

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

2SK2401

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS
 CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.13\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 17S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 200V$)
- Enhancement-Mode : $V_{th} = 1.5 \sim 3.5V$ ($V_{DS} = 10V, I_D = 1mA$)

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	200	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)	V_{DGR}	200	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	DC	I_D	15 A
	Pulse	I_{DP}	45 A
Drain Power Dissipation ($T_c = 25^\circ C$)	P_D	75	W
Single Pulse Avalanche Energy**	E_{AS}	166	mJ
Avalanche Current	I_{AR}	15	A
Repetitive Avalanche Energy*	E_{AR}	7.5	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	$R_{th(ch-c)}$	1.67	$^\circ C / W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ C / W$

Note ;

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

** $V_{DD} = 50V$, Starting $T_{ch} = 25^\circ C$, $L = 1.2mH$
 $R_G = 25\Omega, I_{AR} = 15A$

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

INDUSTRIAL APPLICATIONS

TO-220FL Unit in mm

1. GATE
 2. DRAIN (HEAT SINK)
 3. SOURCE

JEDEC —
 EIAJ —
TOSHIBA 2-10S1B

TO-220SM Unit in mm

1. GATE
 2. DRAIN (HEAT SINK)
 3. SOURCE

JEDEC —
 EIAJ —
TOSHIBA 2-10S2B

Weight : 1.5g

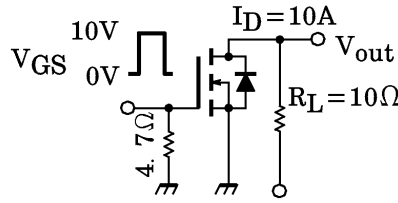
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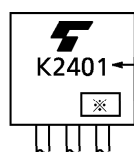
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	± 10	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = 200V, V_{GS} = 0V$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR) DSS}$	$I_D = 10mA, V_{GS} = 0V$	200	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = 10V, I_D = 1mA$	1.5	—	3.5	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 10A$	—	0.13	0.18	Ω
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = 10V, I_D = 10A$	10	17	—	S
Input Capacitance		C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	—	2000	—	pF
Reverse Transfer Capacitance		C_{rss}		—	200	—	
Output Capacitance		C_{oss}		—	600	—	
Switching Time	Rise Time	t_r	 <p>$I_D = 10A$ $V_{GS} = 10V, 0V$ $R_L = 10\Omega$ $V_{DD} \doteq 100V$</p>	—	35	—	ns
	Turn-on Time	t_{on}		—	50	—	
	Fall Time	t_f		—	10	—	
	Turn-off Time	t_{off}		$V_{IN} : t_r, t_f < 5ns,$ $Duty \leq 1\%, t_w = 10\mu s$	—	66	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \doteq 100V, V_{GS} = 10V, I_D = 15A$	—	40	—	nC
Gate-Source Charge		Q_{gs}		—	25	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	15	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	15	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	45	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 15A, V_{GS} = 0V$	—	—	-2.0	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 15A, V_{GS} = 0V$	—	180	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR} / dt = 100A / \mu s$	—	1.13	—	μC

