

2 S J 6 1 0

High Speed Switching, High Current Applications
Switching Regulator, DC-DC Converter and
Motor Drive Applications

Features

- Low drain-source ON resistance: $R_{DS(ON)} = 1.85 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 1.8 S$ (typ.)
- Low leakage current: $I_{DSS} = -100 \mu A$ ($V_{DS} = -250 V$)
- Enhancement-mode: $V_{th} = -1.5 \sim -3.5 V$ ($V_{DS} = 10 V$, $I_D = 1 mA$)

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

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	-250	V
Drain-gate voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	-250	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC	I_D	-2.0	A
	Pulse ($t = 1 ms$)	I_{DP}	-4.0	
Drain power dissipation ($T_a = 25^\circ C$) (Note)		P_D	20	W
Single pulse avalanche energy*		E_{AS}	180	mJ
Avalanche current		I_{AR}	-2.0	A
Repetitive avalanche energy**		E_{AR}	2.0	mJ
Channel temperature		T_{ch}	150	$^\circ C$
Storage temperature range		T_{stg}	-55~150	$^\circ C$

Note:

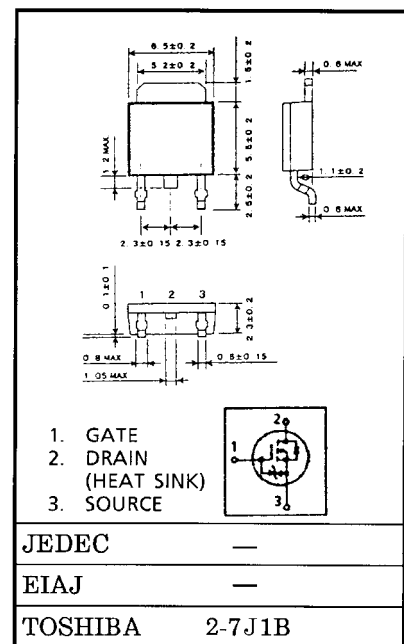
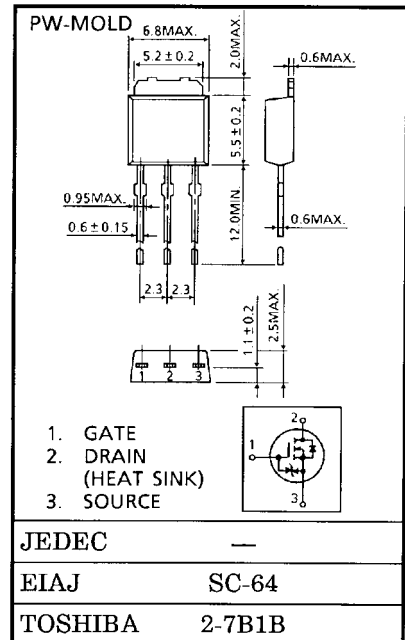
* $V_{DD} = 50 V$, $T_{ch} = 25^\circ C$, $L = 75 mH$, $I_{AR} = -2.0 A$, $R_G = 25 \Omega$

** Repetitive rating; pulse width limited by max channel temperature

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

INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 0.36 g

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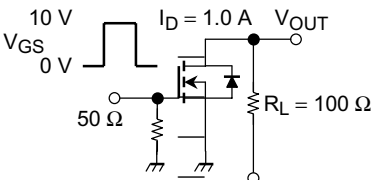
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Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	6.25	°C/W
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	125	°C/W

Electrical Characteristics (Ta = 25°C)

