

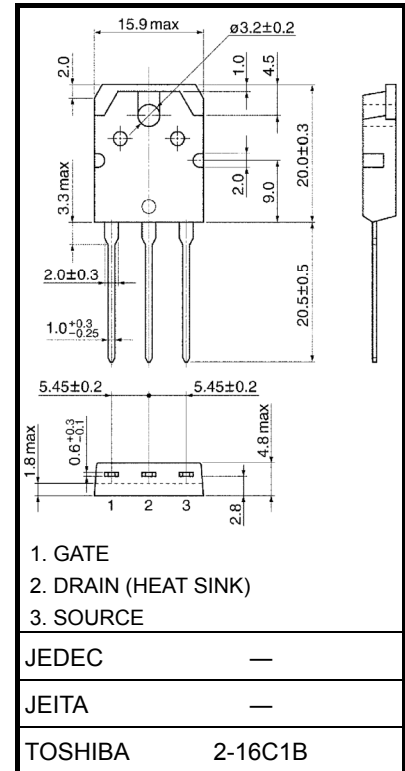
TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π-MOSII⁵)

2SK1359

DC-DC Converter and Motor Drive Applications

Unit: mm

- Low drain-source ON resistance : $R_{DS(ON)} = 3.0 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 2.0 S$ (typ.)
- Low leakage current : $I_{DSS} = 300 \mu A$ (max) ($V_{DS} = 800 V$)
- Enhancement mode : $V_{th} = 1.5 \sim 3.5 V$ ($V_{DS} = 10 V, I_D = 1 mA$)



Weight: 4.6 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	1000	V
Drain-gate voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	1000	V
Gate-source voltage		V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	5	A
	Pulse (Note 1)	I_{DP}	15	
Drain power dissipation ($T_c = 25^\circ C$)		P_D	125	W
Channel temperature		T_{ch}	150	$^\circ C$
Storage temperature range		T_{stg}	-55~150	$^\circ C$

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.).

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	1.0	$^\circ C / W$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	50	$^\circ C / W$

Note 1: Ensure that the channel temperature does not exceed 150°C.

This transistor is an electrostatic-sensitive device.
Please handle with caution.

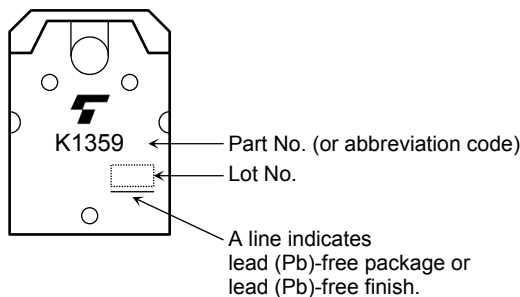
Electrical Characteristics (Ta = 25°C)

