

**TENTATIVE**

**2SK3399**

Switching Regulator Applications

- Low drain-source ON resistance:  $R_{DS(ON)} = 0.54 \Omega$  (typ)
- High forward transfer admittance:  $|Y_{fs}| = 5.2 S$  (typ)
- Low leakage current:  $I_{DSS} = 100 \mu A$  (max) ( $V_{DSS} = 600 V$ )
- Enhancement model:  $V_{th} = 3.0\text{--}5.0 V$  ( $V_{DS} = 10 V, I_D = 1 mA$ )

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

Characteristics		Symbol	Rating	Unit
Drain-source voltage		$V_{DSS}$	600	V
Drain-gate voltage ( $R_{GS} = 20 k\Omega$ )		$V_{DGR}$	600	V
Gate-source voltage		$V_{GSS}$	$\pm 30$	V
Drain current	DC	$I_D$	10	A
	Pulse	$I_{DP}$	40	
Drain power dissipation ( $T_c = 25^\circ C$ )		$P_D$	100	W
Single pulse avalanche energy (Note2)		EAS	363	mJ
Avalanche current		$I_{AR}$	10	A
Repetitive avalanche energy (Note1)		EAR	10	mJ
Channel temperature		$T_{ch}$	150	$^\circ C$
Storage temperature range		$T_{stg}$	-55~150	$^\circ C$

Thermal Characteristics

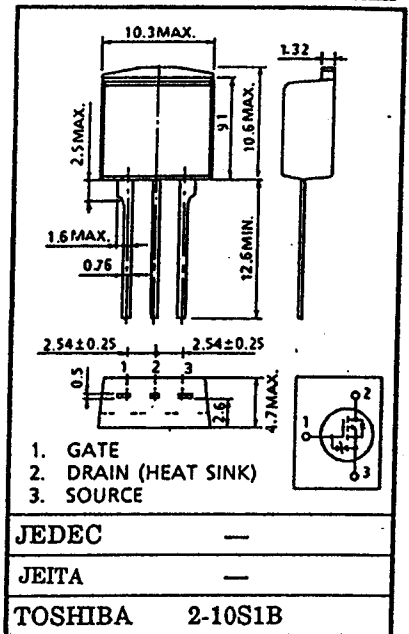
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	1.25	$^\circ C/W$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	83.3	$^\circ C/W$

Note1: Repetitive rating; pulse width limited by max junction temperature.

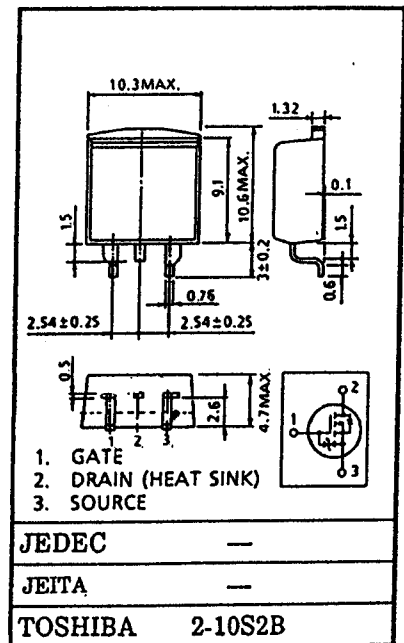
Note2:  $V_{DD} = 90 V, T_{ch} = 25^\circ C$  (initial),  $L = 6.36 mH,$   
 $R_G = 25 \Omega, I_{AR} = 10 A$

