

2SJ439

DC/DC Converter, Relay Drive and Motor Drive Applications

- 2.5-V gate drive
- Low drain-source ON-resistance : $R_{DS(ON)} = 0.18 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 6.0 \text{ S}$ (typ.)
- Low leakage current : $I_{DSS} = -100 \mu\text{A}$ (max) ($V_{DS} = -16 \text{ V}$)
- Enhancement mode : $V_{th} = -0.5 \text{ to } -1.1 \text{ V}$ ($V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$)

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	-16	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	-16	V
Gate-source voltage		V_{GSS}	± 8	V
Drain current	DC (Note 1)	I_D	-5	A
	Pulse (Note 1)	I_{DP}	-20	
Drain power dissipation ($T_c = 25^\circ\text{C}$)		P_D	20	W
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

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

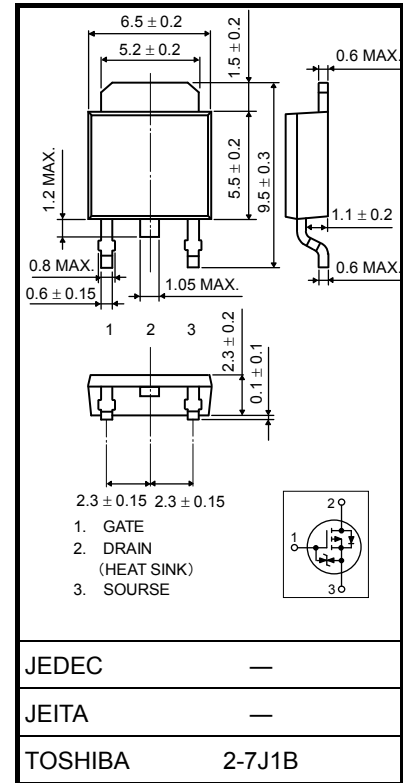
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	6.25	$^\circ\text{C} / \text{W}$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	125	$^\circ\text{C} / \text{W}$

This transistor is an electrostatic-sensitive device. Handle with care.

Unit: mm



Weight: 0.36 g (typ.)

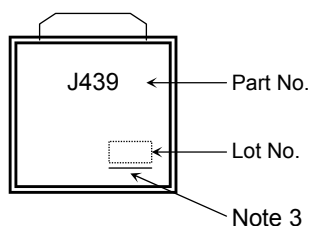
Electrical Characteristics (Ta = 25°C)

Characteristic		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 cutoff 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}	$V_{DS} = -10 \text{ V}, I_D = -1 \text{ mA}$	-0.5	—	-1.1	V
Drain-source ON-resistance		$R_{DS(ON)}$	$V_{GS} = -2.5 \text{ V}, I_D = -2.5 \text{ A}$	—	0.18	0.28	Ω
			$V_{GS} = -4 \text{ V}, I_D = -2.5 \text{ A}$	—	0.14	0.2	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = -10 \text{ V}, I_D = -2.5 \text{ A}$	3.0	6.0	—	S
Input capacitance		C_{iss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	1050	—	pF
Reverse transfer capacitance		C_{rss}		—	120	—	
Output capacitance		C_{oss}		—	460	—	
Switching time	Rise time	t_r		—	80	—	ns
	Turn-on time	t_{on}		—	100	—	
	Fall time	t_f		—	250	—	
	Turn-off time	t_{off}		Duty $\leq 1\%$, $t_W = 10 \mu\text{s}$	—	550	
Total gate charge (Gate-source plus gate-drain)		Q_g	$V_{DD} \approx -16 \text{ V}, V_{GS} = -5 \text{ V}, I_D = -5 \text{ A}$	—	24	—	nC
Gate-source charge		Q_{gs}		—	16	—	
Gate-drain ("Miller") charge		Q_{gd}		—	8	—	