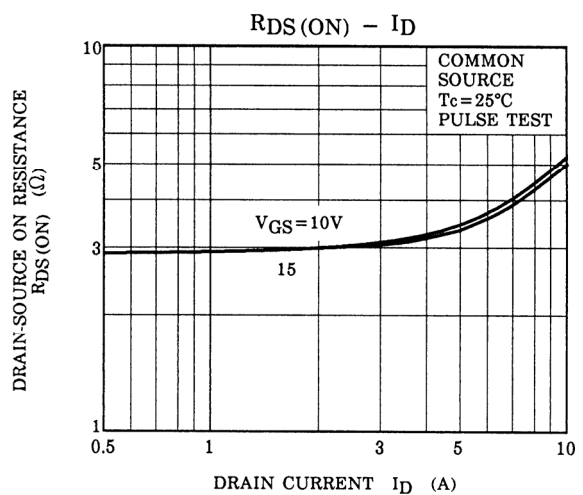
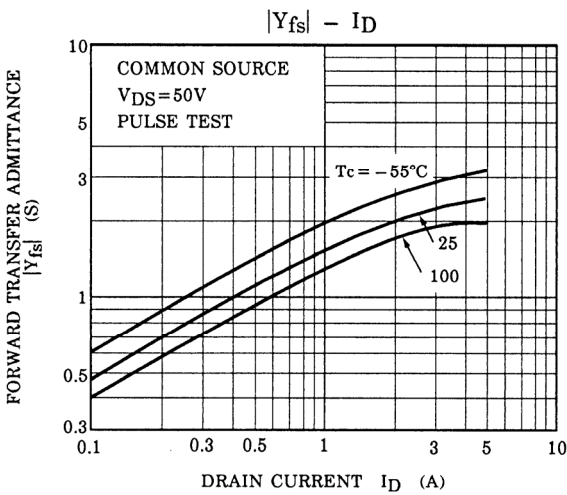
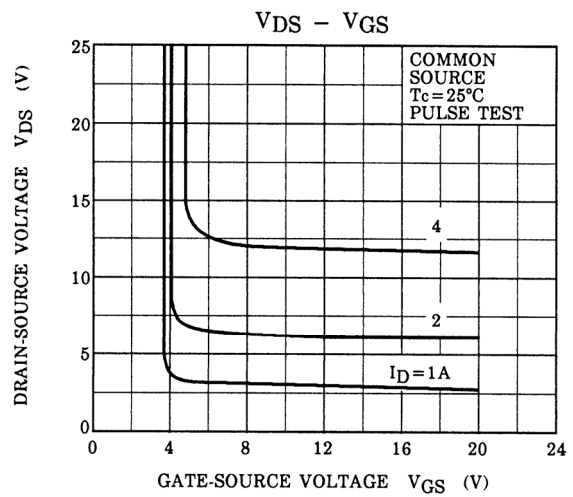
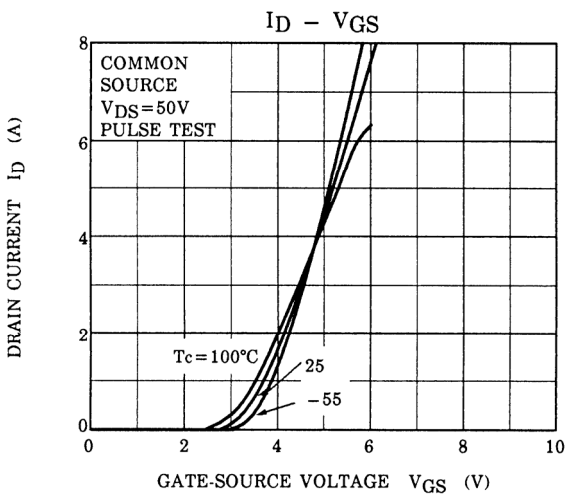
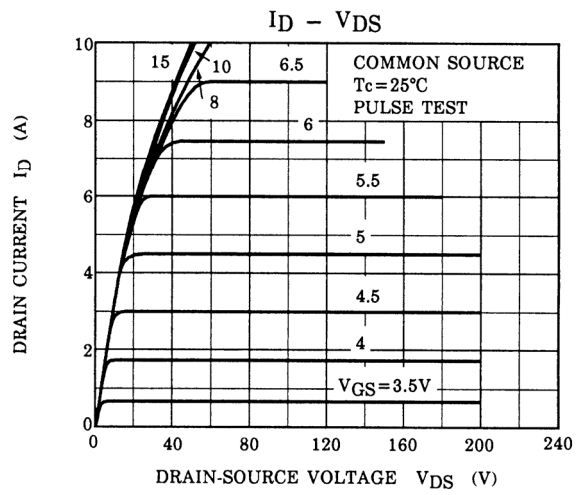
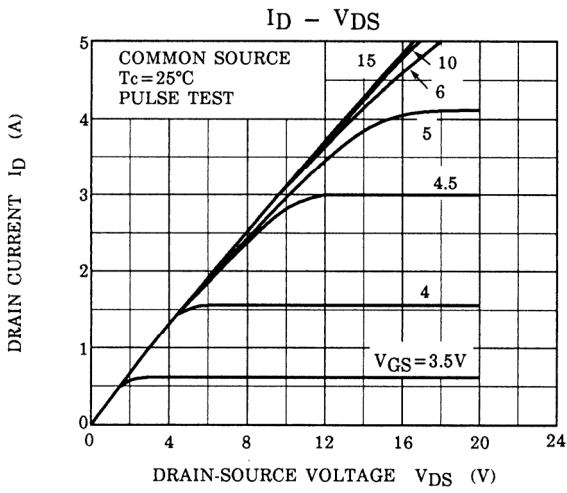
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 25\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 50	nA
Drain cut-off current		I_{DSS}	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	—	—	300	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	1000	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.5	—	3.5	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 2\text{ A}$	—	3.0	3.8	Ω
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 20\text{ V}, I_D = 2\text{ A}$	1.0	2.0	—	S
Input capacitance		C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	700	—	pF
Reverse transfer capacitance		C_{rss}		—	55	—	
Output capacitance		C_{oss}		—	100	—	
Switching time	Rise time	t_r	<p>$I_D = 2\text{ A}$ $V_{GS} = 10\text{ V}$ 0 V 4.7Ω $R_L = 200\Omega$ $V_{DD} \approx 400\text{ V}$ V_{OUT} Duty $\leq 1\%$, $t_W = 10\mu\text{s}$</p>	—	18	—	ns
	Turn-on time	t_{on}		—	30	—	
	Fall time	t_f		—	12	—	
	Turn-off time	t_{off}		—	70	—	
Total gate charge (Gate-source plus gate-drain)		Q_g	$V_{DD} \approx 400\text{ V}, V_{GS} = 10\text{ V}, I_D = 4\text{ A}$	—	60	—	nC
Gate-source charge		Q_{gs}		—	35	—	
Gate-drain ("miller") charge		Q_{gd}		—	25	—	

