

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

2SK1359

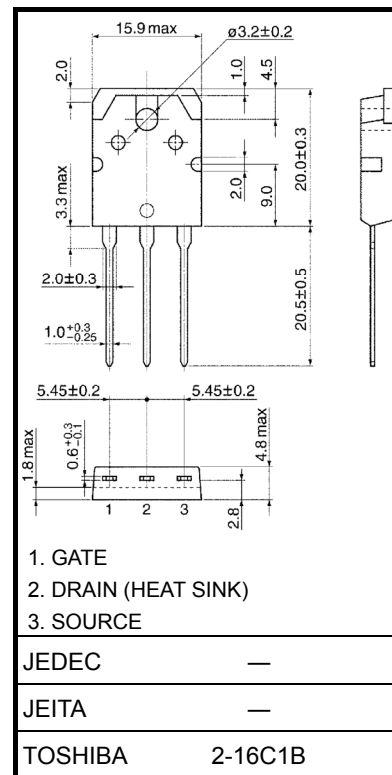
DC-DC Converter and Motor Drive Applications

Unit: mm

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

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

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



Weight: 4.6 g (typ.)

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.).

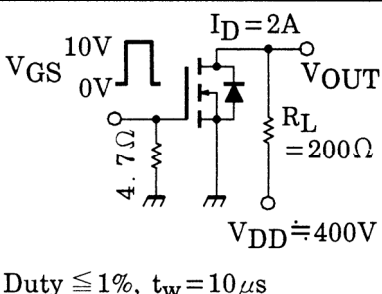
Thermal Characteristics

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

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

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

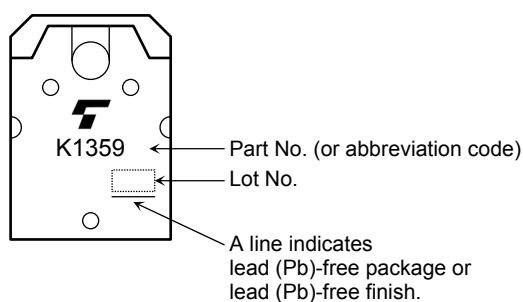
Electrical Characteristics (Ta = 25°C)

