

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L²-π-MOSV)

2SK2963

HIGH SPEED APPLICATIONS

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

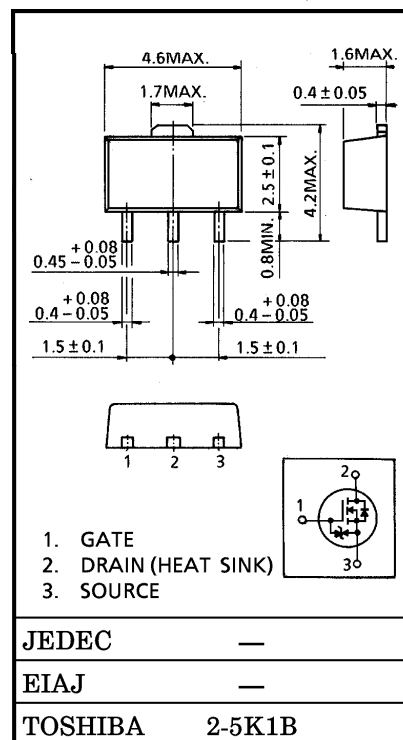
- 4V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)}=0.5\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}|=1.2S$ (Typ.)
- Low Leakage Current : $I_{DSS}=100\mu A$ (max.) ($V_{DS}=100V$)
- Enhancement-Mode : $V_{th}=0.8\sim 2.0V$ ($V_{DS}=10V, I_D=1mA$)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Drain-Gate Voltage ($R_{GS}=20k\Omega$)		V_{DGR}	100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	1	A
	Pulse	I_{DP}	3	A
Drain Power Dissipation***		P_D	1.5	W
Single Pulse Avalanche Energy**		E_{AS}	137	mJ
Avalanche Current		I_{AR}	1	A
Repetitive Avalanche Energy*		E_{AR}	0.15	mJ
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	-55~150	°C

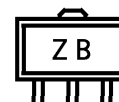
INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 0.05g (Typ.)

MARKING



THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	°C/W

Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD}=25V$, Starting $T_{ch}=25°C$, $L=221mH$, $R_G=25\Omega$, $I_{AR}=1A$
- *** Mounted on ceramic substrate (1inch²×0.8t)