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

Unit in mm



TO-220SM Unit in mm



Weight : 1.5 g

## Electrical Characteristics (Ta = 25°C)

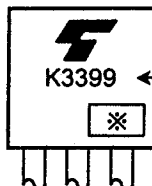
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Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	$I_{GSS}$	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	$\pm 10$	$\mu\text{A}$	
Gate-source breakdown voltage	$V_{(BR)GSS}$	$I_G = \pm 10 \mu\text{A}, V_{DS} = 0 \text{ V}$	$\pm 30$	—	—	V	
Drain cut-off current	$I_{DSS}$	$V_{DS} = 600 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	$\mu\text{A}$	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	600	—	—	V	
Gate threshold voltage	$V_{th}$	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$	3.0	—	5.0	V	
Drain-source ON resistance	$R_{DS(ON)}$	$V_{GS} = 10 \text{ V}, I_D = 5 \text{ A}$	—	0.54	0.75	$\Omega$	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 5 \text{ A}$	2.0	5.2	—	S	
Input capacitance	$C_{iss}$	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	1750	—	pF	
Reverse transfer capacitance	$C_{rss}$		—	11	—		
Output capacitance	$C_{oss}$		—	170	—		
Switching time	Rise time	$t_r$		—	15	—	ns
	Turn-on time	$t_{on}$		—	40	—	
	Fall time	$t_f$		—	8	—	
	Turn-off time	$t_{off}$		—	35	—	
Total gate charge (Gate-source plus gate-drain)	$Q_g$	$V_{DD} = 400 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 10 \text{ A}$	—	35	—	nC	
Gate-source charge	$Q_{gs}$		—	15	—		
Gate-drain ("Miller") charge	$Q_{gd}$		—	20	—		

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current	$I_{DR}$	—	—	—	10	A
Pulse drain reverse current	$I_{DRP}$	—	—	—	40	A
Diode forward voltage	$V_{DSF}$	$I_{DR} = 10 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.7	V
Reverse recovery time	$t_{rr}$	$I_{DR} = 10 \text{ A}, V_{GS} = 0 \text{ V}$	—	1300	—	ns
Reverse recovery charge	$Q_{rr}$	$dI_{DR}/dt = 100 \text{ A}/\mu\text{s}$	—	16	—	$\mu\text{C}$