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

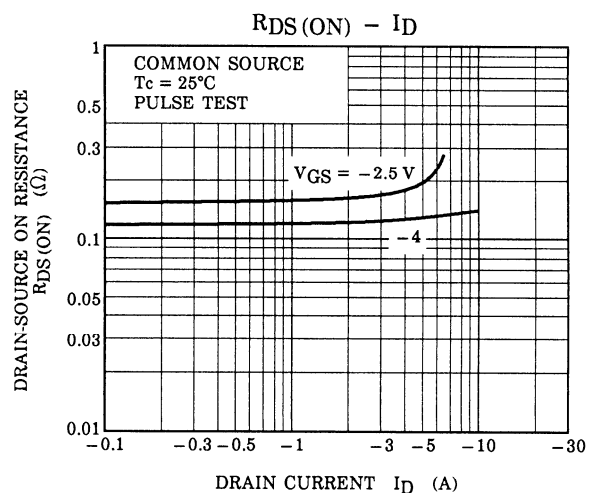
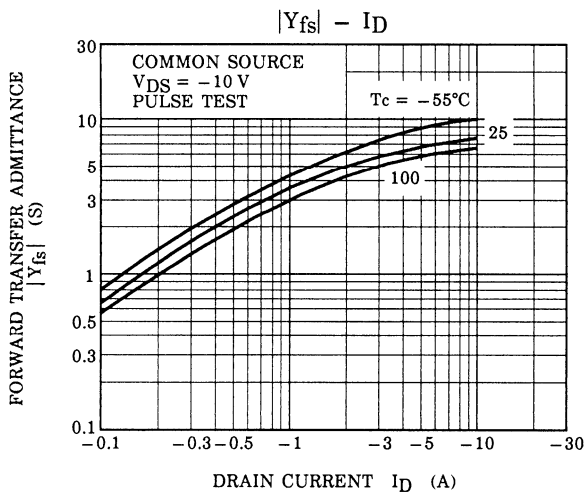
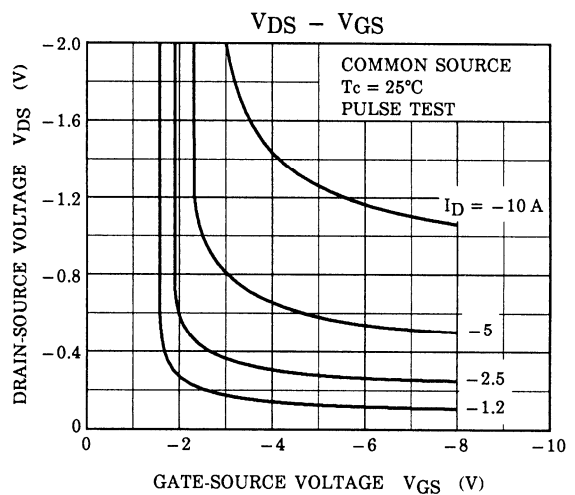
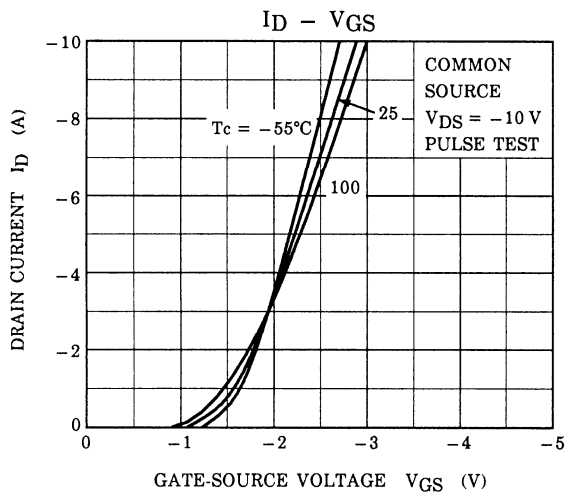
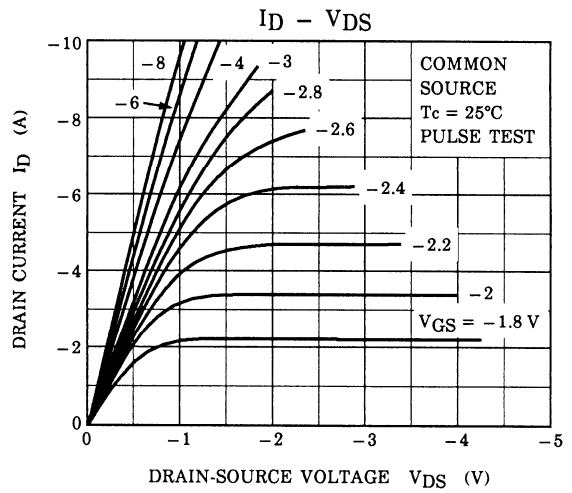
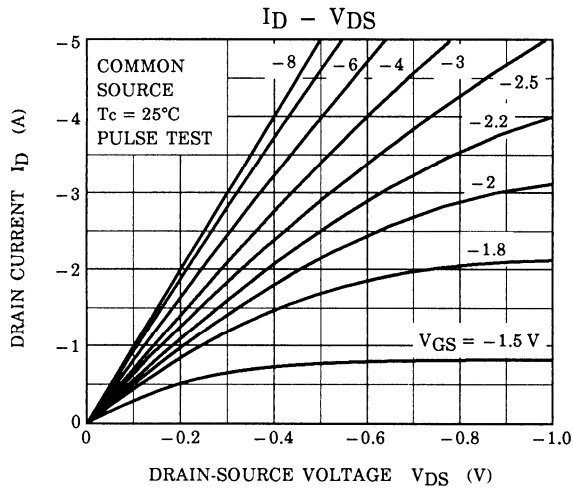
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	-5	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	-20	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = -5 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = -5 \text{ A}, V_{GS} = 0 \text{ V}, dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	120	—	ns
Reverse recovery charge	Q_{rr}		—	0.12	—	μC

