

2SJ360

High Speed, High current Switching Applications

Chopper Regulator, DC-DC Converter and Motor Drive Applications

- 4-V gate drive
- Low drain-source ON resistance : $R_{DS(ON)} = 0.55 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 0.9 S$ (typ.)
- Low leakage current : $I_{DSS} = -100 \mu A$ (max) ($V_{DS} = -60 V$)
- Enhancement mode : $V_{th} = -0.8$ to $-2.0 V$ ($V_{DS} = -10 V$, $I_D = -1 mA$)

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

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	-60	V
Drain-gate voltage ($R_{GS} = 20 k \Omega$)		V_{DGR}	-60	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	-1	A
	Pulse (Note 1)	I_{DP}	-4	A
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 to 150	$^\circ C$

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

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

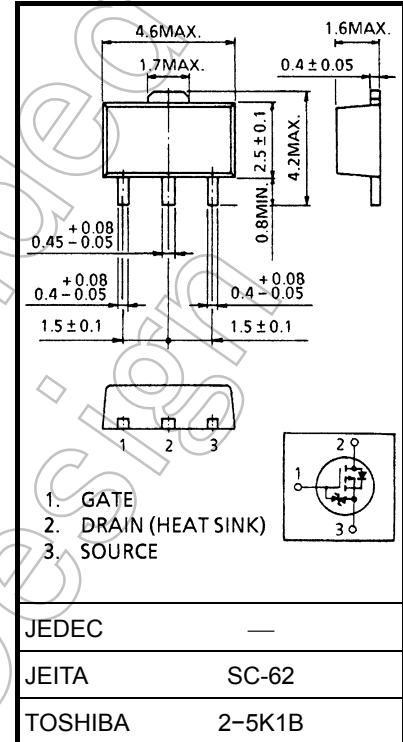
Note 3: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

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.

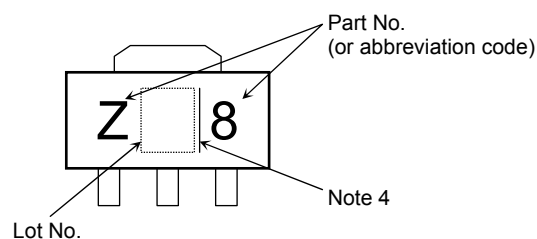
Unit: mm



Weight: 0.05 g (typ.)

JEDEC	—
JEITA	SC-62
TOSHIBA	2-5K1B

Marking



Note 4: A line to the right of a Lot No. identifies the indication of product Labels.