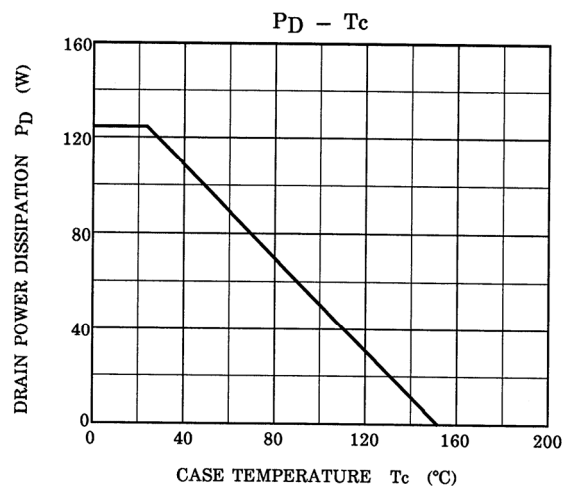
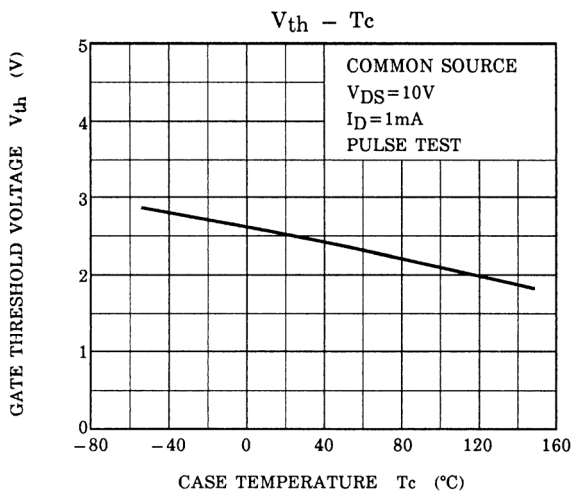
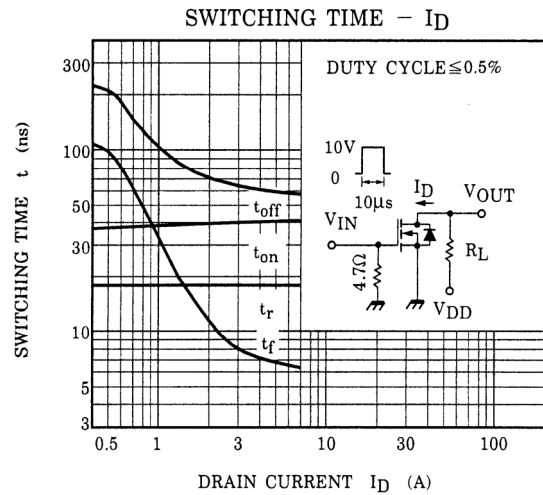
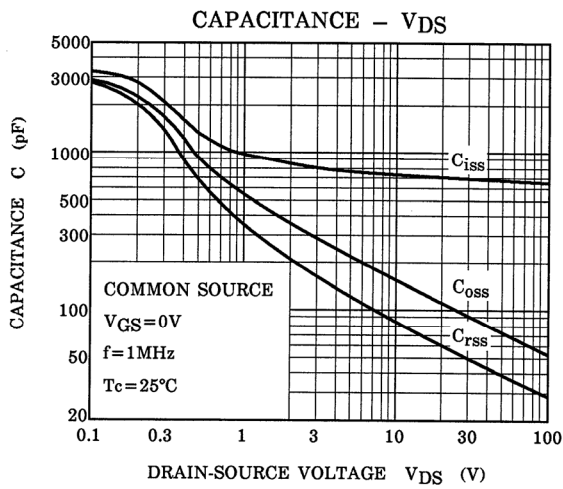
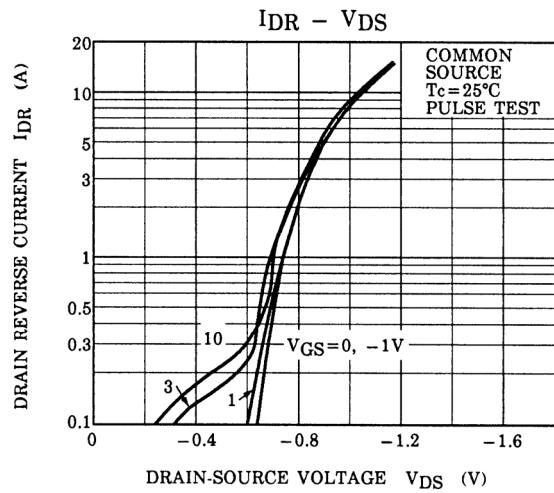
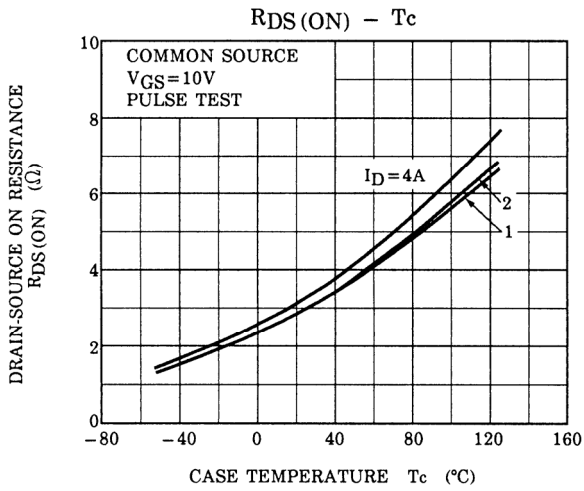
Source-Drain Ratings and Characteristics (Ta = 25°C)