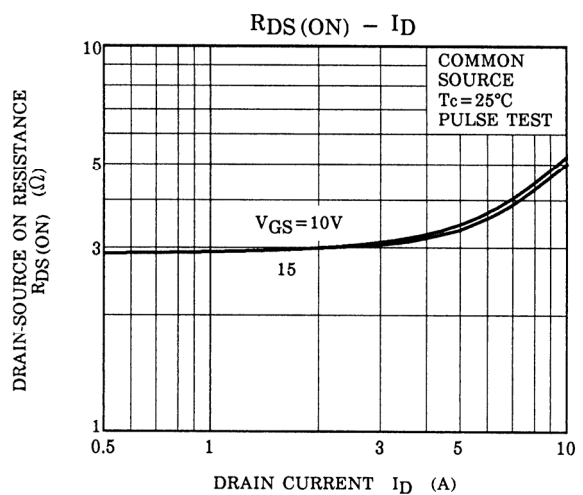
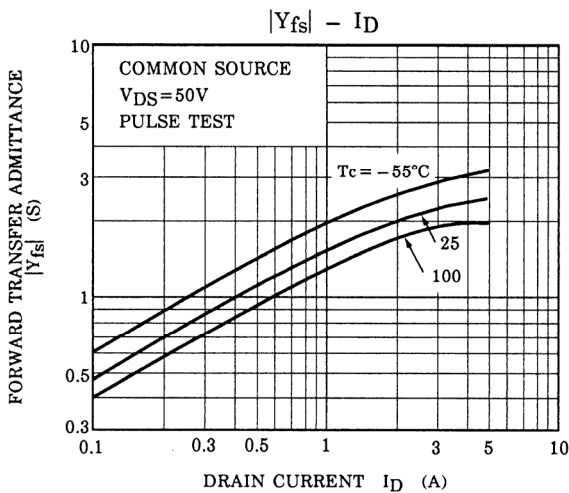
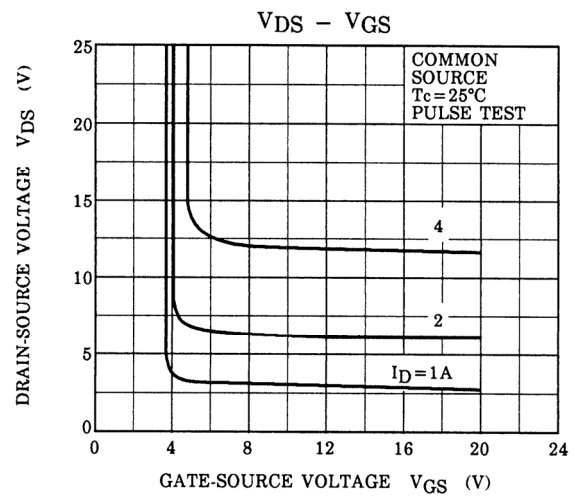
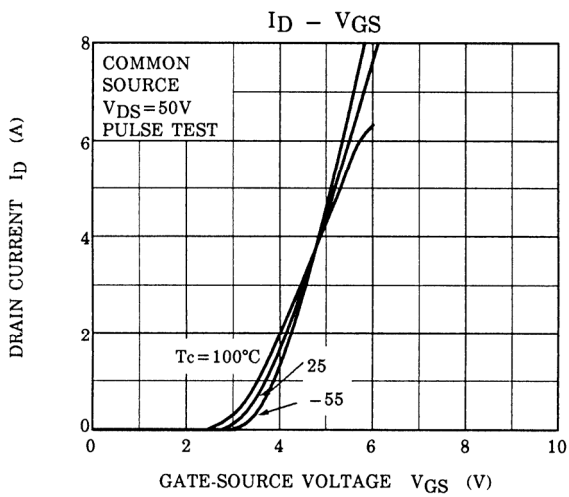
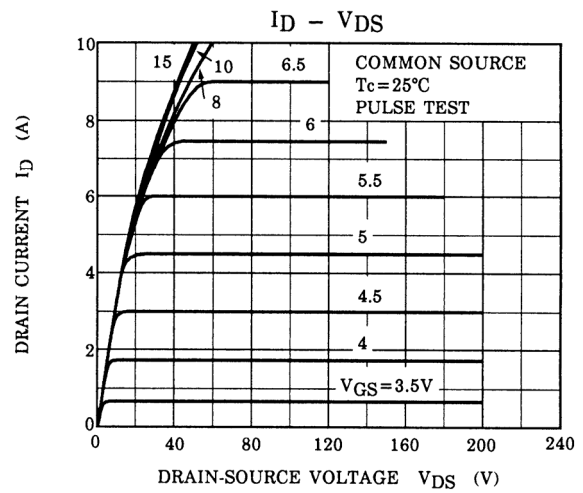
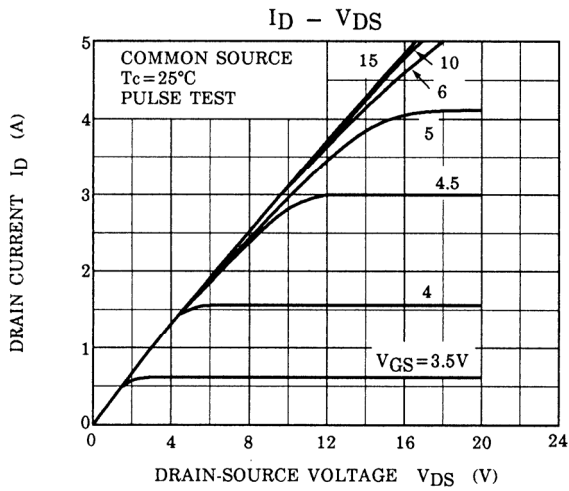
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 50	nA
Drain cut-off current		I_{DSS}	$V_{DS} = 800 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	300	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	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	 $I_D = 2 \text{ A}$ $V_{GS} = 10 \text{ V}$ V_{OUT} $R_L = 200 \Omega$ $V_{DD} \approx 400 \text{ V}$ $\text{Duty} \leq 1\%, t_W = 10 \mu\text{s}$	—	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	—	