## Marking



← Type

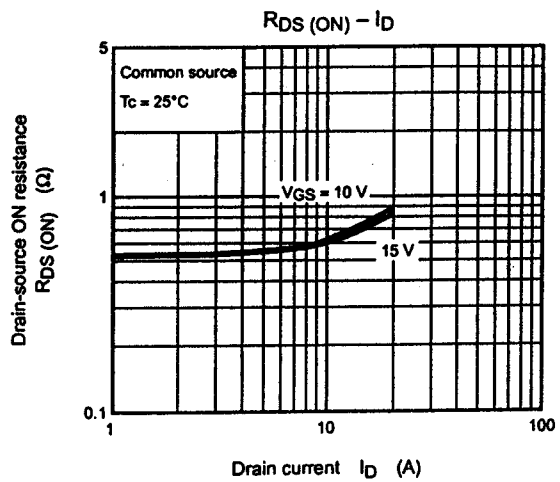
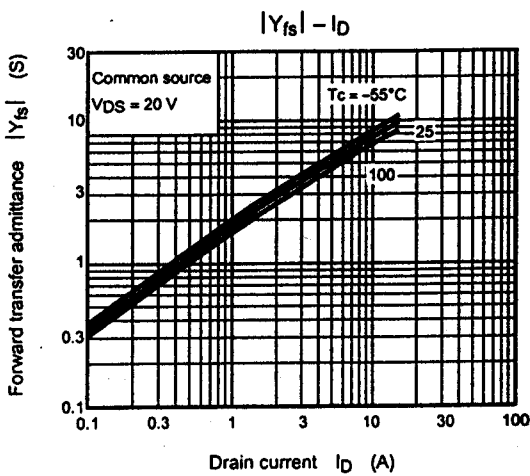
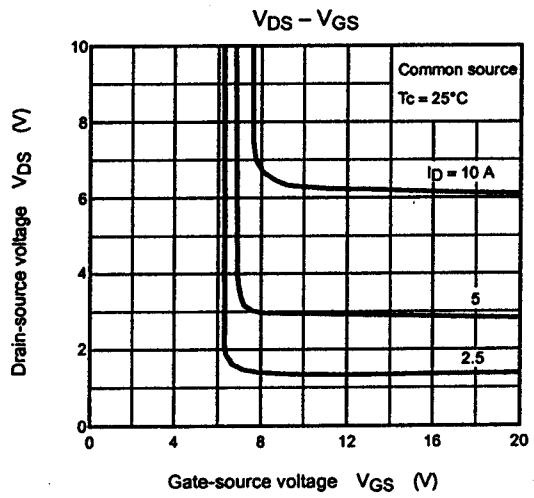
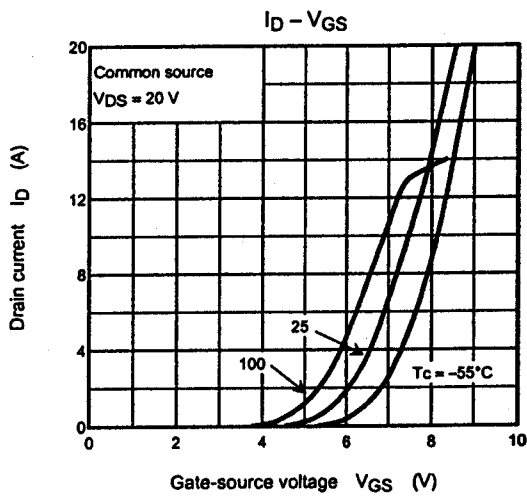
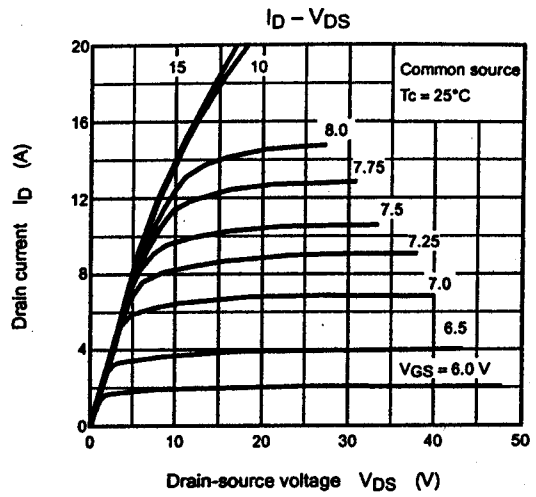
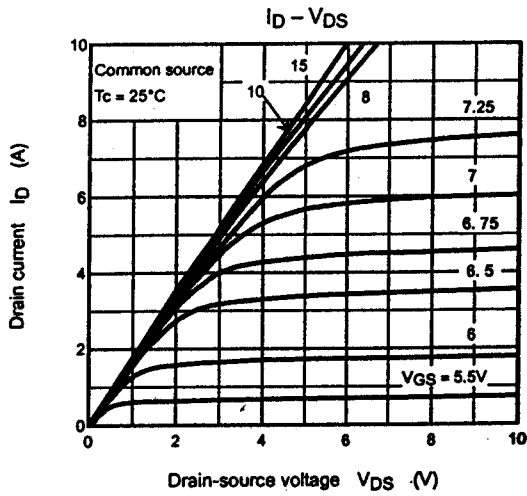
