

2SK2549

DC-DC Converter, Relay Drive and Motor Drive Applications

- 2.5-V gate drive
- Low drain-source ON resistance : $R_{DS(ON)} = 0.29 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 3.0 S$ (typ.)
- Low leakage current : $I_{DSS} = 100 \mu A$ (max) ($V_{DS} = 16 V$)
- Enhancement mode : $V_{th} = 0.5 \sim 1.1 V$ ($V_{DS} = 10 V$, $I_D = 200 \mu A$)

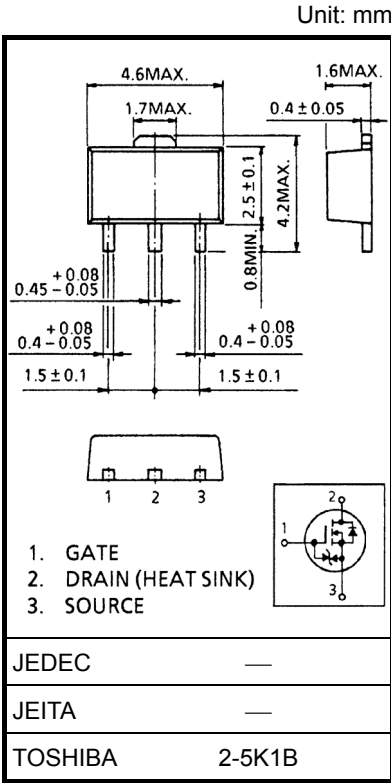
Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	16	V
Drain-gate voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	16	V
Gate-source voltage		V_{GSS}	± 8	V
Drain current	DC (Note 1)	I_D	2	A
	Pulse (Note 1)	I_{DP}	6	
Drain power dissipation		P_D	0.5	W
Drain power dissipation (Note 2)		P_D	1.5	W
Channel temperature		T_{ch}	150	$^\circ C$
Storage temperature range		T_{stg}	$-55 \sim 150$	$^\circ C$

Note 1: Ensure that the channel temperature does not exceed $150^\circ C$.

Note 2: Mounted on a ceramic substrate ($25.4 mm \times 25.4 mm \times 0.8 mm$)

Note 3: 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).



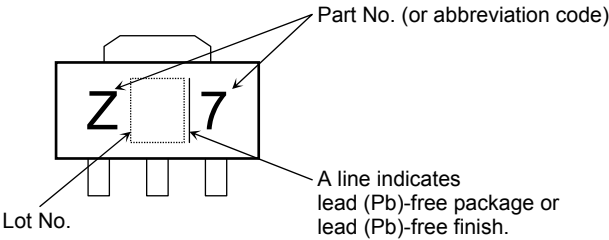
Weight: 0.05 g (typ.)

Thermal Characteristics

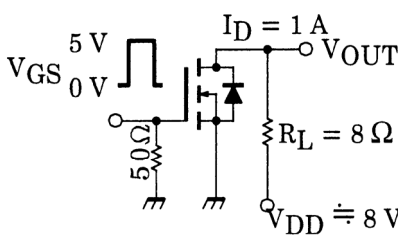
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	250	$^\circ C / W$