MARKING

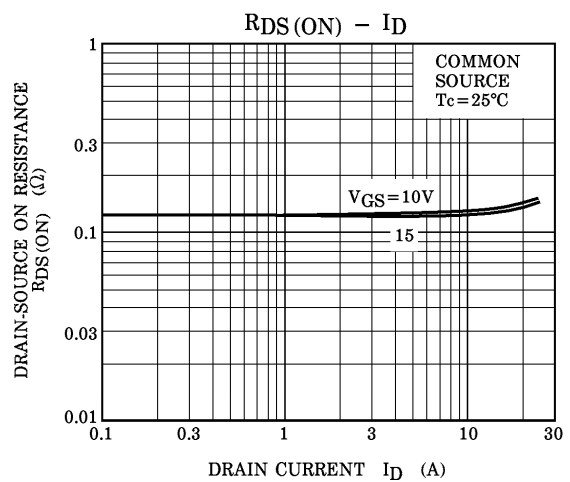
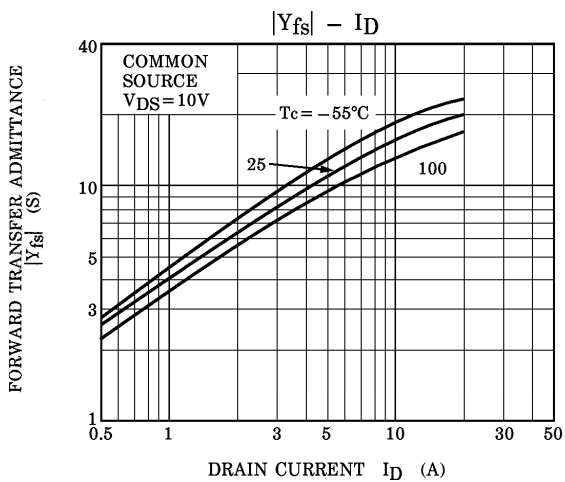
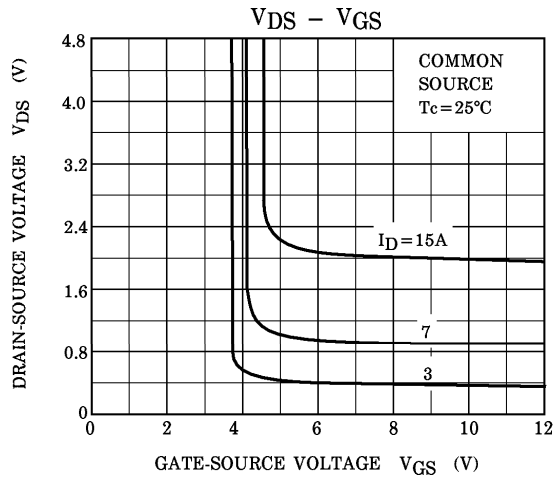
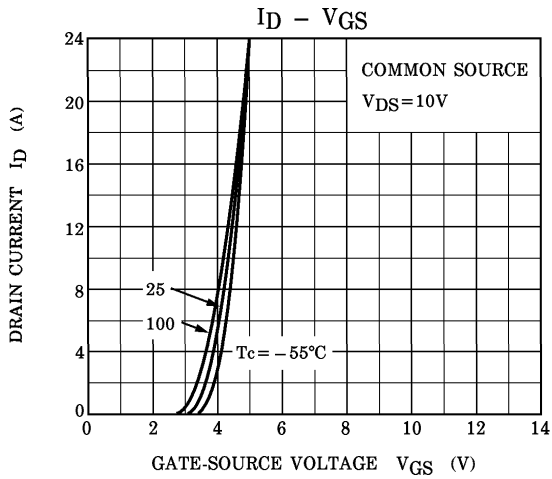
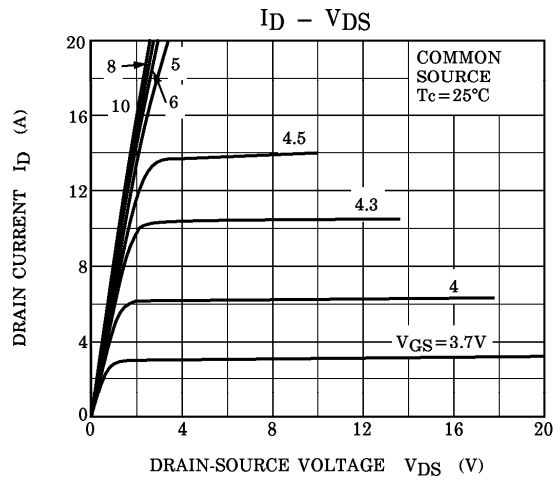
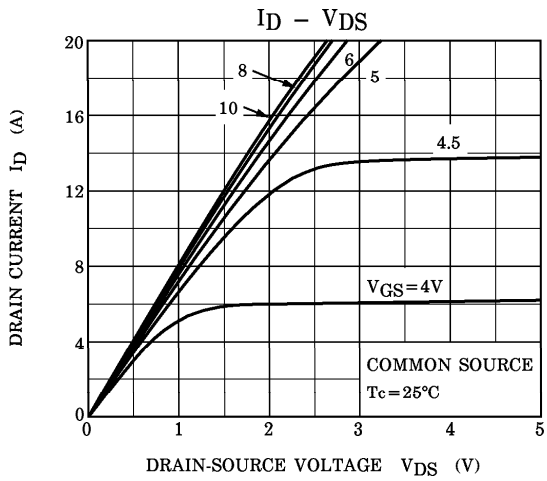


