

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π -MOS ν)

2SK2949

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.4\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 8.0S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.)
($V_{DS} = 400V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0V$
($V_{DS} = 10V, I_D = 1mA$)

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	400	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)		V_{DGR}	400	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	DC	I_D	10	A
	Pulse	I_{DP}	40	A
Drain Power Dissipation ($T_c = 25^\circ C$)		P_D	80	W
Single Pulse Avalanche Energy**		E_{AS}	360	mJ
Avalanche Current		I_{AR}	10	A
Repetitive Avalanche Energy*		E_{AR}	8	mJ
Channel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ C$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	1.56	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ C/W$

Note ;

* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

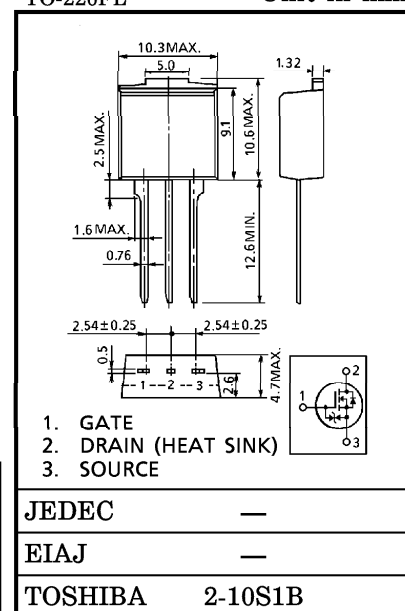
** $V_{DD} = 90V$, Starting $T_{ch} = 25^\circ C$, $L = 5.85mH$, $R_G = 25\Omega$, $I_{AR} = 10A$

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

INDUSTRIAL APPLICATIONS

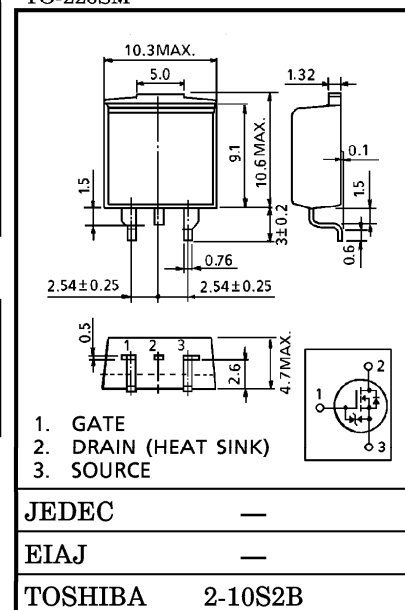
TO-220FL

Unit in mm



Weight : 1.5g (Typ.)

TO-220SM

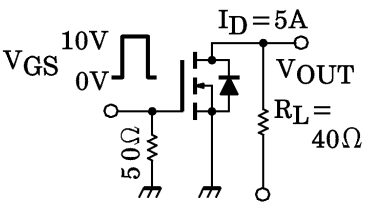


Weight : 1.5g (Typ.)

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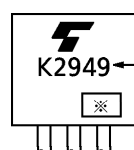
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 25V, V_{DS} = 0V$	—	—	± 10	μA
Gate-Source Breakdown Voltage		$V_{(BR) GSS}$	$I_G = \pm 10\mu A, V_{DS} = 0V$	± 30	—	—	V
Drain Cut-Off Current		I_{DSS}	$V_{DS} = 400V, V_{GS} = 0V$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR) DSS}$	$I_D = 10mA, V_{GS} = 0V$	400	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = 10V, I_D = 1mA$	2.0	—	4.0	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 5.0A$	—	0.4	0.55	Ω
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = 10V, I_D = 5.0A$	4.0	8.0	—	S
Input Capacitance		C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	—	1340	—	pF
Reverse Transfer Capacitance		C_{rss}		—	160	—	
Output Capacitance		C_{oss}		—	490	—	
Switching Time	Rise Time	t_r	 $V_{GS} = 10V, 0V$ $I_D = 5A$ V_{OUT} $R_L = 40\Omega$ $V_{DD} \doteq 200V$ $V_{IN} : t_r, t_f < 5ns,$ $Duty \leq 1\%, t_w = 10\mu s$	—	22	—	ns
	Turn-On Time	t_{on}		—	60	—	
	Fall Time	t_f		—	32	—	
	Turn-Off Time	t_{off}		—	140	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \doteq 320V, V_{GS} = 10V$ $I_D = 10A$	—	34	—	nC
Gate-Source Charge		Q_{gs}		—	18	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	16	—	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	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}	$I_{DR} = 10A, V_{GS} = 0V$	—	—	-1.7	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 10A, V_{GS} = 0V$	—	350	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR} / dt = 100A / \mu s$	—	2.6	—	μC