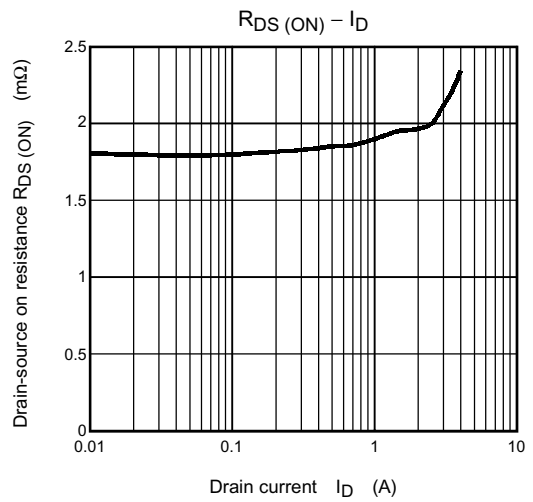
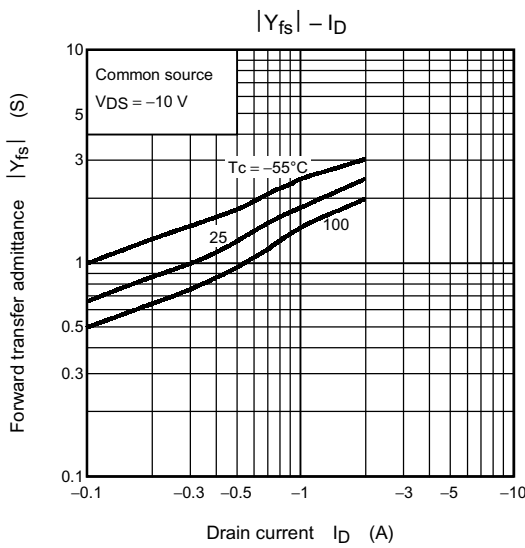
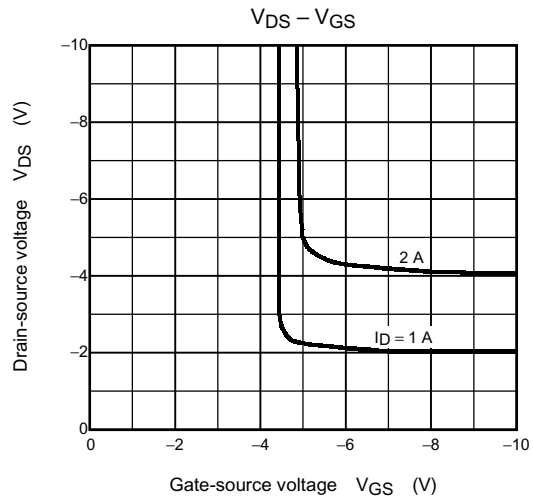
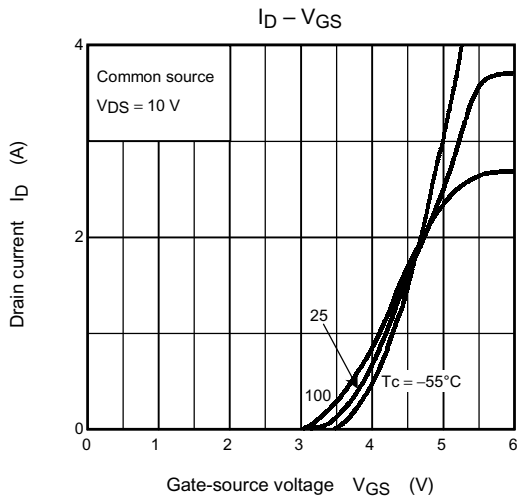
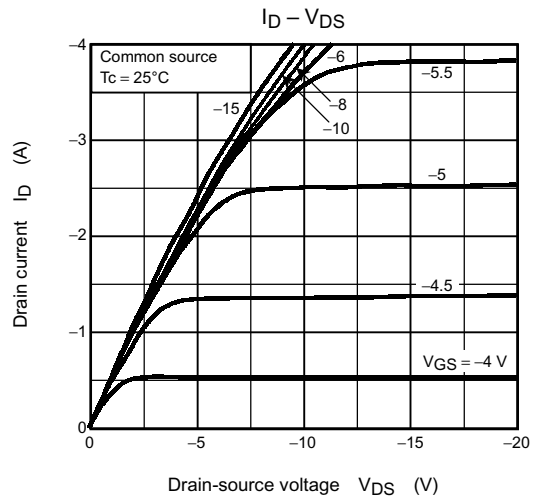
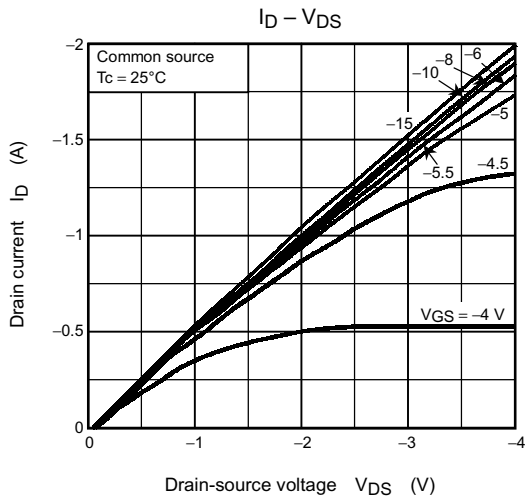
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain cut-off current		I_{DSS}	$V_{DS} = -250\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	-100	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = -10\text{ mA}$, $V_{GS} = 0\text{ V}$	-250	—	—	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		$R_{DS(ON)}$	$V_{GS} = -10\text{ V}$, $I_D = -1.0\text{ A}$	—	1.85	2.55	Ω
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = -10\text{ V}$, $I_D = -1.0\text{ A}$	0.5	1.8	—	S
Input capacitance		C_{iss}	$V_{DS} = -10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	381	—	pF
Reverse transfer capacitance		C_{rss}		—	52	—	
Output capacitance		C_{oss}		—	157	—	
Switching time	Rise time	t_r	 V_{IN}: t_r, $t_f < 5\text{ ns}$ Duty $\leq 1\%$, $t_w = 10\text{ }\mu\text{s}$	—	5	—	ns
	Turn-on time	t_{on}		—	20	—	
	Fall time	t_f		—	6	—	
	Turn-off time	t_{off}		—	36	—	
Total gate charge		Q_g	$V_{DD} \approx -200\text{ V}$, $V_{GS} = -10\text{ V}$, $I_D = -2.0\text{ A}$	—	24	—	nC
Gate-source charge		Q_{gs}		—	10	—	
Gate-drain charge		Q_{gd}		—	13	—	