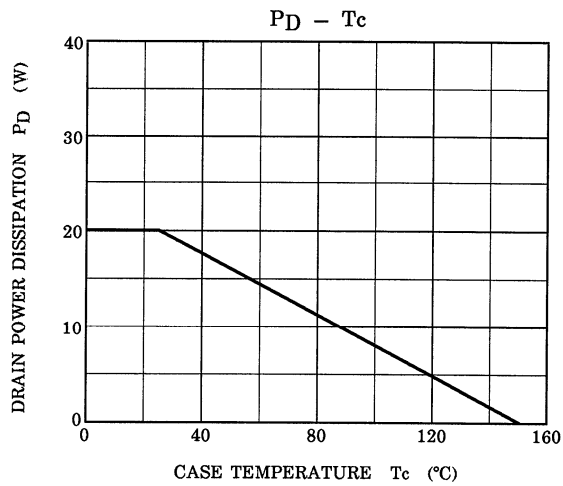
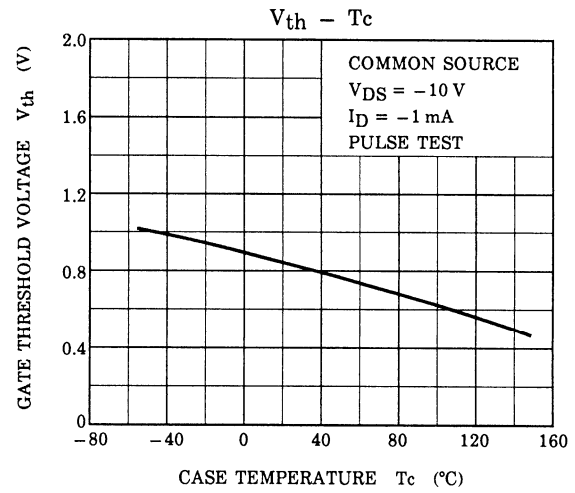
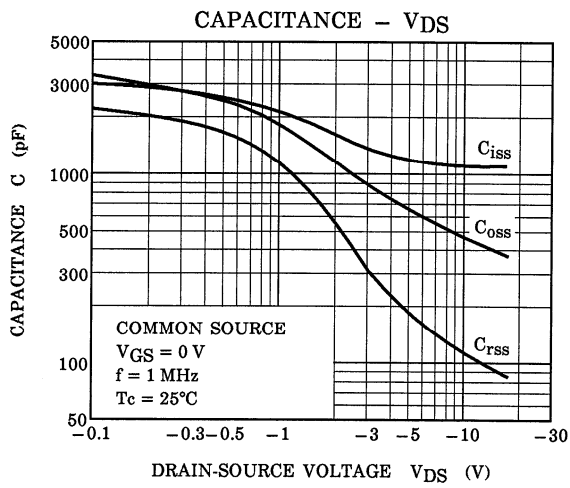
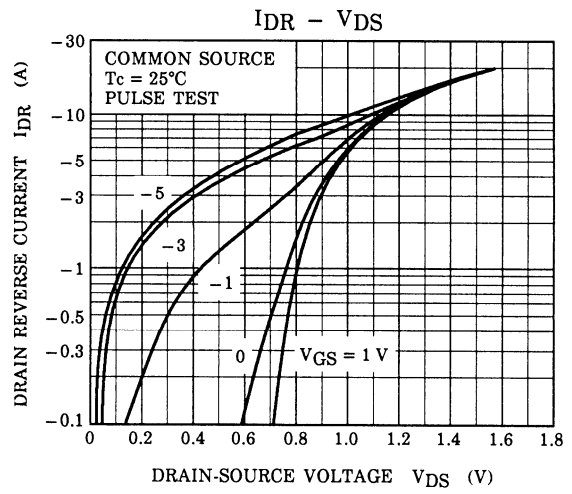
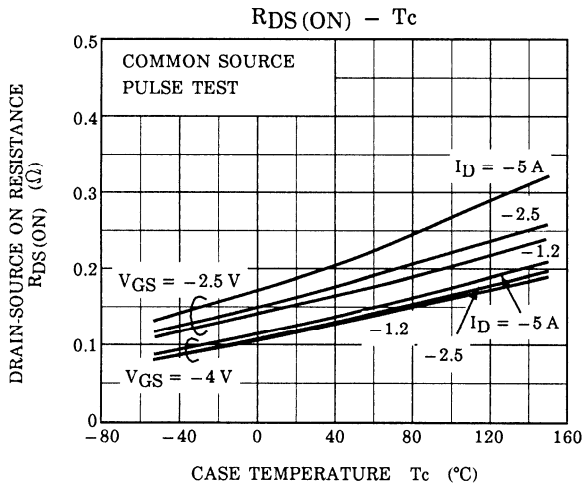
Marking