MARKING



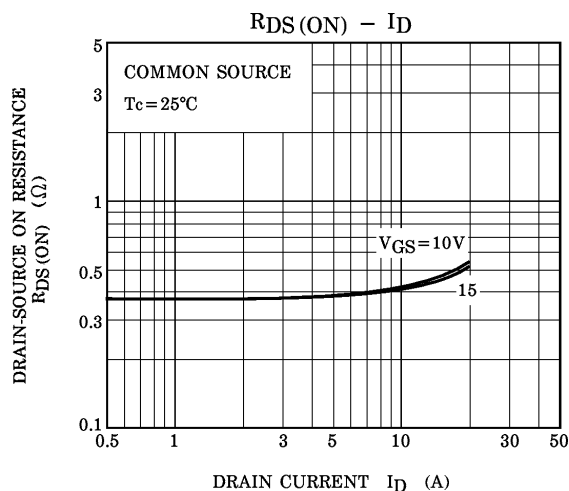
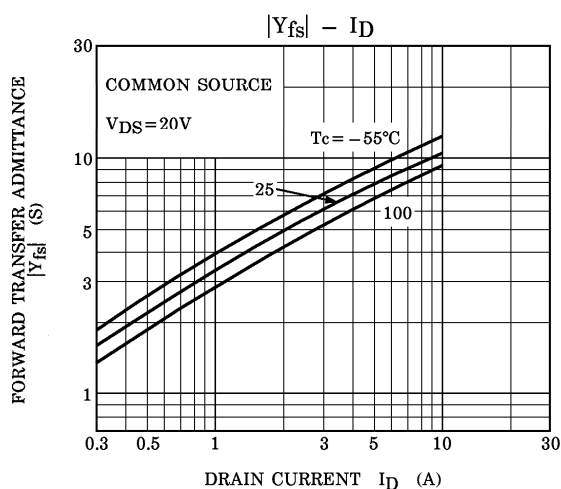
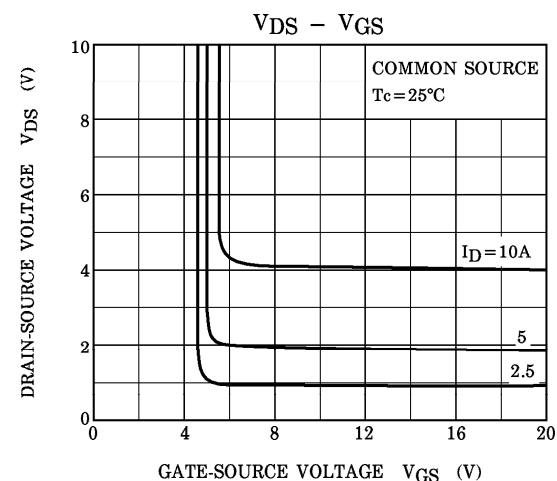
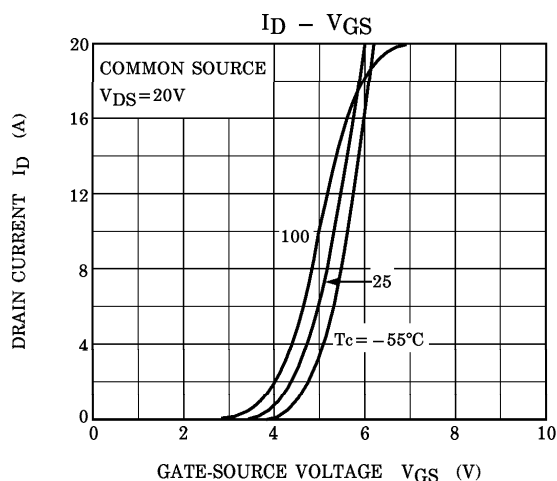
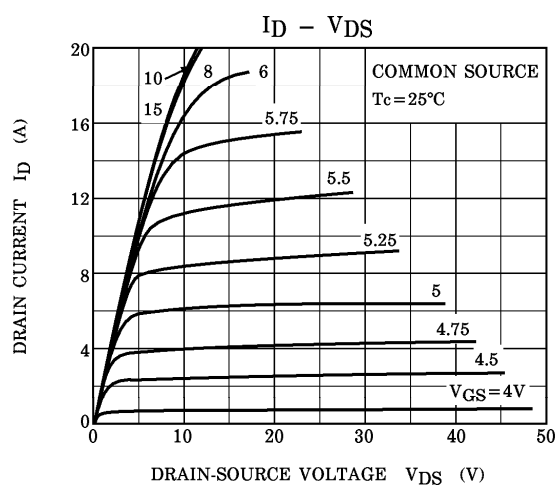
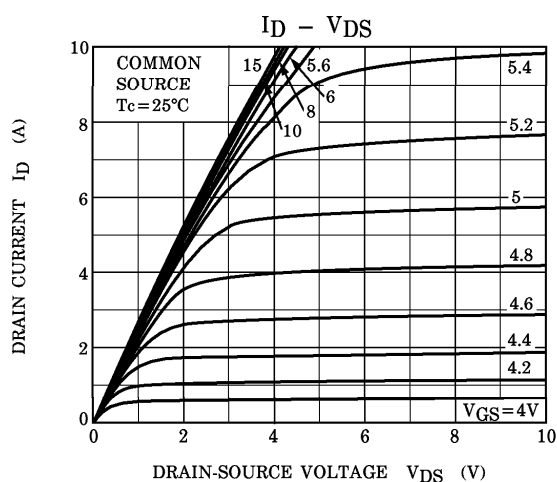
