

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

2SK3132

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.07 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 33 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu\text{A}$ (Max.) ($V_{DS} = 500 \text{ V}$)
- Enhancement-Mode : $V_{th} = 2.4 \sim 3.4 \text{ V}$
($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	500	V
Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	500	V
Gate-Source Voltage	V_{GSS}	± 30	V
DC Drain Current	DC I_D	50	A
	Pulse I_{DP}	200	A
Drain Power Dissipation ($T_c = 25^\circ\text{C}$)	P_D	250	W
Single Pulse Avalanche Energy**	E_{AS}	525	mJ
Avalanche Current	I_{AR}	50	A
Repetitive Avalanche Energy*	E_{AR}	25	mJ
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	0.5	$^\circ\text{C/W}$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	35.7	$^\circ\text{C/W}$

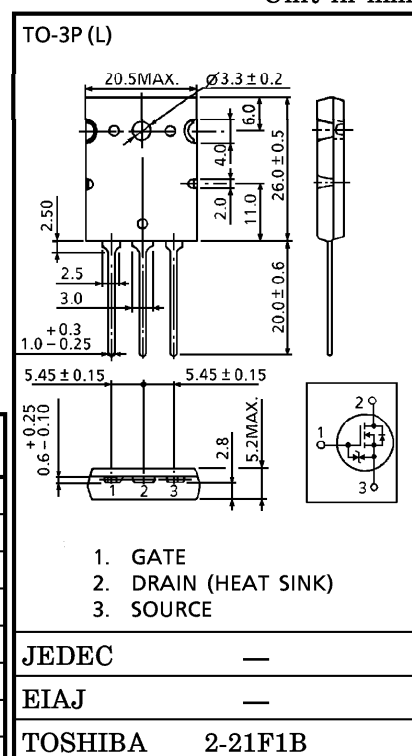
Note ;

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

** $V_{DD} = 90 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 357 \mu\text{H}$, $R_G = 25 \Omega$, $I_{AR} = 50 \text{ A}$ **This transistor is an electrostatic sensitive device.****Please handle with caution.**

INDUSTRIAL APPLICATIONS

Unit in mm



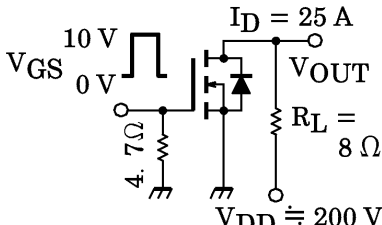
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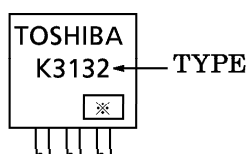
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I _{GSS}	V _{GS} = ±25 V, V _{DS} = 0 V	—	—	±10	μA
Gate-Source Breakdown Voltage		V (BR) GSS	I _G = ±10 μA, V _{DS} = 0 V	±30	—	—	V
Drain Cut-off Current		I _{DSS}	V _{DS} = 500 V, V _{GS} = 0 V	—	—	100	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	500	—	—	V
Gate Threshold Voltage		V _{th}	V _{DS} = 10 V, I _D = 1 mA	2.4	—	3.4	V
Drain-Source ON Resistance		R _{DS(ON)}	V _{GS} = 10 V, I _D = 25 A	—	0.07	0.095	Ω
Forward Transfer Admittance		Y _{fs}	V _{DS} = 10 V, I _D = 25 A	15	33	—	S
Input Capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	11000	—	pF
Reverse Transfer Capacitance		C _{rss}		—	2100	—	
Output Capacitance		C _{oss}		—	4200	—	
Switching Time	Rise Time	t _r		—	105	—	ns
	Turn-on Time	t _{on}		—	160	—	
	Fall Time	t _f		—	65	—	
	Turn-off Time	t _{off}		—	245	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q _g	V _{DD} ≐ 400 V, V _{GS} = 10 V, I _D = 50 A	—	280	—	nC
Gate-Source Charge		Q _{gs}		—	150	—	
Gate-Drain ("Miller") Charge		Q _{gd}		—	130	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I _{DR}	—	—	—	50	A
Pulse Drain Reverse Current	I _{DRP}	—	—	—	200	A
Diode Forward Voltage	V _{DSF}	I _{DR} = 25 A, V _{GS} = 0 V	—	—	−1.7	V
Reverse Recovery Time	t _{rr}	I _{DR} = 50 A, V _{GS} = 0 V	—	600	—	ns
Reverse Recovery Charge	Q _{rr}	dI _{DR} / dt = 100 A / μs	—	12	—	μC