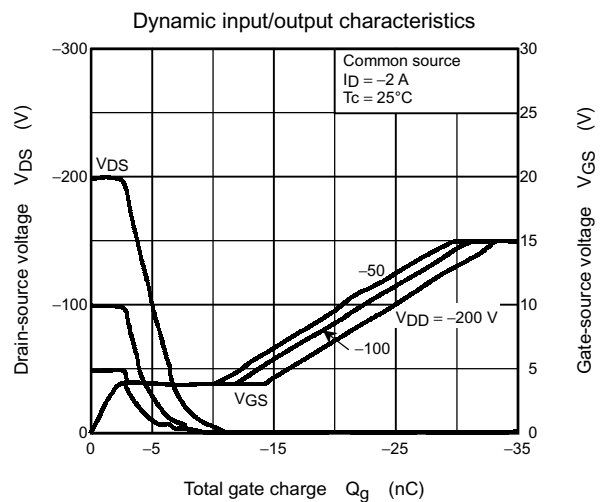
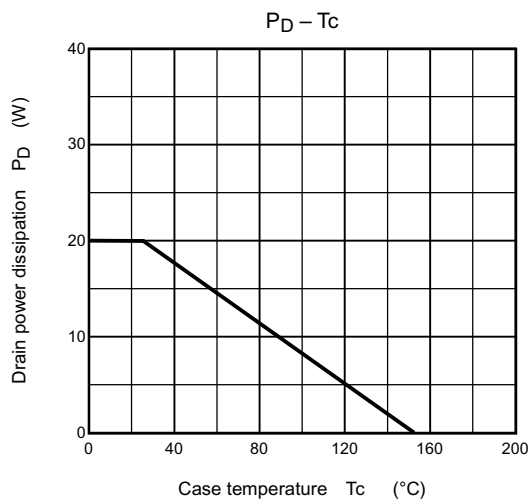
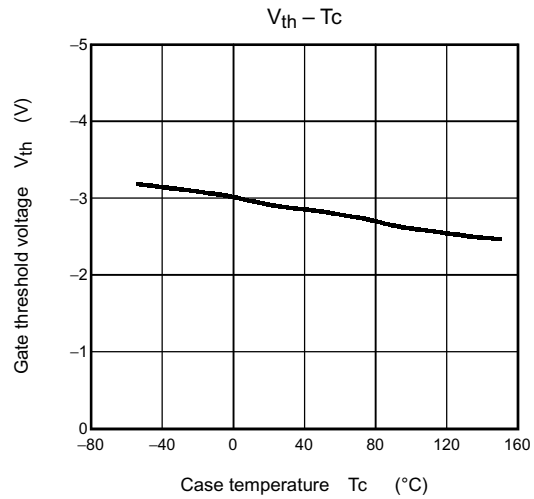
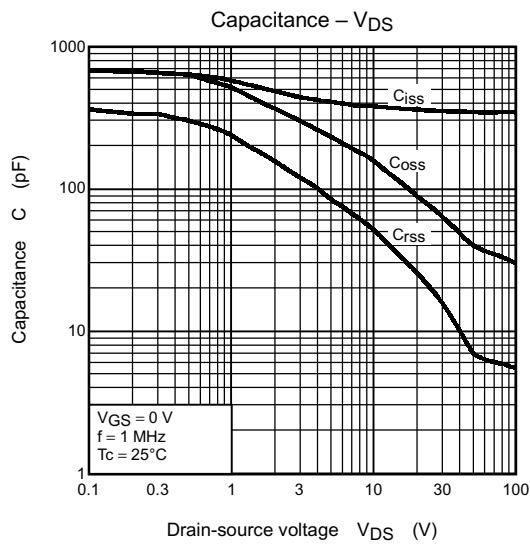
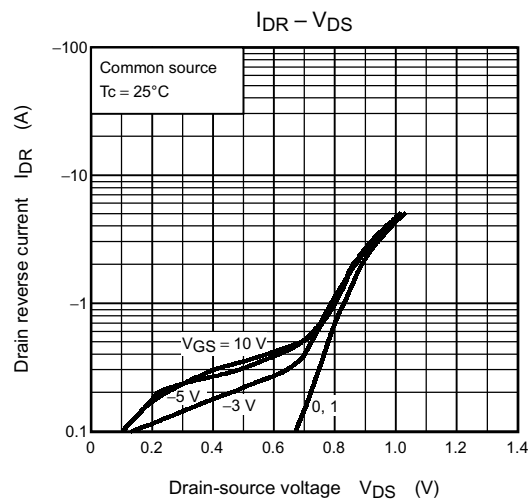
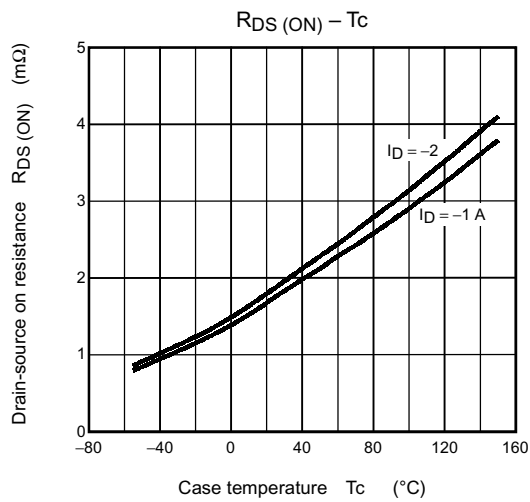
Source-Drain Diode Ratings and Characteristics (Ta = 25°C)