Without a line: [[Pb]]/INCLUDES > MCV

With a line: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

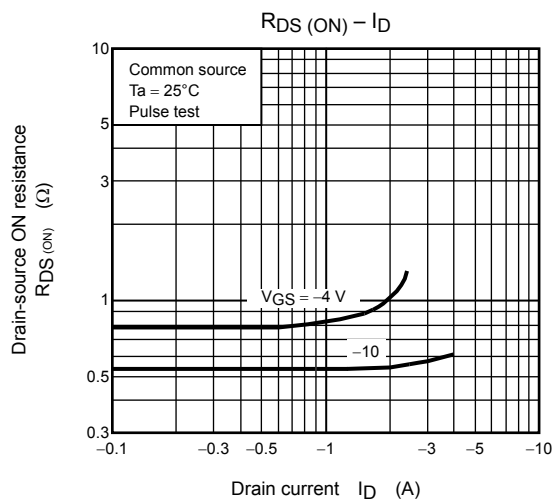
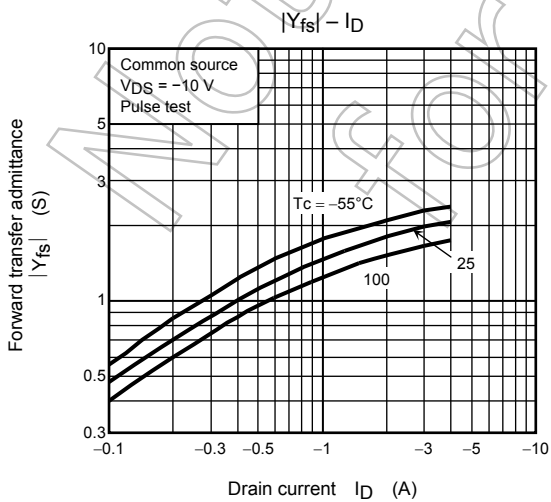
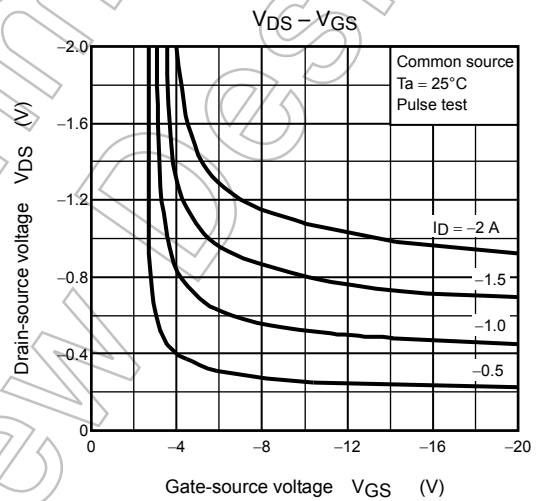
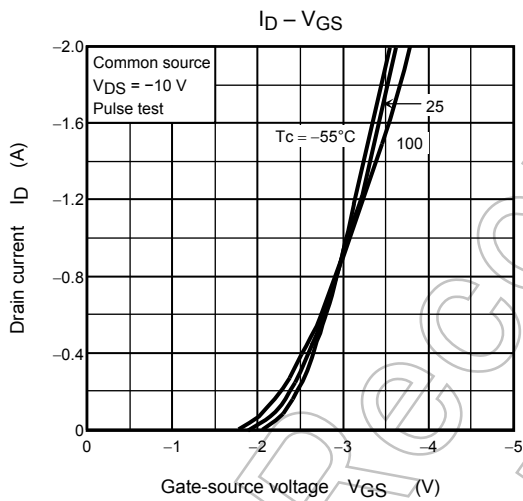
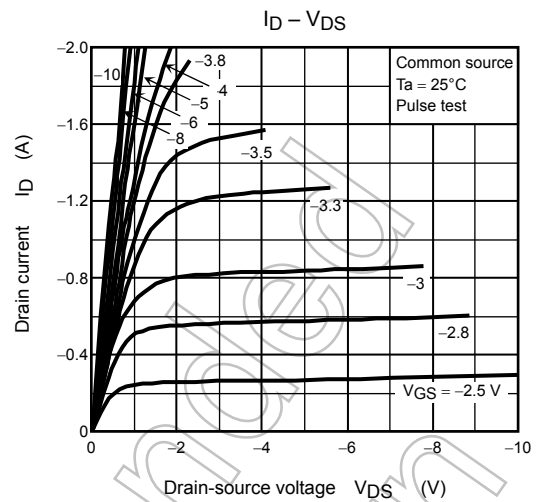
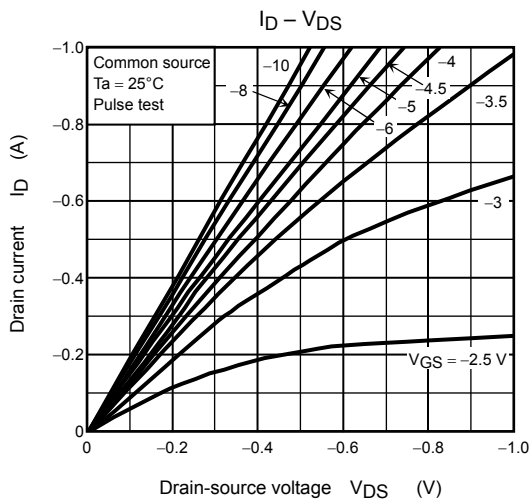
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