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

Marking



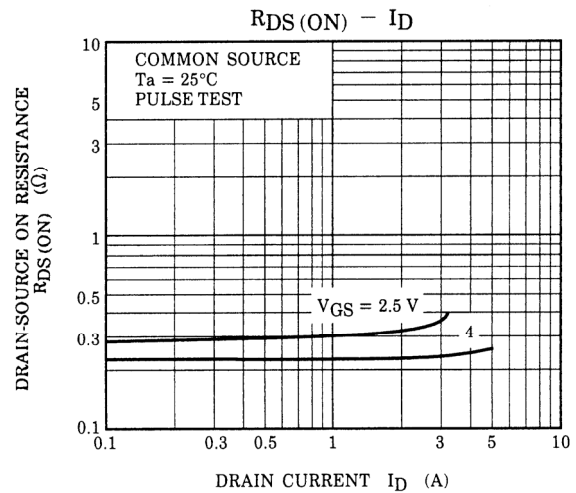
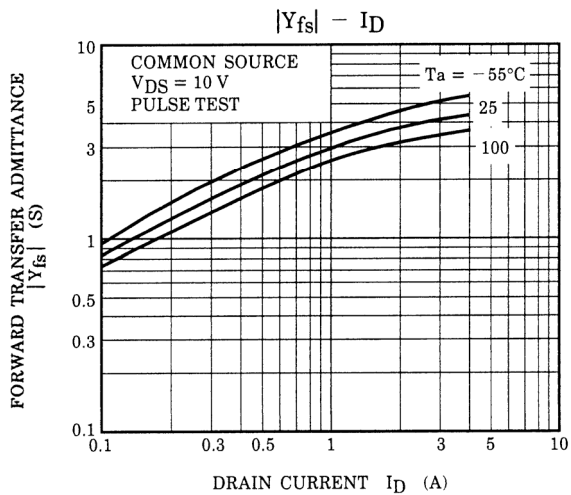
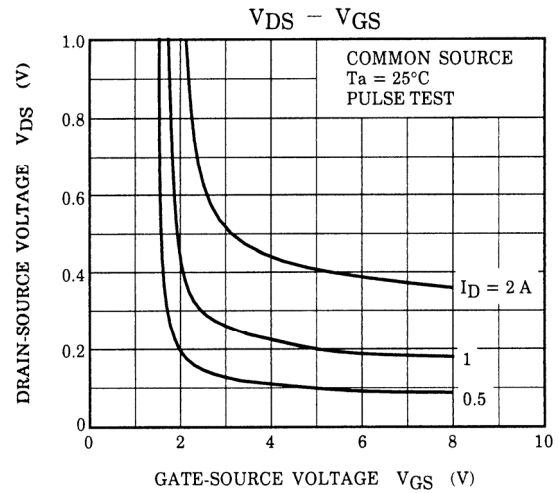
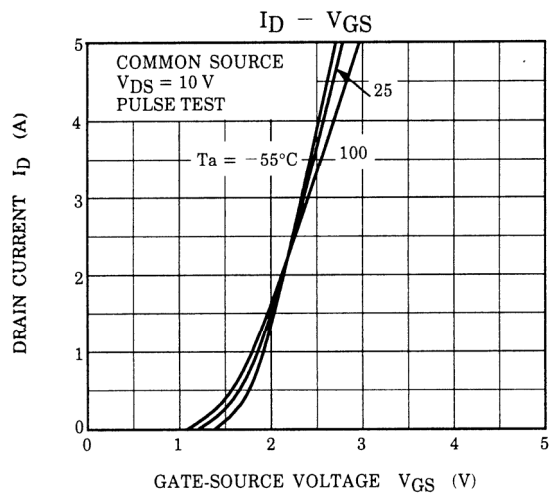
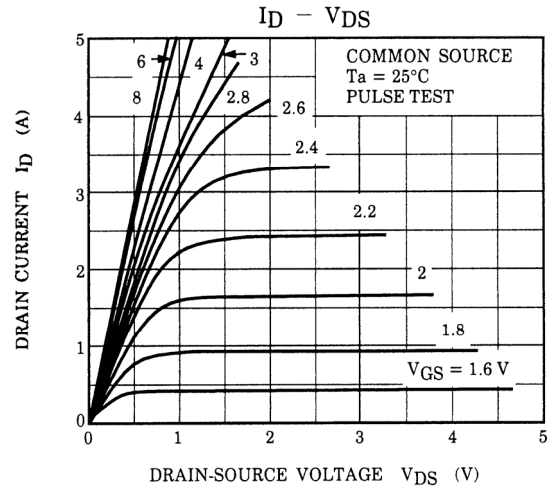
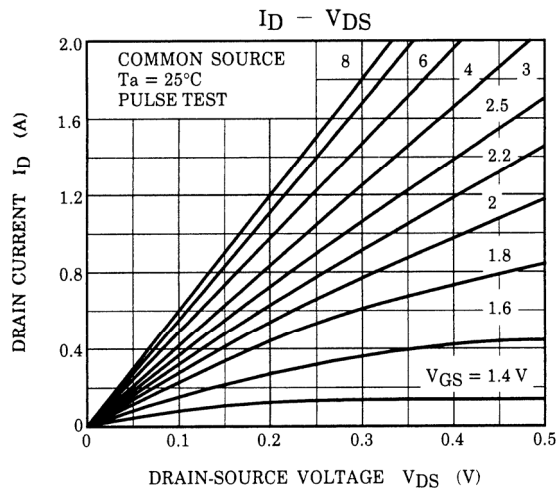
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 6.5 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cut-off current		I_{DSS}	$V_{DS} = 16 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR) DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	16	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = 10 \text{ V}, I_D = 200 \mu\text{A}$	0.5	—	1.1	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = 2.5 \text{ V}, I_D = 0.5 \text{ A}$	—	0.29	0.38	Ω
			$V_{GS} = 4 \text{ V}, I_D = 1 \text{ A}$	—	0.22	0.29	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ A}$	1.5	3.0	—	S
Input capacitance		C_{iss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	260	—	pF
Reverse transfer capacitance		C_{rss}		—	34	—	
Output capacitance		C_{oss}		—	103	—	
Switching time	Rise time	t_r	 <p>$I_D = 1 \text{ A}$ $V_{GS} = 5 \text{ V}$ $V_{GS} = 0 \text{ V}$ 50Ω $R_L = 8 \Omega$ $V_{DD} \approx 8 \text{ V}$</p> <p>Duty $\leq 1\%$, $t_w = 10 \mu\text{s}$</p>	—	200	—	ns
	Turn-on time	t_{on}		—	250	—	
	Fall time	t_f		—	300	—	
	Turn-off time	t_{off}		—	800	—	
Total gate charge (Gate-source plus gate-drain)		Q_g	$V_{DD} \approx 16 \text{ V}, V_{GS} = 5 \text{ V}, I_D = 2 \text{ A}$	—	5.0	—	nC
Gate-source charge		Q_{gs}		—	3.2	—	
Gate-drain ("miller") charge		Q_{gd}		—	1.8	—	