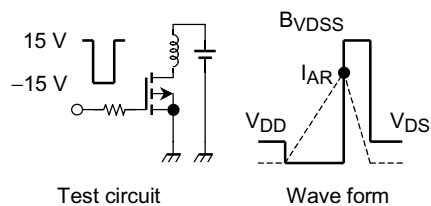
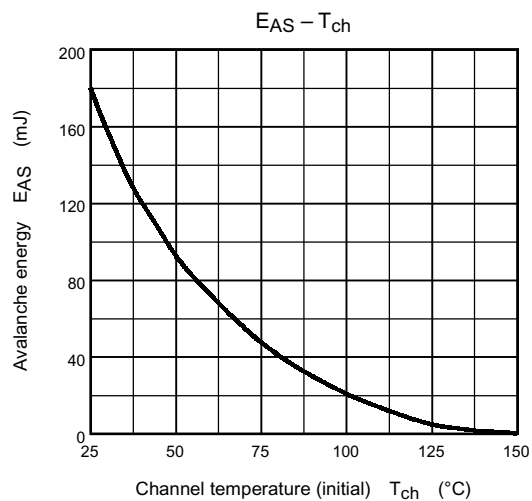
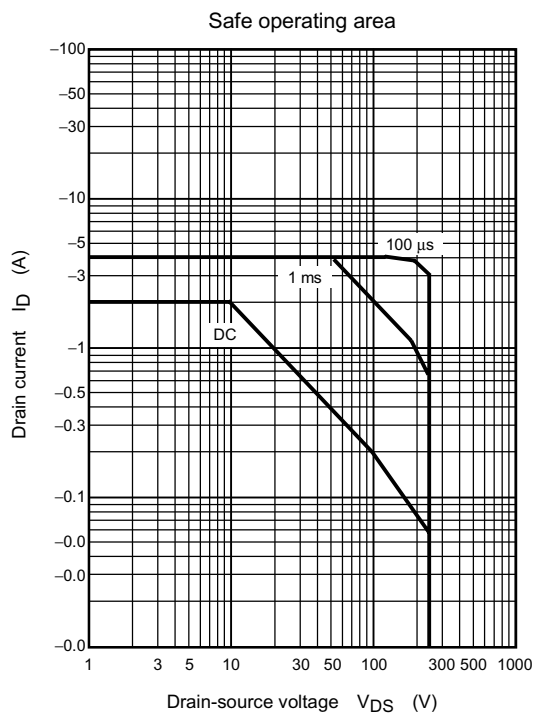
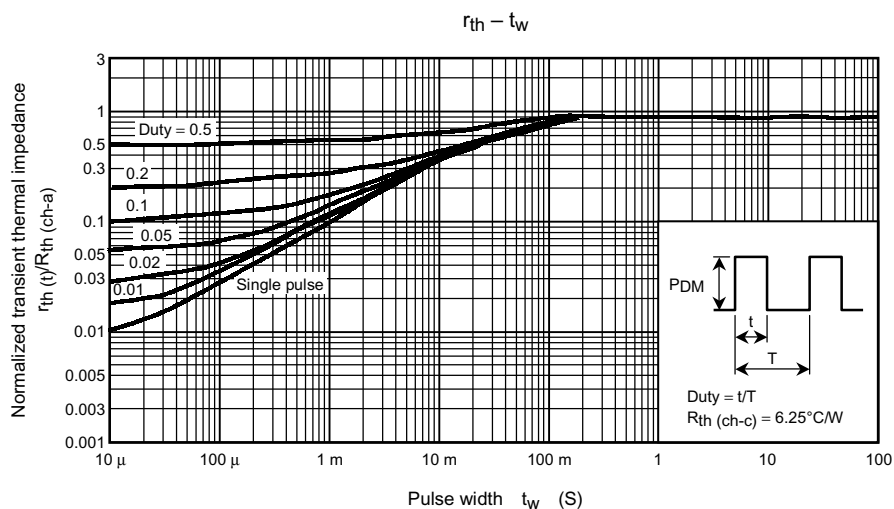
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current	I_{DR}	—	—	—	-2.0	A
Pulse drain reverse current	I_{DRP}	—	—	—	-4.0	A
Diode forward voltage	V_{DSF}	$I_{DR} = -2.0\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	2.0	V
Reverse recovery time	t_{rr}	$I_{DR} = -2.0\text{ A}$, $V_{GS} = 0\text{ V}$,	—	120	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	540	—	nC

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Peak $I_{AR} = -2$ A, $R_G = 25 \Omega$
 $V_{DD} = -50$ V, $L = 75$ mH

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$