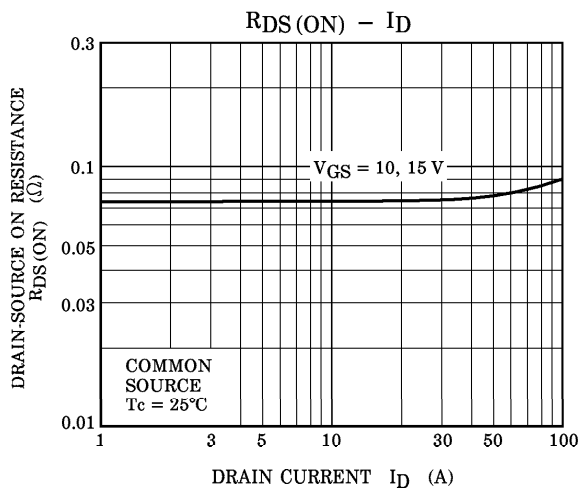
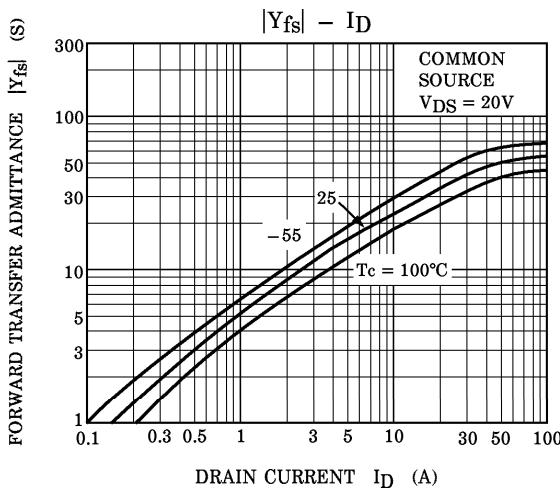
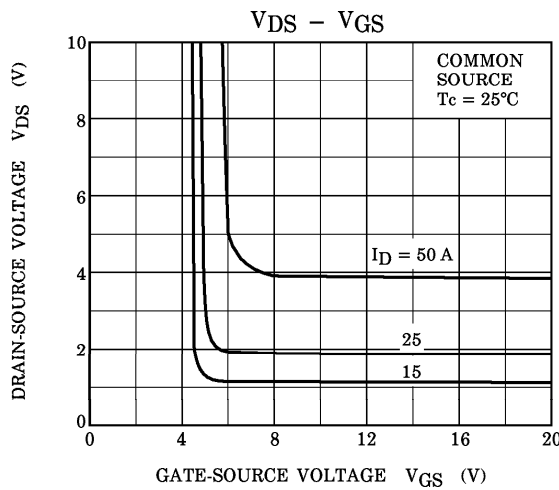
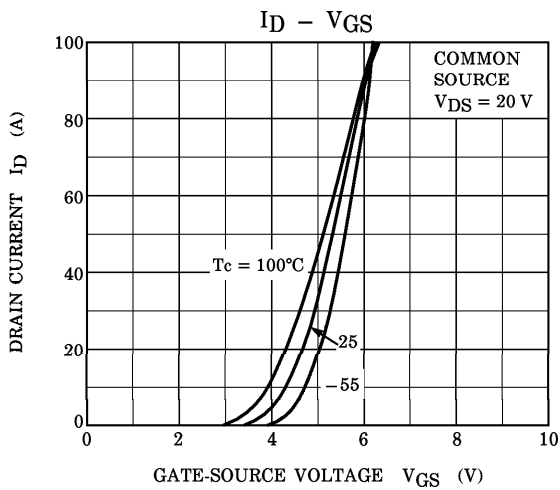
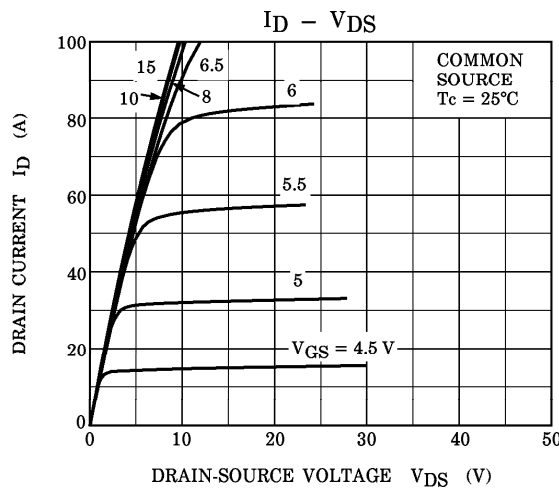
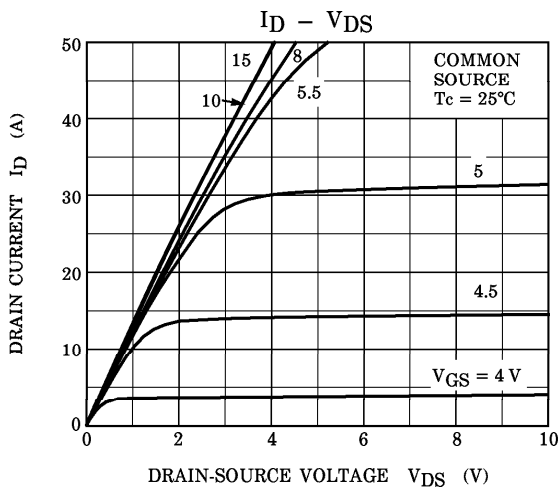
MARKING

