

# 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 (Ta = 25°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		$V_{GSS}$	$\pm 20$	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	°C
Storage temperature range		$T_{stg}$	-55 to 150	°C

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

Note 2: Mounted on a ceramic substrate (25.4 mm × 25.4 mm × 0.8 mm)

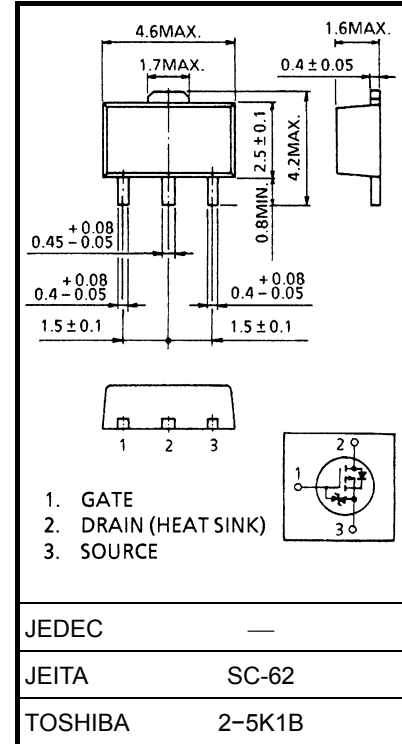
Note 3: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

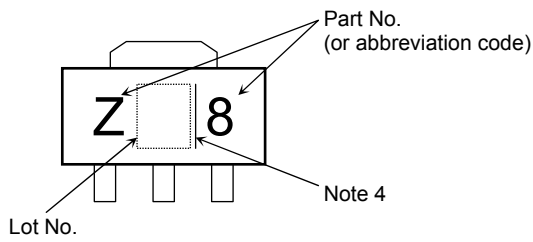
This transistor is an electrostatic-sensitive device. Please handle with caution.

Unit: mm



Weight: 0.05 g (typ.)

## 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]]

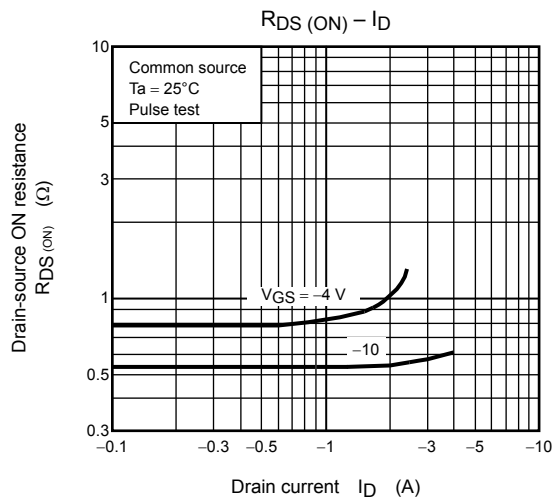
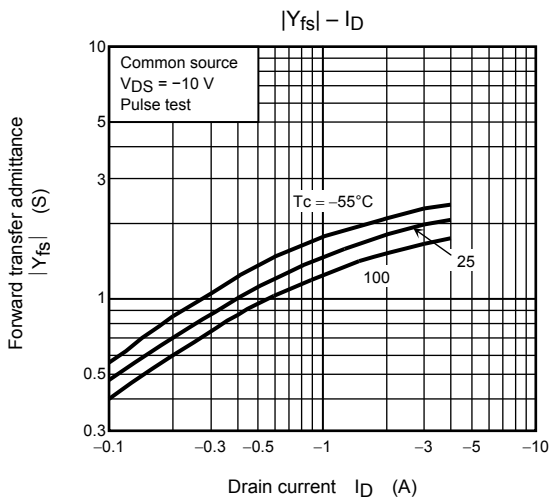
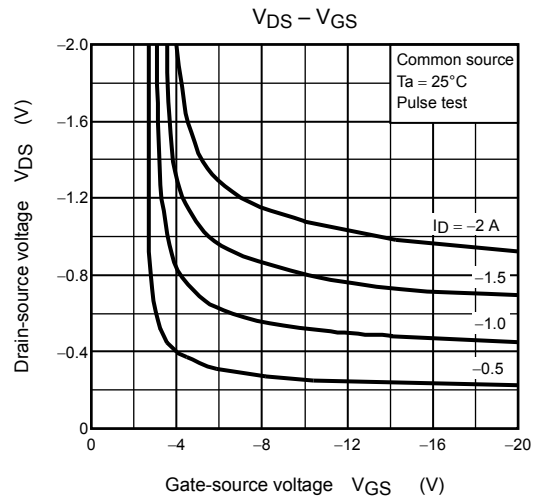
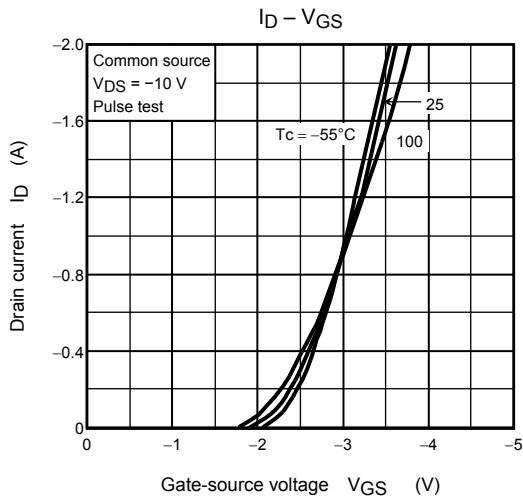
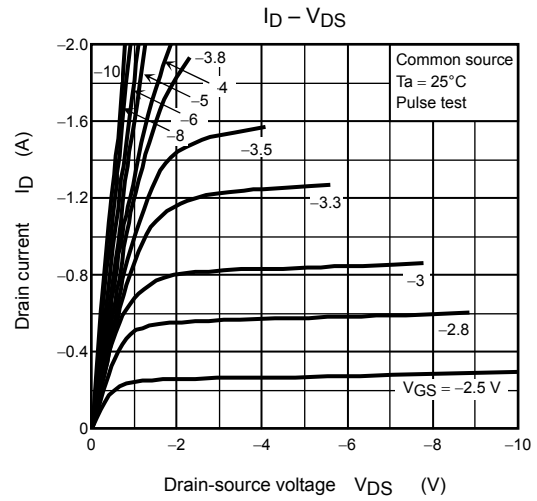
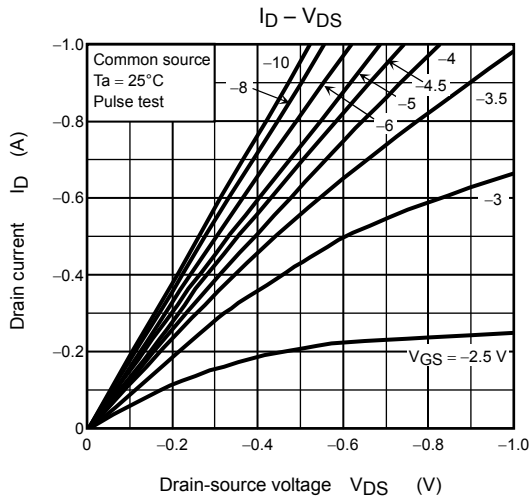
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical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