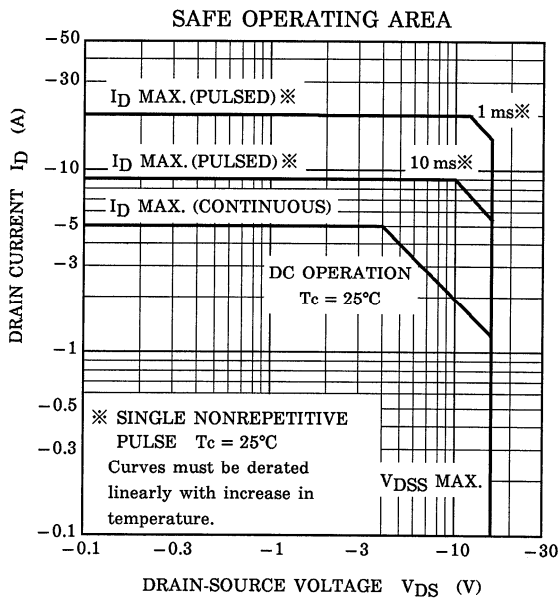
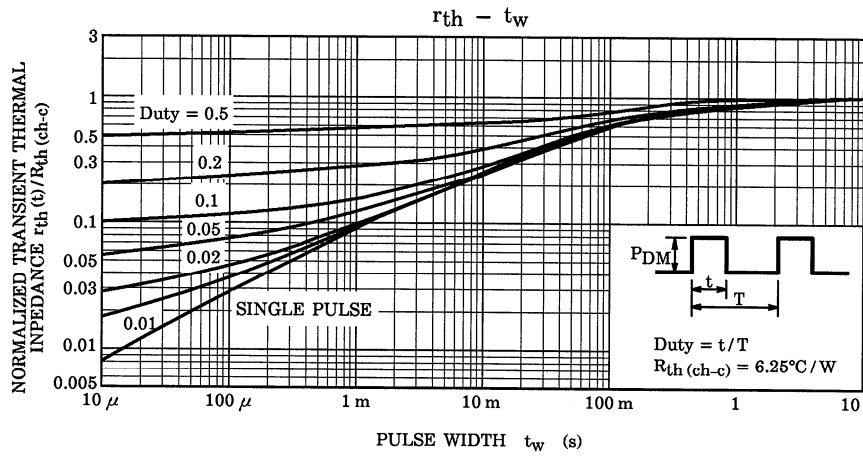


Note 3 : A line under a Lot No. identifies the indication of product Labels [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is 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.







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