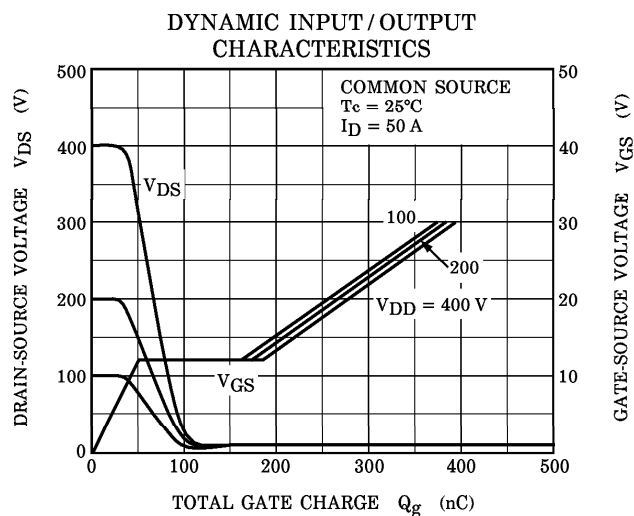
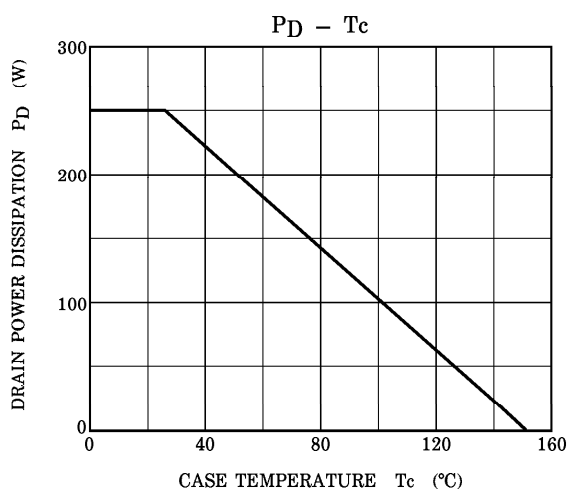
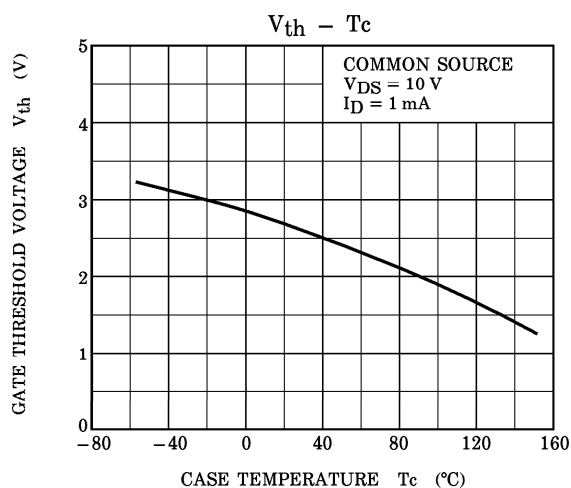