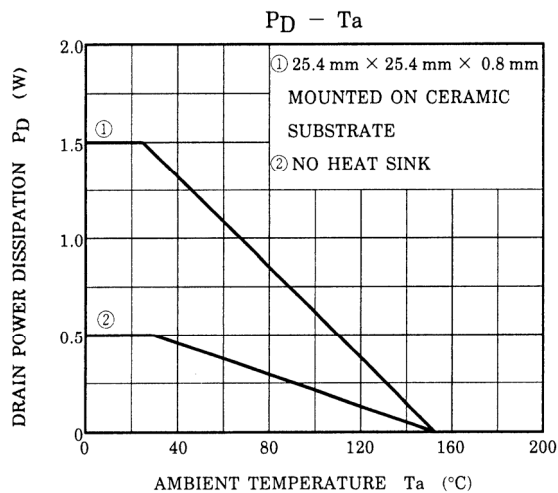
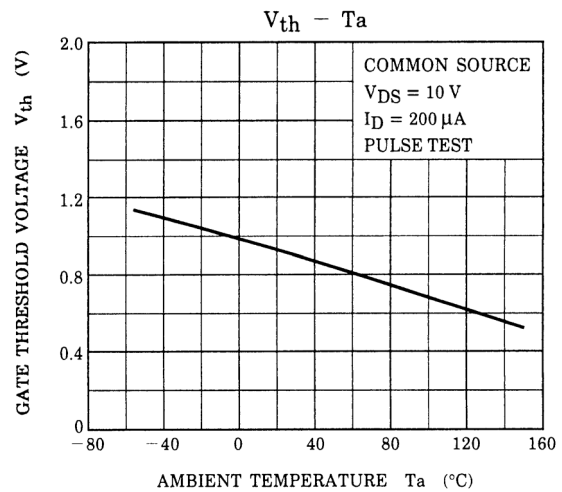
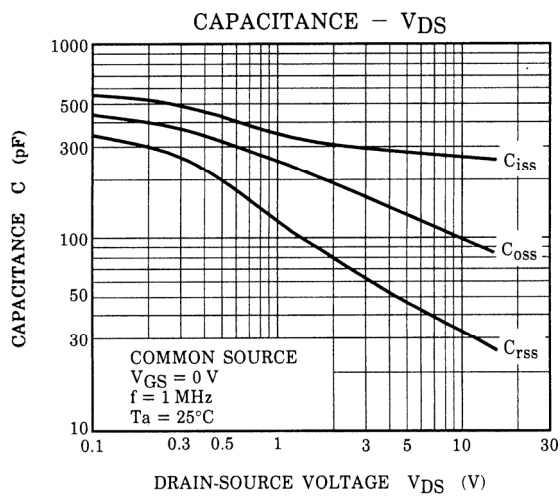
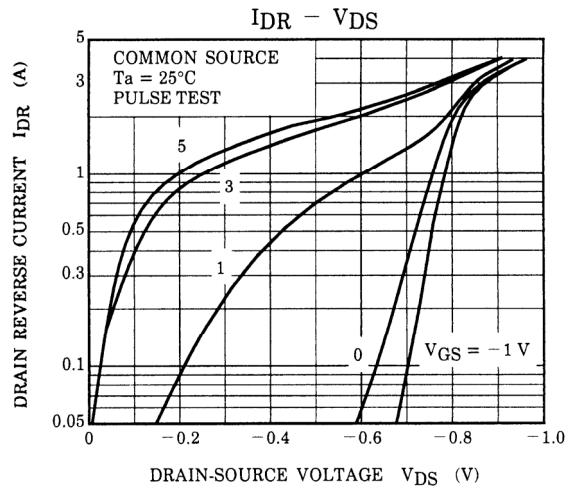
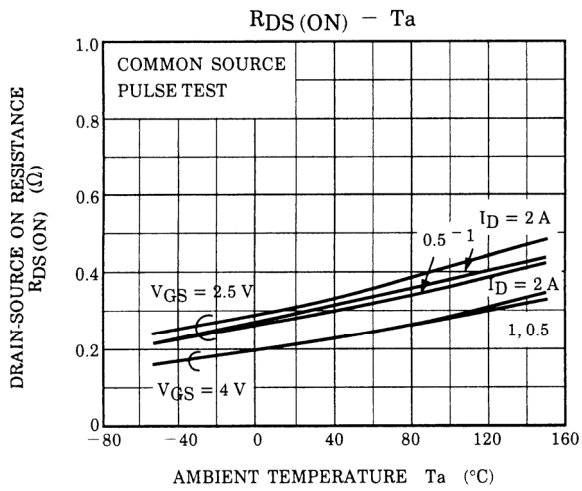
Source-Drain Ratings and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	2	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	6	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 2 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 2 \text{ A}, V_{GS} = 0 \text{ V}$	—	220	—	ns
Reverse recovered charge	Q_{rr}	$dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	0.32	—	μC