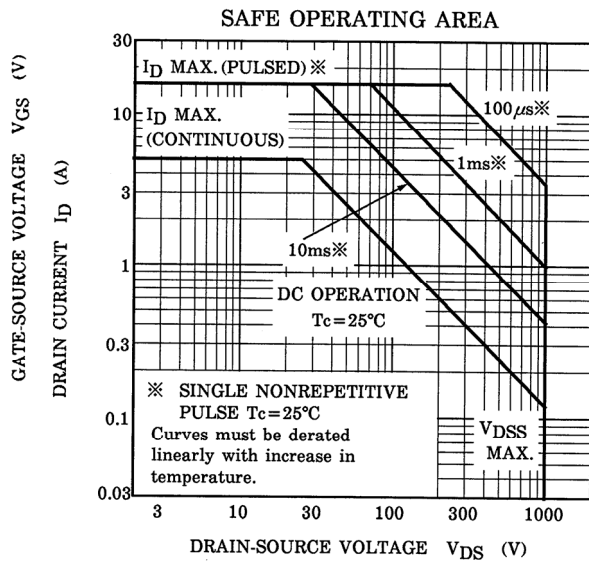
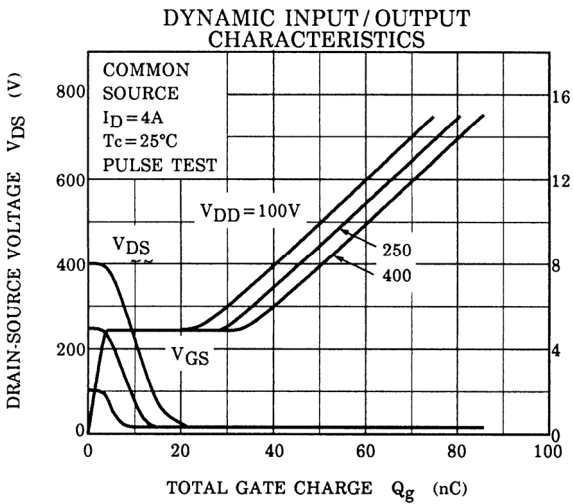
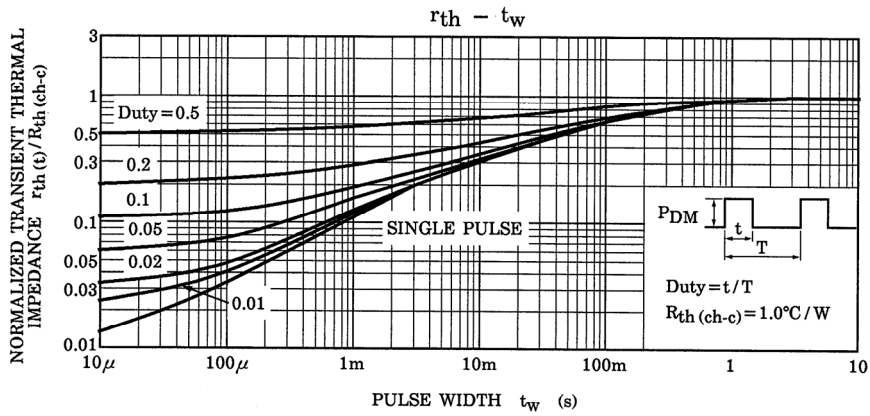
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	5	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	15	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 4\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.9	V

Marking









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20070701-EN

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