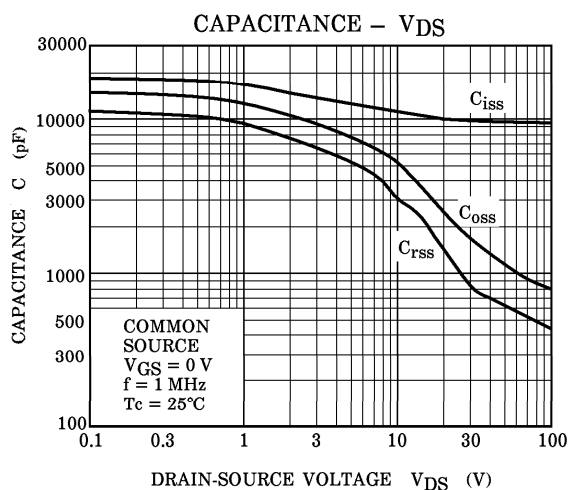
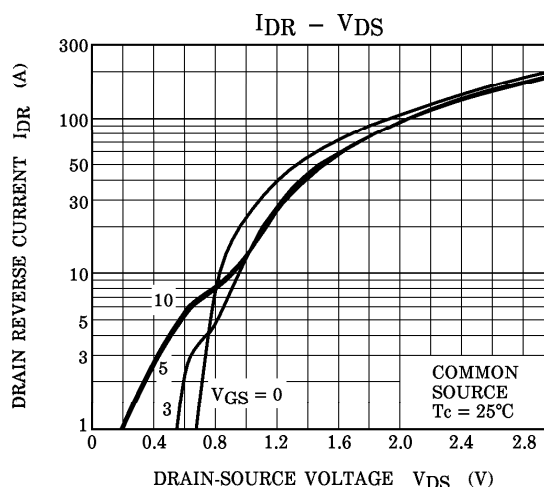
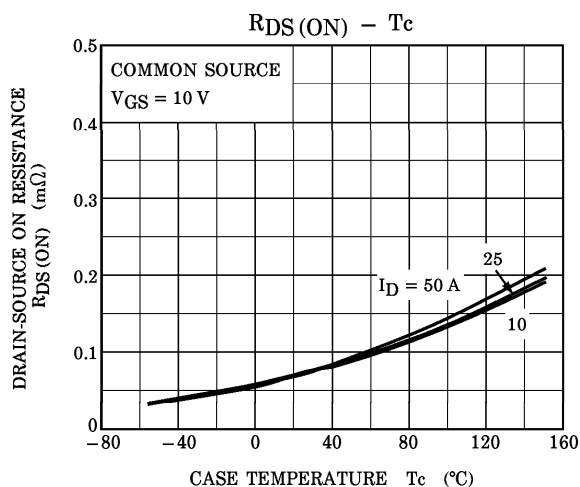