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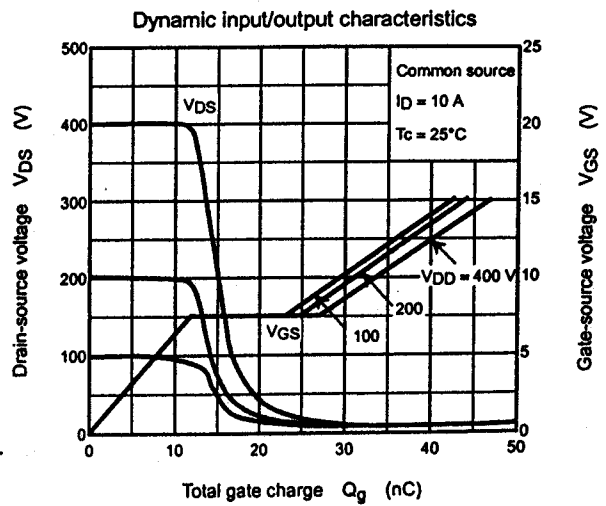
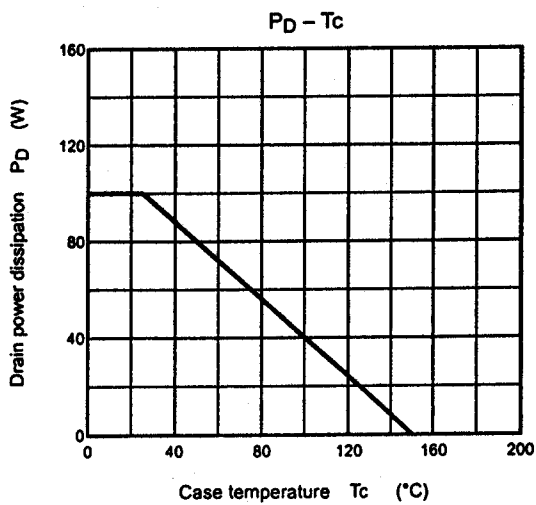
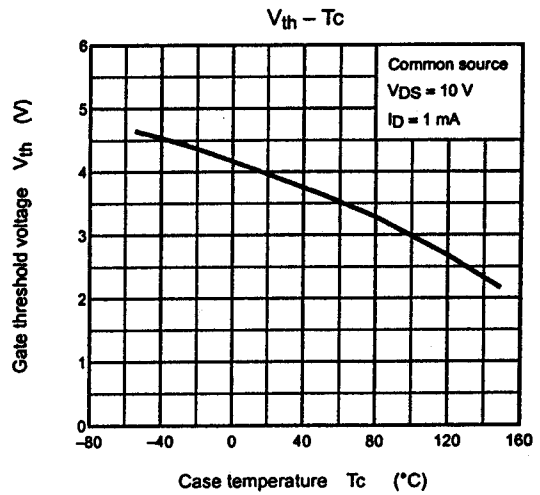
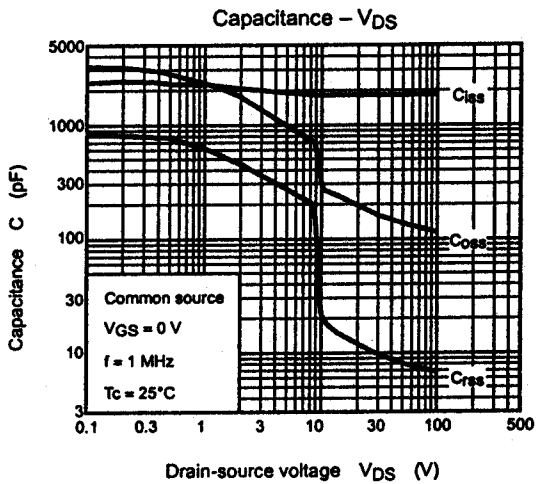
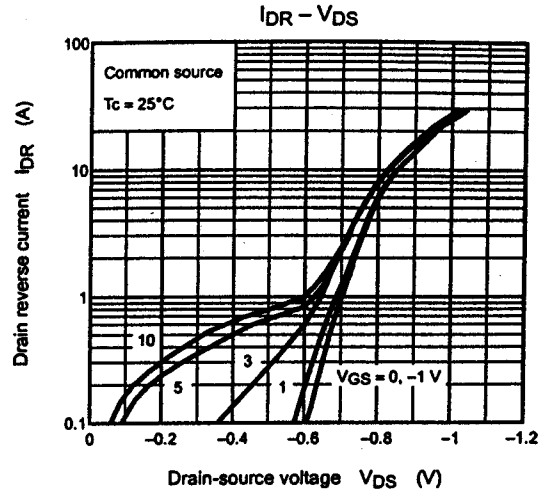
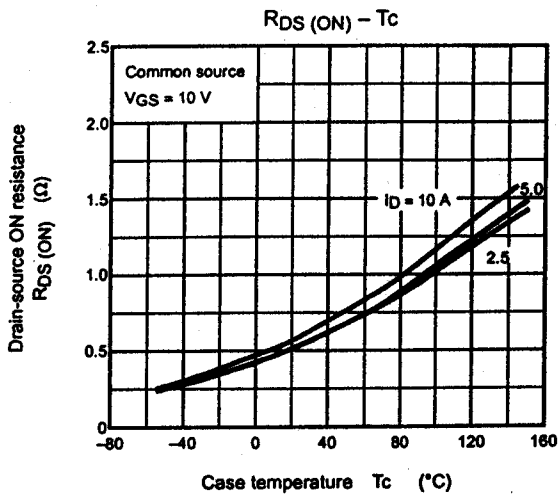
Month (starting from alphabet A)