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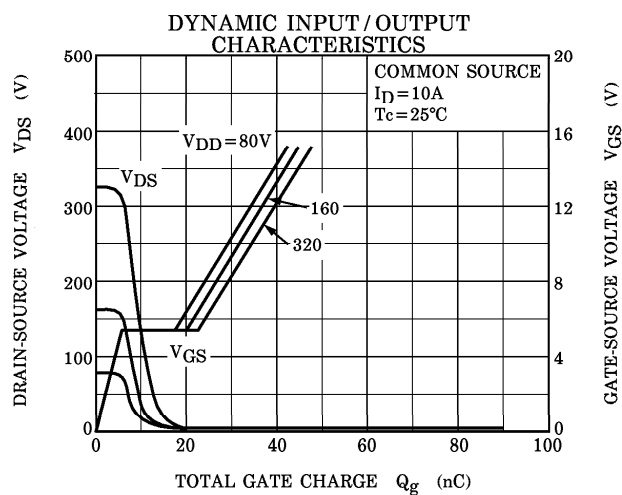
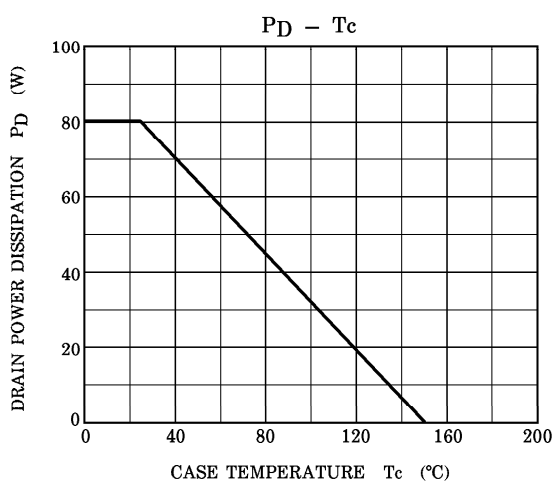
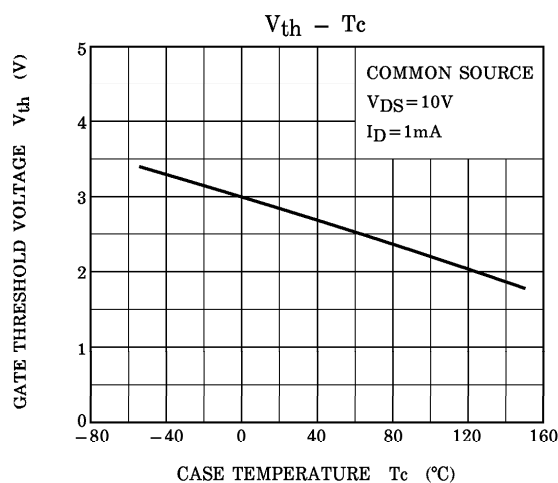
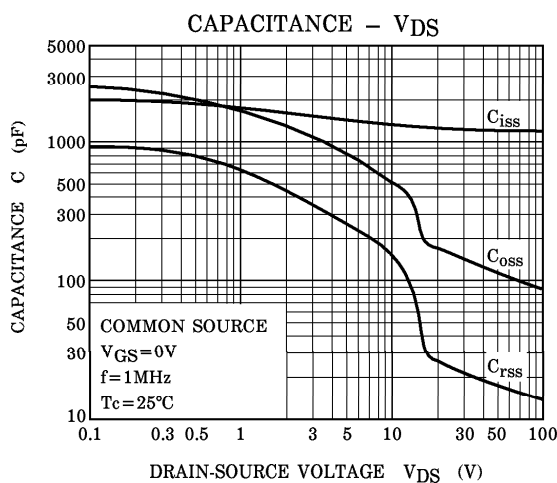