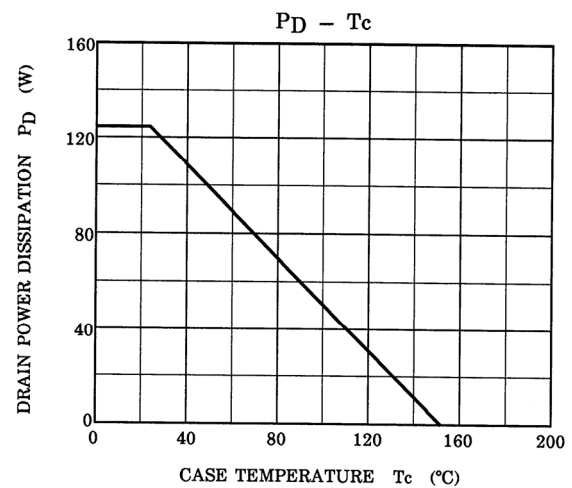
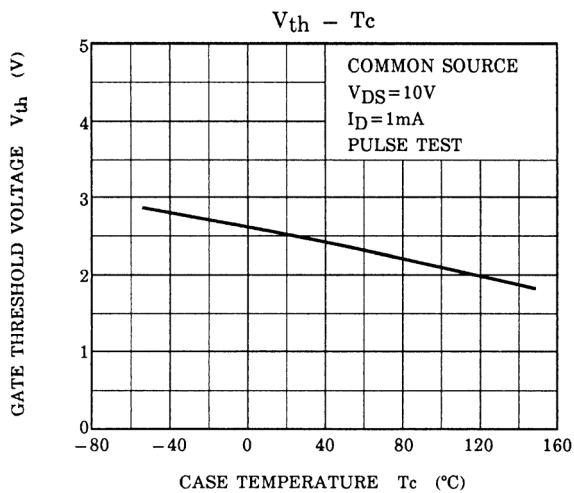
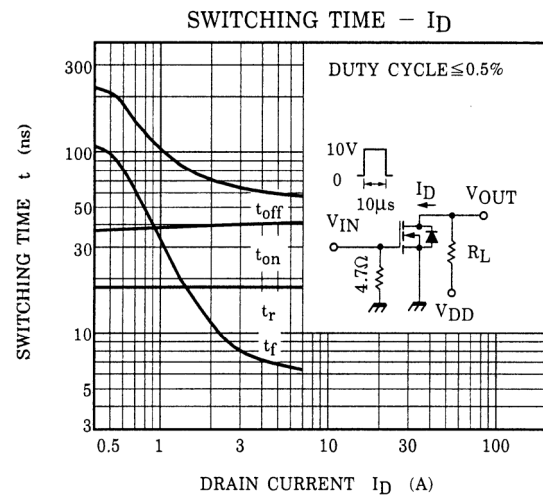
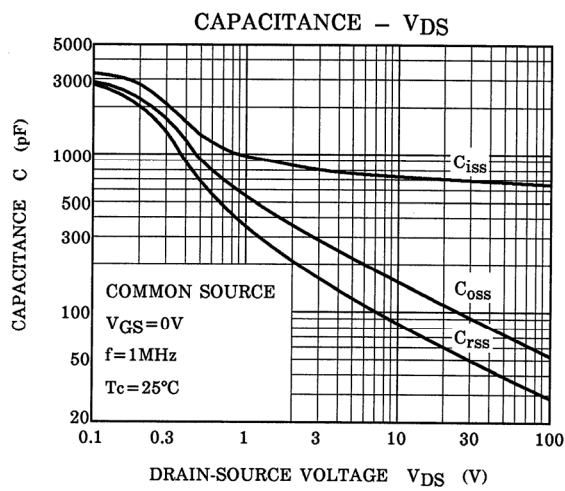
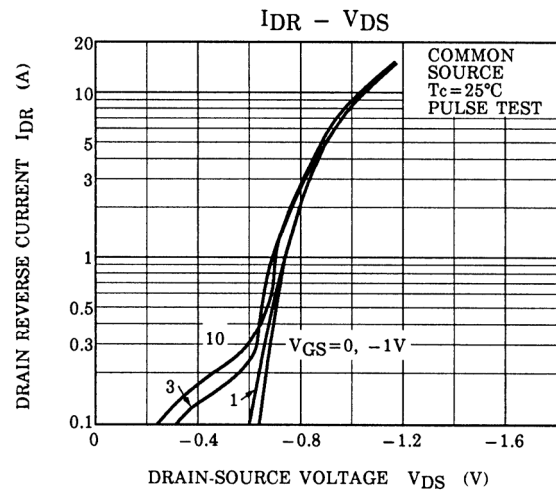
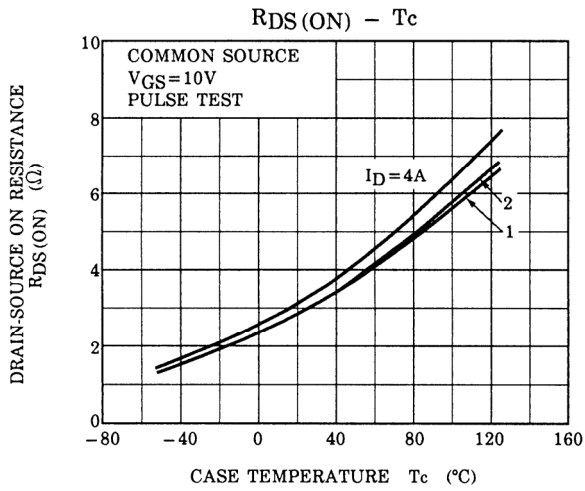
Source-Drain Ratings and Characteristics (Ta = 25°C)