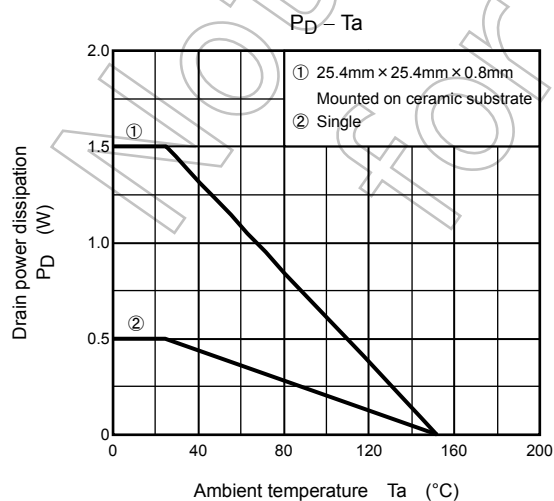
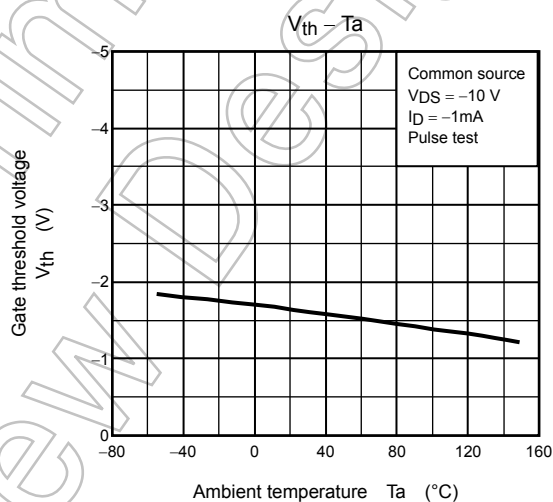
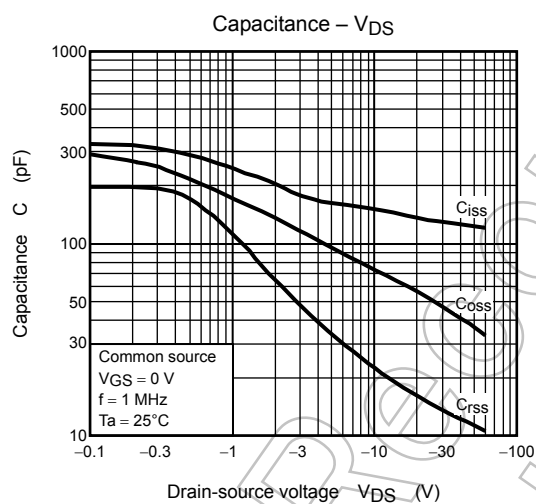
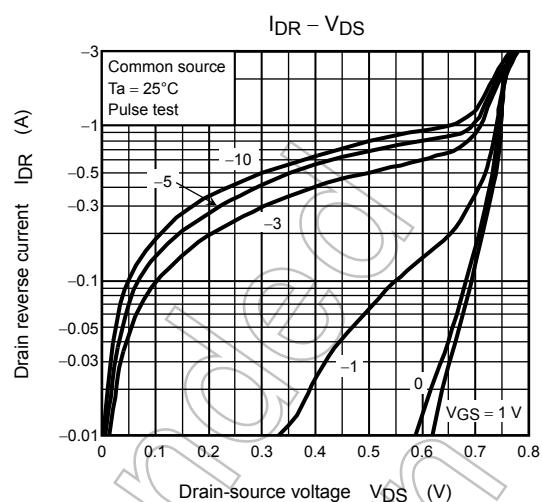
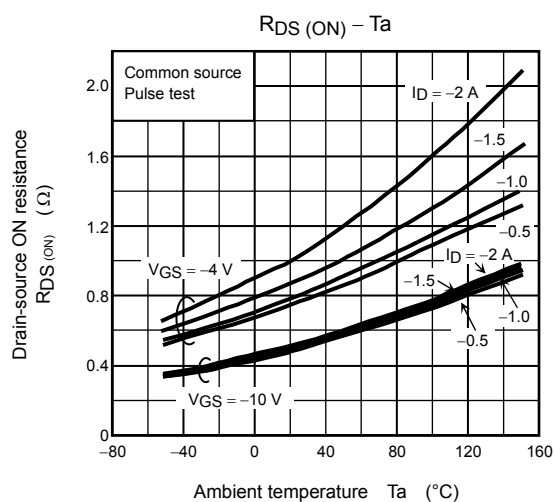
Electrical Characteristics (Ta = 25°C)