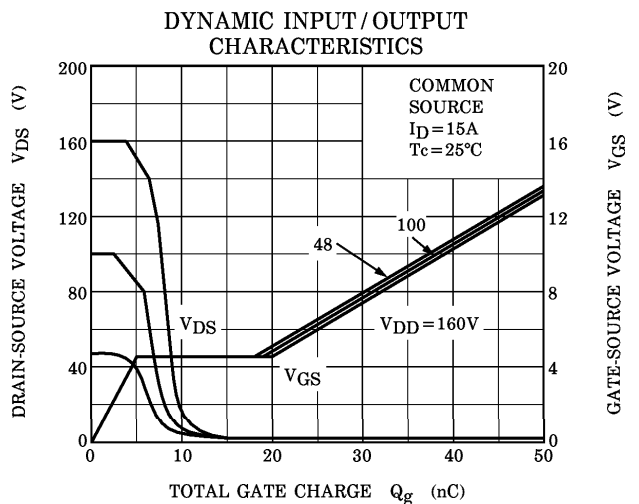
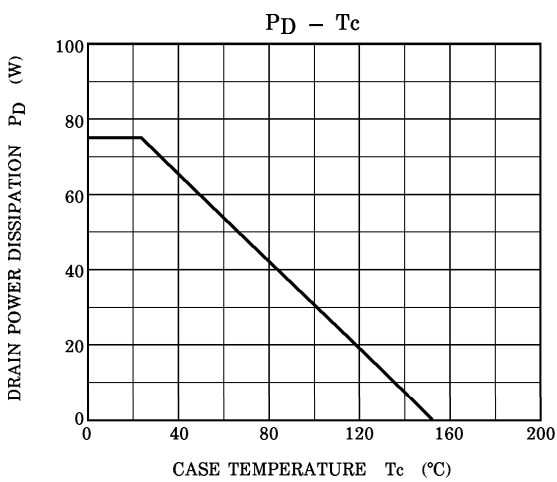
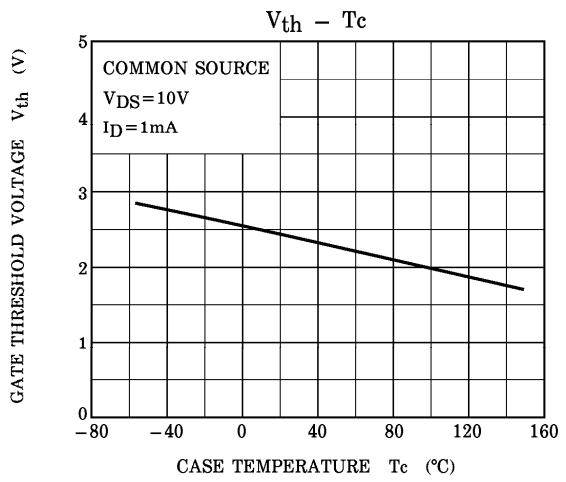
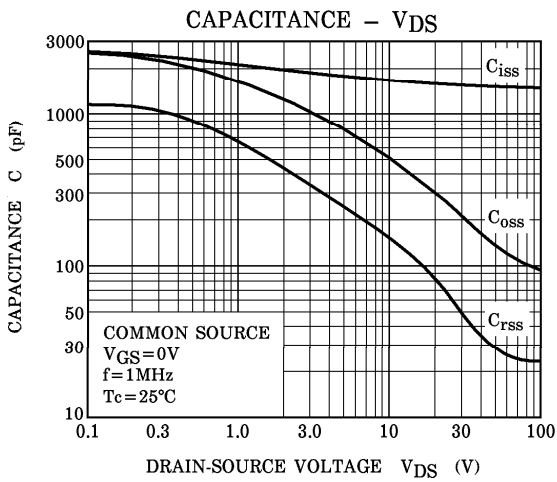
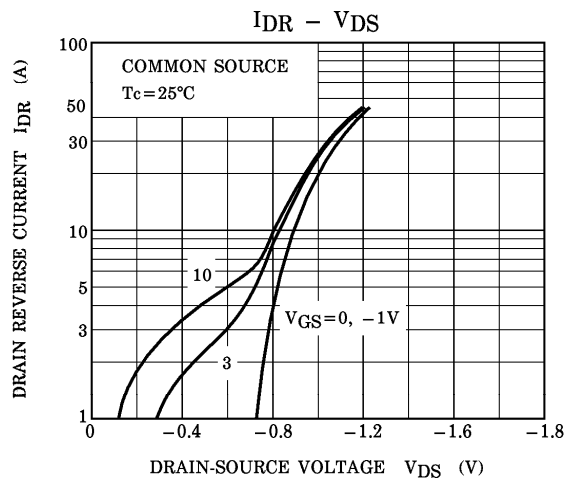
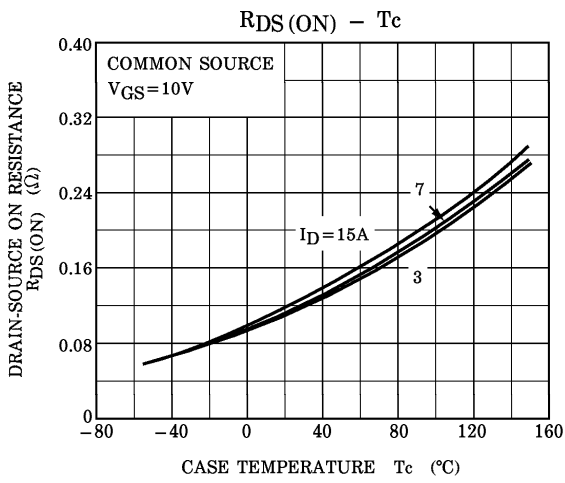
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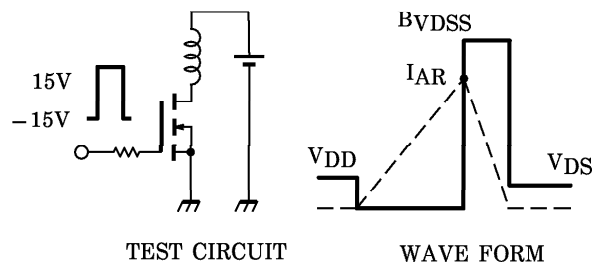