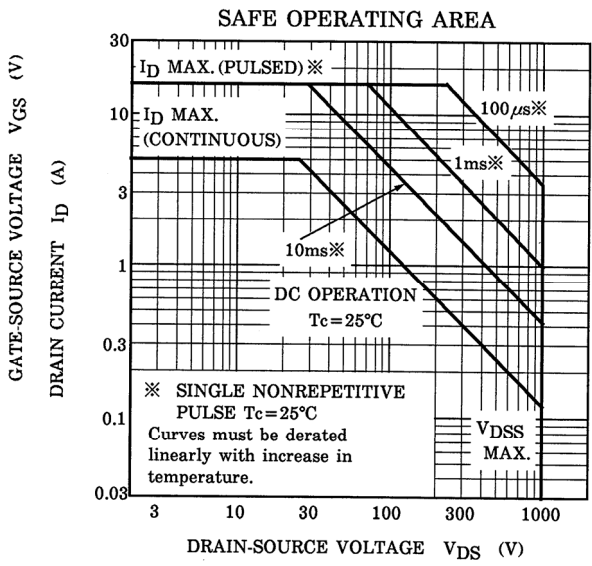
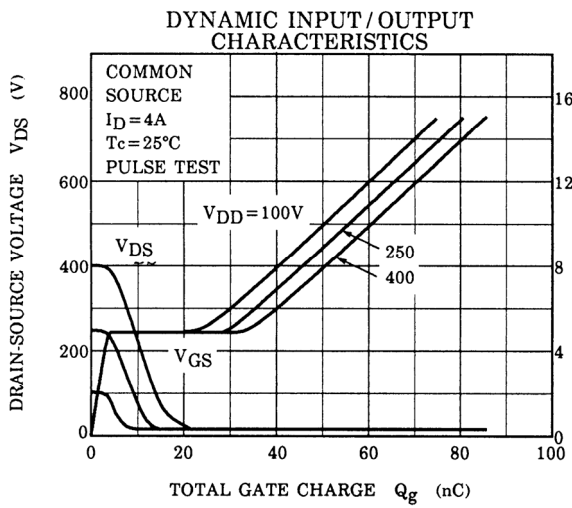
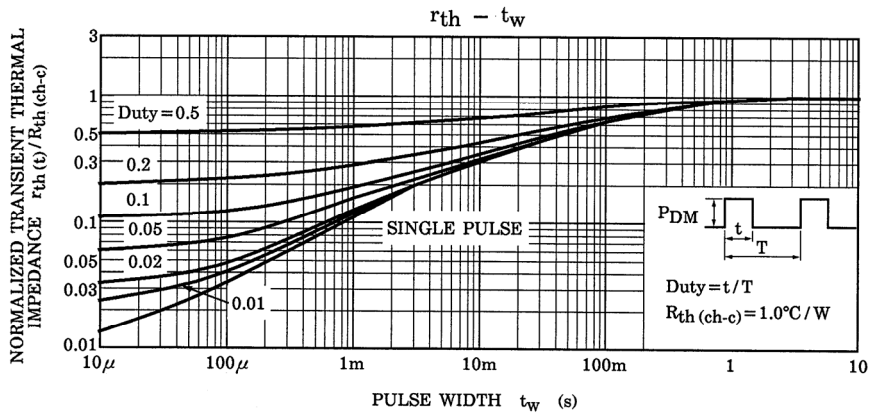
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	5	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	15	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 4 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.9	V

Marking









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