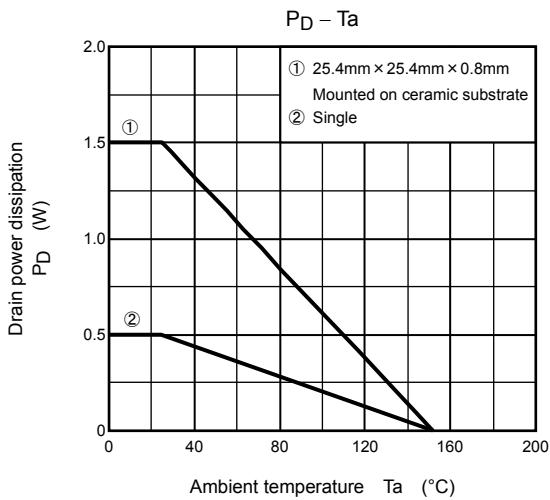
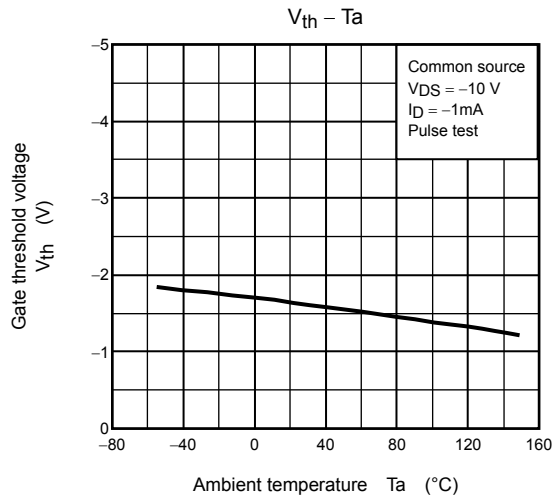
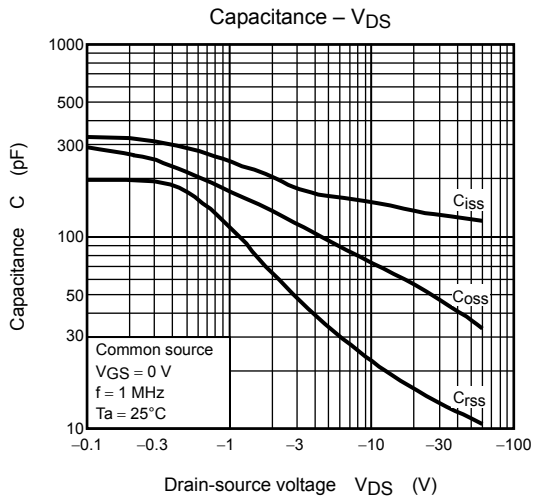
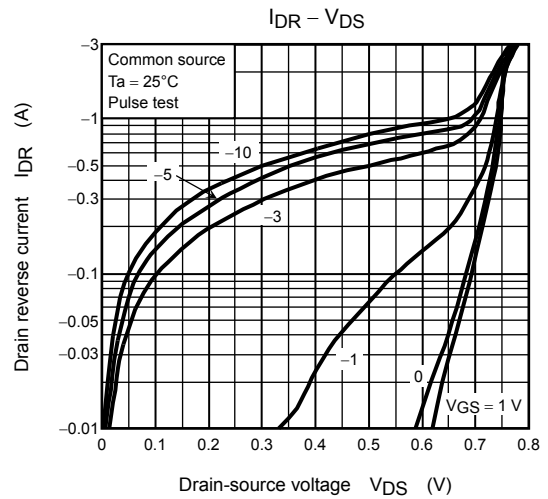
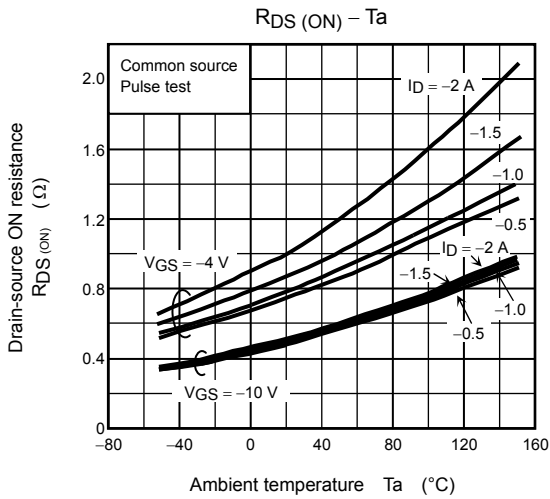
## Electrical Characteristics (Ta = 25°C)