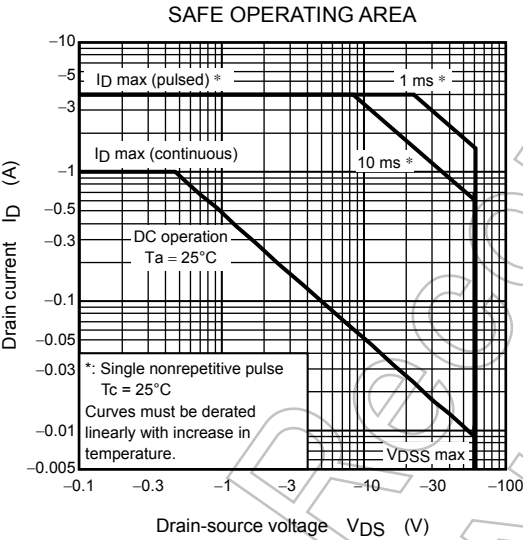
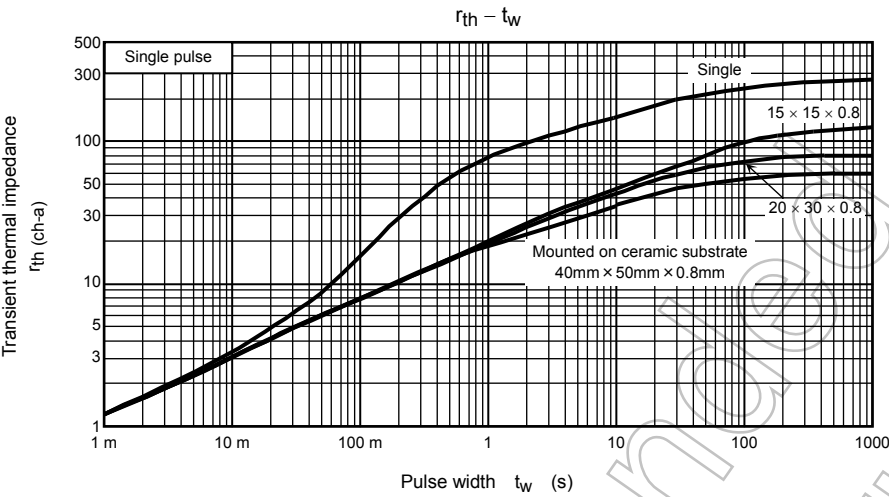
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cut-off current		I_{DSS}	$V_{DS} = -60 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	-100	μA
Drain-source breakdown voltage		$V_{(BR) DSS}$	$I_D = -10 \text{ mA}, V_{GS} = 0 \text{ V}$	-60	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = -10 \text{ V}, I_D = -1 \text{ mA}$	-0.8	—	-2.0	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = -4 \text{ V}, I_D = -0.5 \text{ A}$	—	0.86	1.2	Ω
			$V_{GS} = -10 \text{ V}, I_D = -0.5 \text{ A}$	—	0.55	0.73	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = -10 \text{ V}, I_D = -0.5 \text{ A}$	0.5	1.0	—	S
Input capacitance		C_{iss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	155	—	pF
Reverse transfer capacitance		C_{rss}		—	22	—	
Output capacitance		C_{oss}		—	75	—	
Switching time	Rise time	t_r	<p>$I_D = -0.5 \text{ A}$ $V_{GS} = 0 \text{ V}, -10 \text{ V}$ $R_L = 60 \Omega$ $V_{DD} \approx -30 \text{ V}$ Duty $\leq 1\%$, $t_w = 10 \mu\text{s}$</p>	—	17	—	ns
	Turn-on time	t_{on}		—	20	—	
	Fall time	t_f		—	20	—	
	Turn-off time	t_{off}		—	100	—	
Total gate charge (Gate-source plus gate-drain)		Q_g	$V_{DD} \approx -48 \text{ V}, V_{GS} = -10 \text{ V}, I_D = -1 \text{ A}$	—	6.5	—	nC
Gate-source charge		Q_{gs}		—	4.5	—	
Gate-drain ("miller") charge		Q_{gd}		—	2.0	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	-1	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	-4	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = -1 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.8	V
Reverse recovery time	t_{rr}	$I_{DR} = -1 \text{ A}, V_{GS} = 0 \text{ V}$ $dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	50	—	ns
Reverse recovery charge	Q_{rr}		—	45	—	nC







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