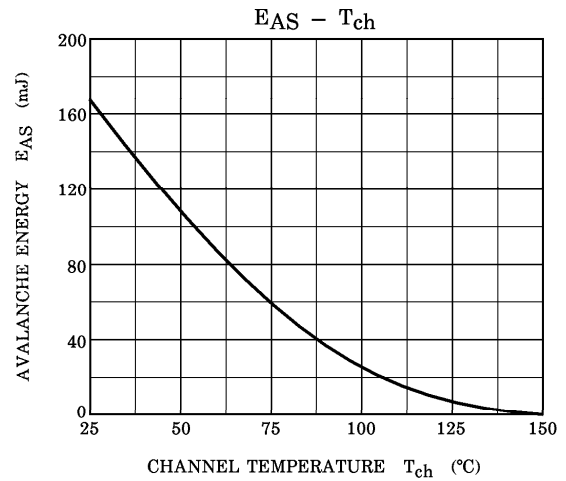
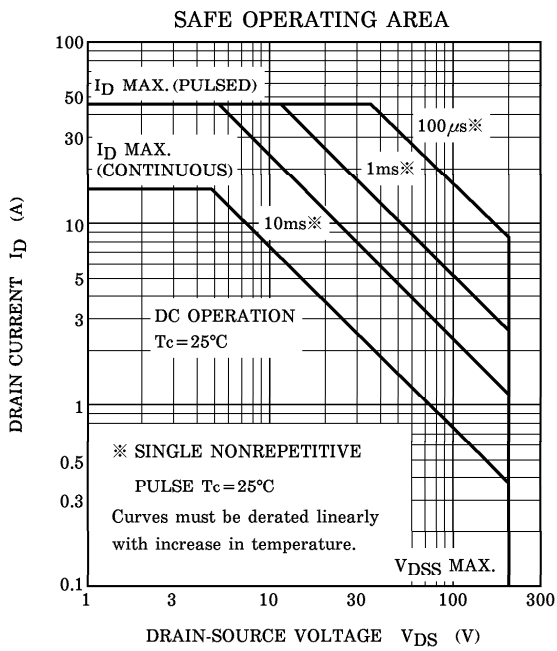
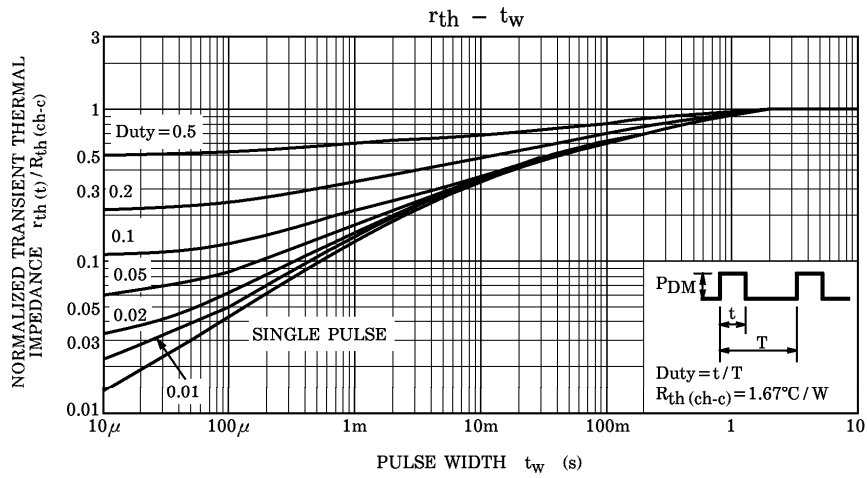
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR} = 15A$, $R_G = 25\Omega$
 $V_{DD} = 50V$, $L = 1.2mH$

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