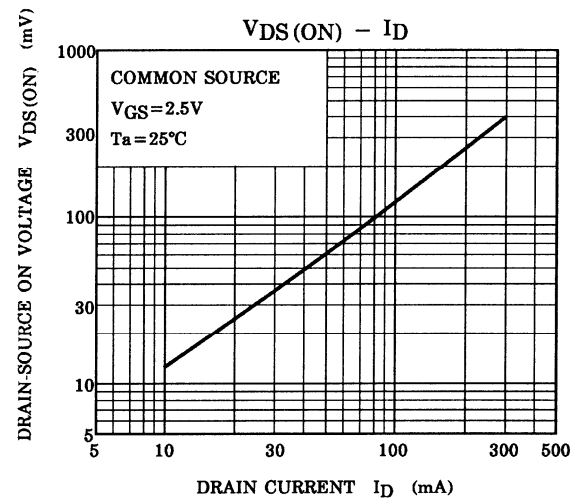
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 10 \text{ V}, V_{DS} = 0$	—	—	± 0.1	μA
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 1 \text{ mA}, V_{GS} = 0$	30	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 30 \text{ V}, V_{GS} = 0$	—	—	10	μA
Gate threshold voltage	V_{th}	$V_{DS} = 3 \text{ V}, I_D = 0.1 \text{ mA}$	0.5	—	1.5	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 3 \text{ V}, I_D = 50 \text{ mA}$	100	—	—	mS
Drain-source ON resistance	$R_{DS(ON)}$	$I_D = 50 \text{ mA}, V_{GS} = 2.5 \text{ V}$	—	1.2	2	Ω
Input capacitance	C_{iss}	$V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	70	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	23	—	pF
Output capacitance	C_{oss}	$V_{DS} = 3 \text{ V}, V_{GS} = 0, f = 1 \text{ MHz}$	—	58	—	pF
Switching time	Turn-on time	$V_{DD} = 3 \text{ V}, I_D = 10 \text{ mA}, V_{GS} = 0 \text{ to } 2.5 \text{ V}$	—	0.06	—	μs
	Turn-off time	$V_{DD} = 3 \text{ V}, I_D = 10 \text{ mA}, V_{GS} = 0 \text{ to } 2.5 \text{ V}$	—	0.12	—	

Switching Time Test Circuit







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