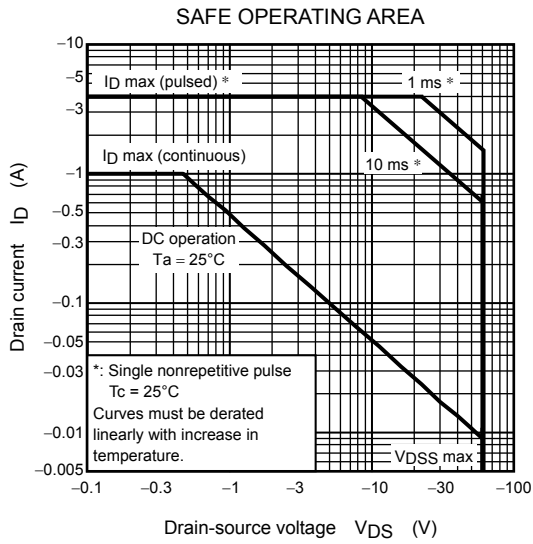
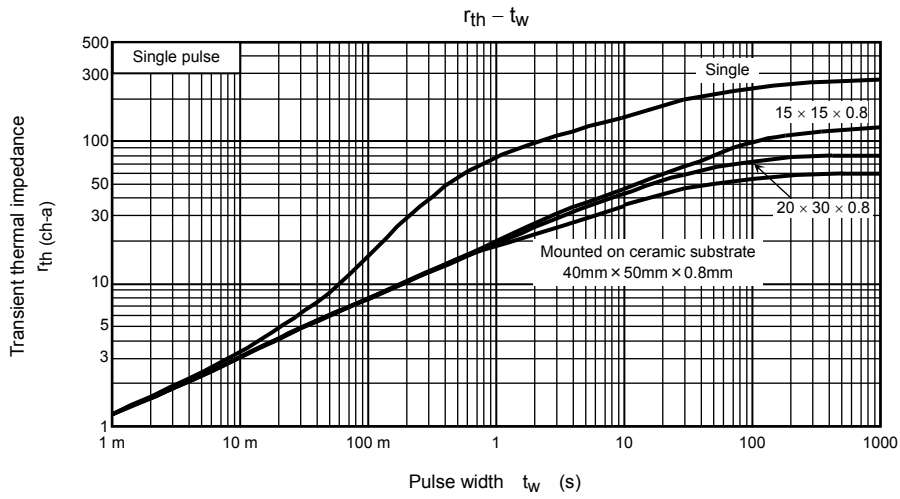
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GSS}$	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$
Drain cut-off current		$I_{DSS}$	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$	—	—	-100	$\mu\text{A}$
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = -10\text{ mA}, V_{GS} = 0\text{ V}$	-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	$\Omega$
			$V_{GS} = -10\text{ V}, I_D = -0.5\text{ A}$	—	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	$t_r$		—	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	$t_{rr}$	$I_{DR} = -1\text{ A}, V_{GS} = 0\text{ V}$	—	50	—	ns
Reverse recovery charge	$Q_{rr}$	$dI_{DR} / dt = 50\text{ A} / \mu\text{s}$	—	45	—	nC







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