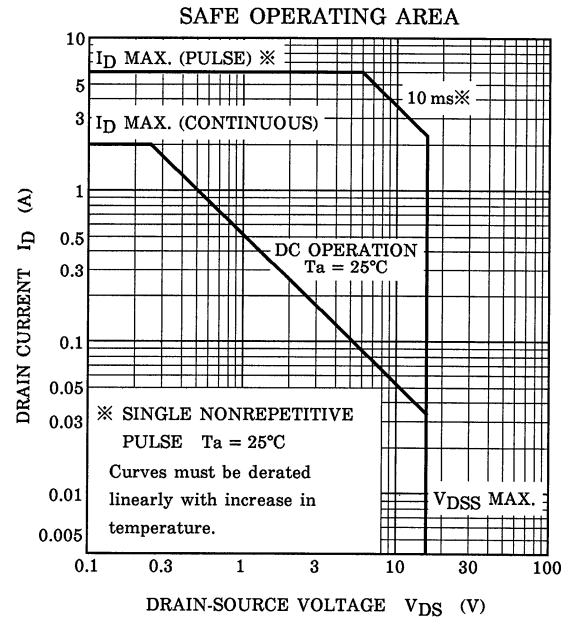
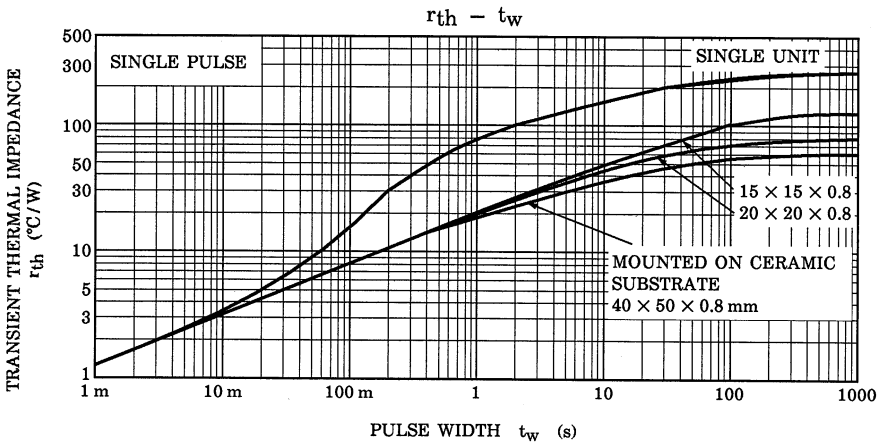
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