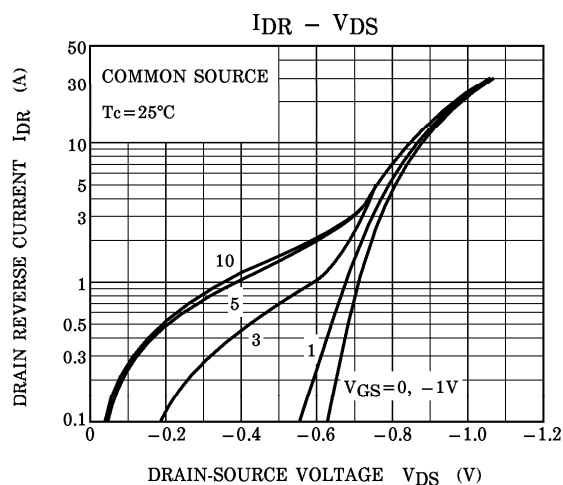
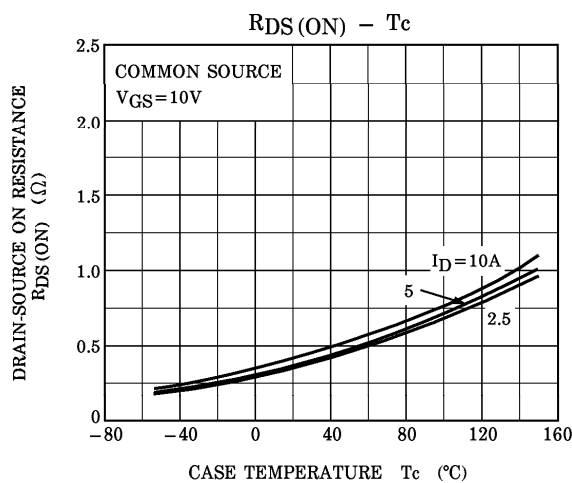
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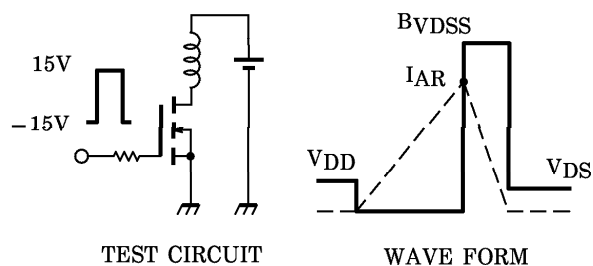
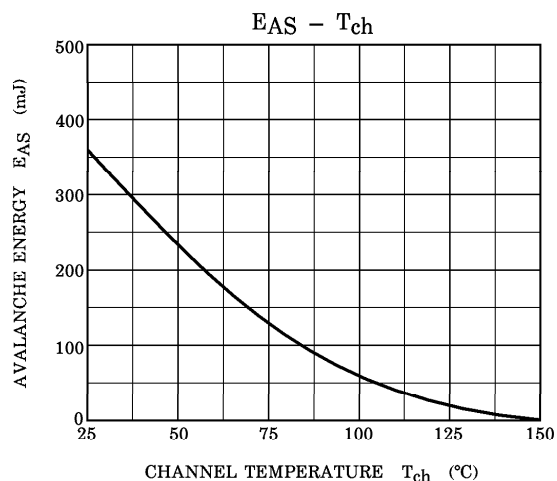
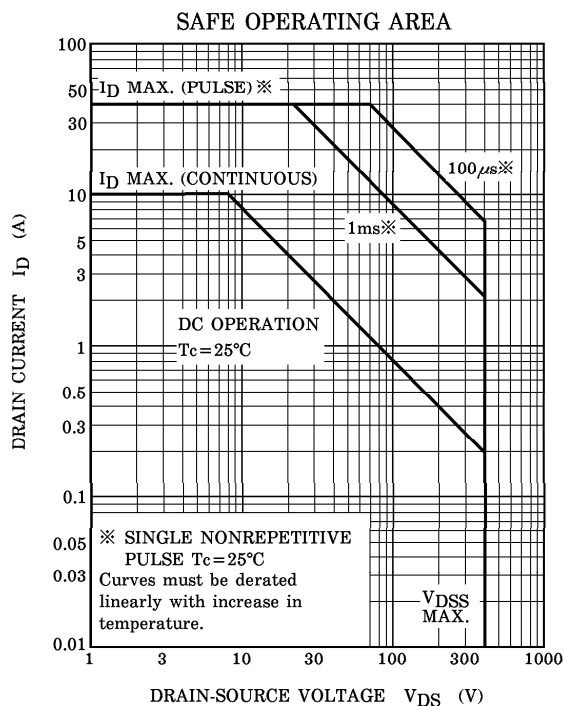