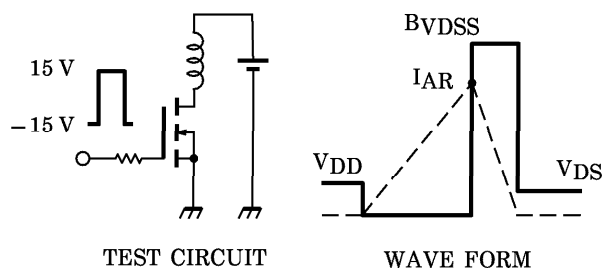
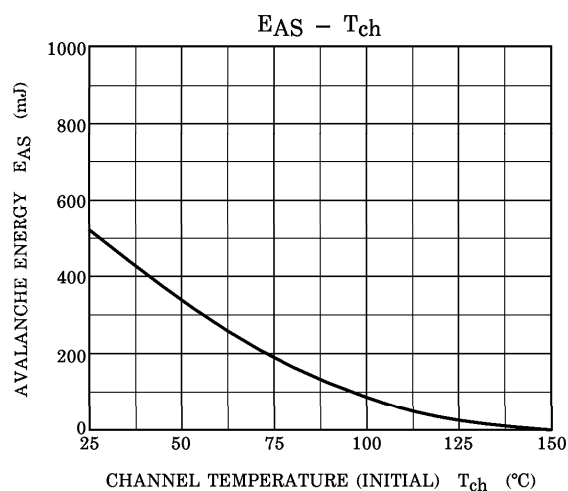
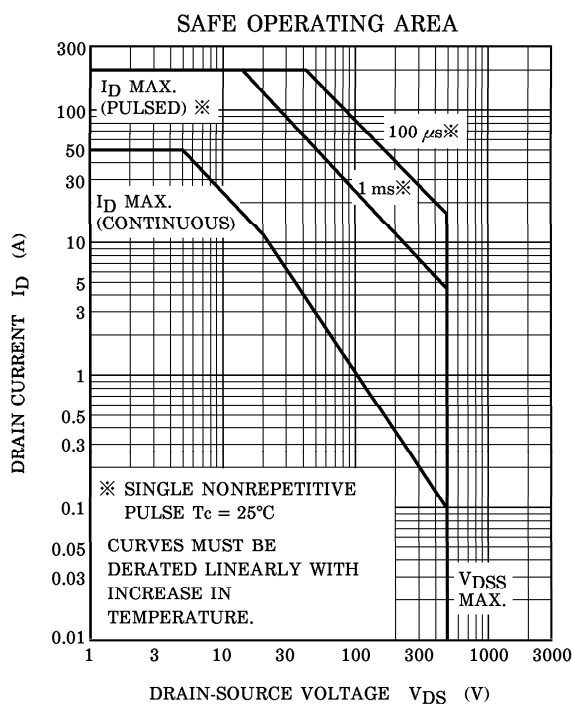
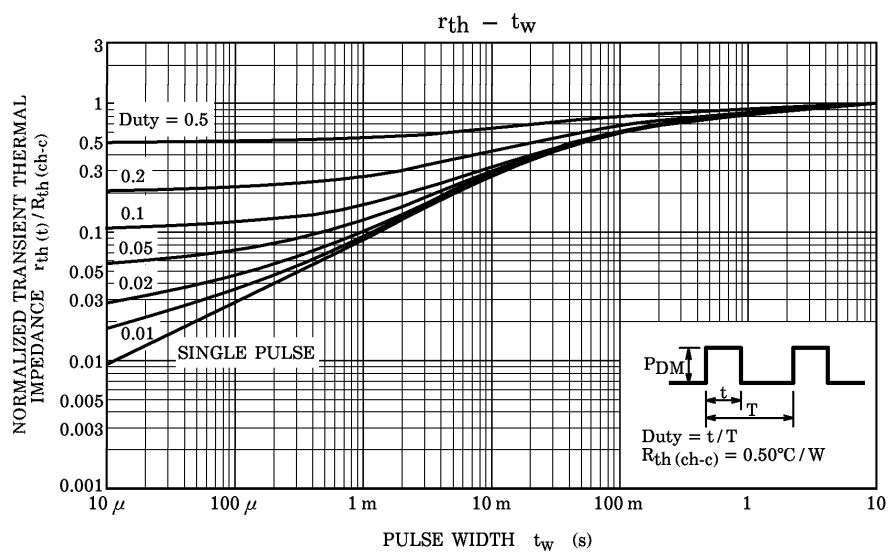
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR} = 50$ A, $R_G = 25 \Omega$
 $V_{DD} = 90$ V, $L = 357 \mu\text{H}$

$$EAS = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$$