Year (last number of the christian era)

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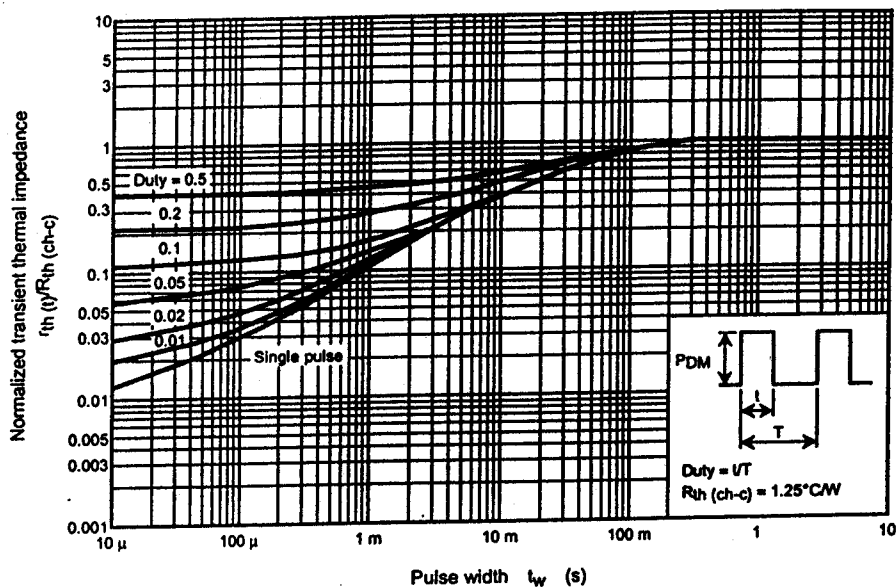


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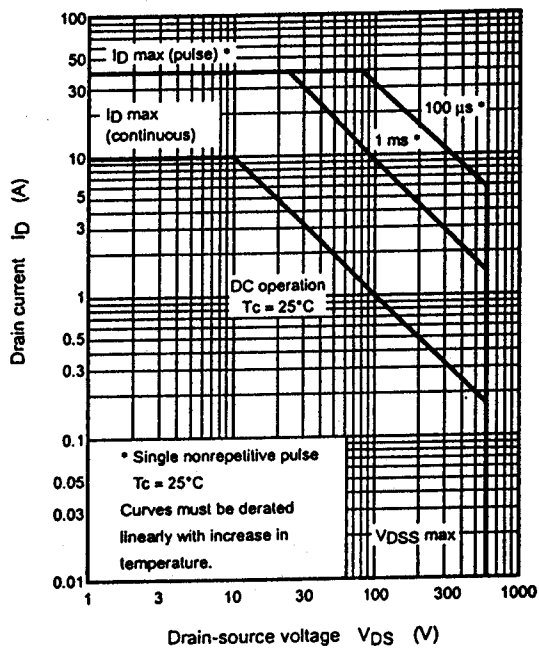


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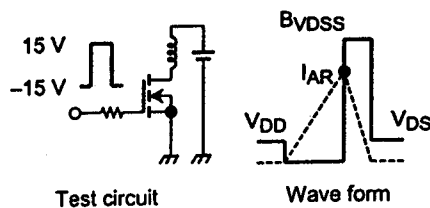
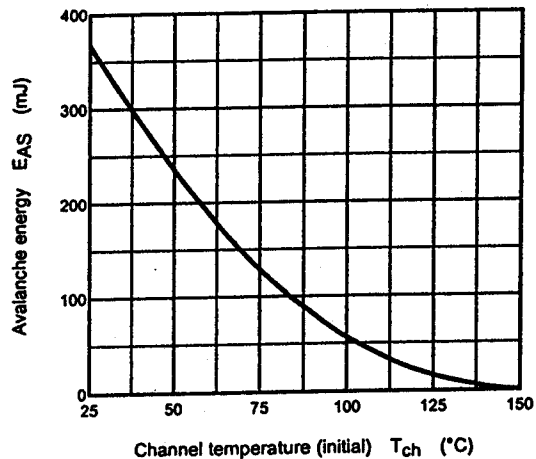
$r_{th} - t_w$



Safe operating area



$E_{AS} - T_{ch}$



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

Parameters:  $R_G = 25 \Omega$ ,  $V_{DD} = 90 V$ ,  $L = 6.36 mH$

**SAFETY RESTRICTIONS ON PRODUCT USE**

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