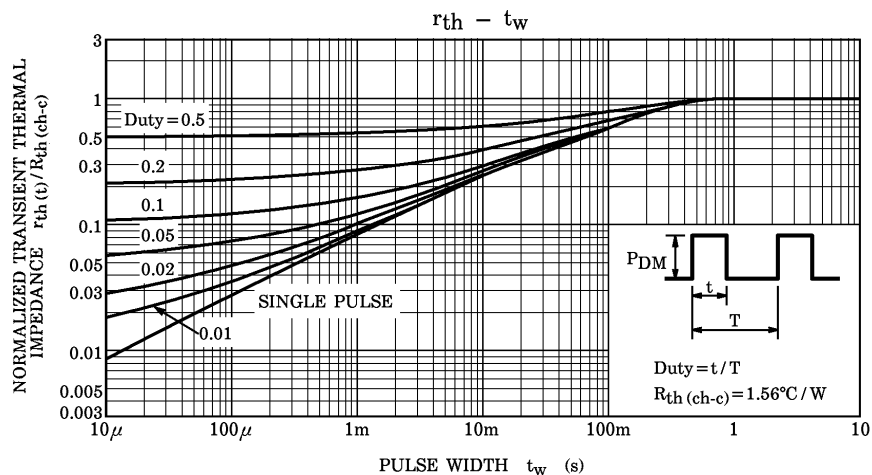


Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)







Peak $I_{AR} = 10A$, $R_G = 25\Omega$
 $V_{DD} = 90V$, $L = 5.85mH$

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