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

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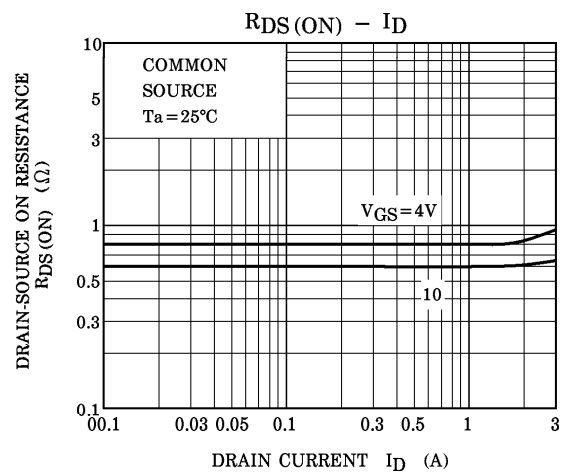
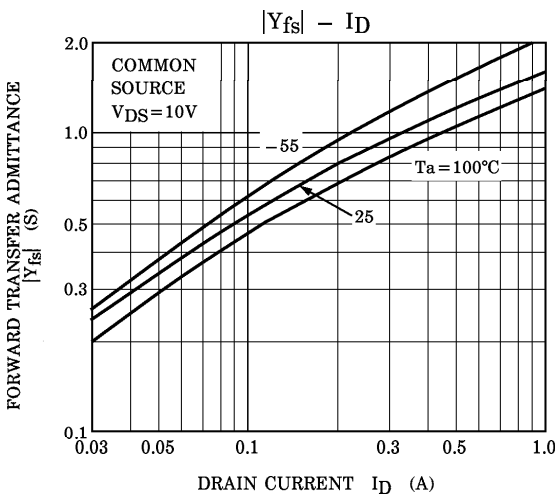
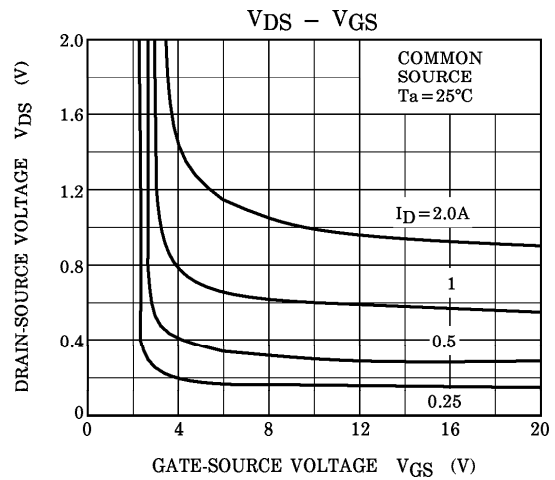
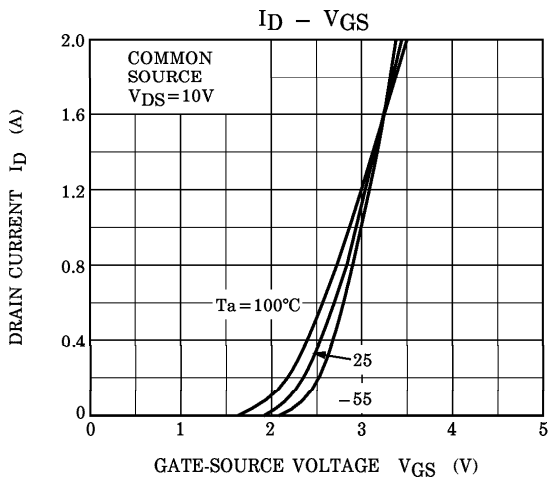
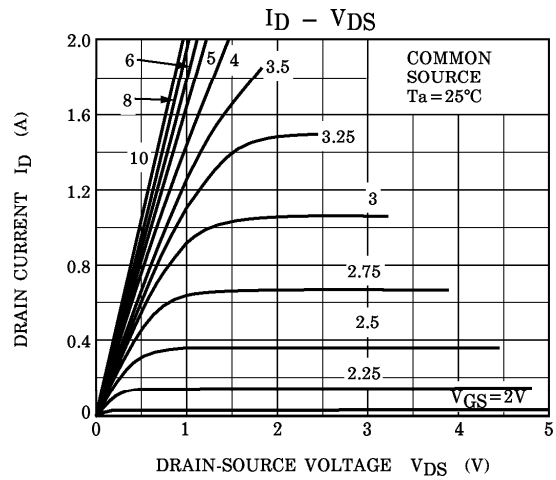
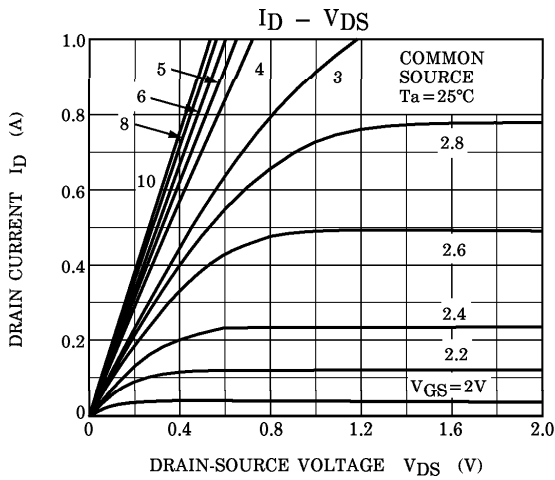
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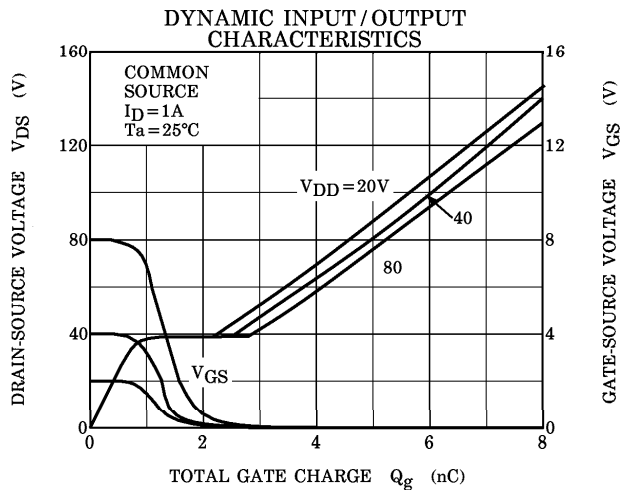
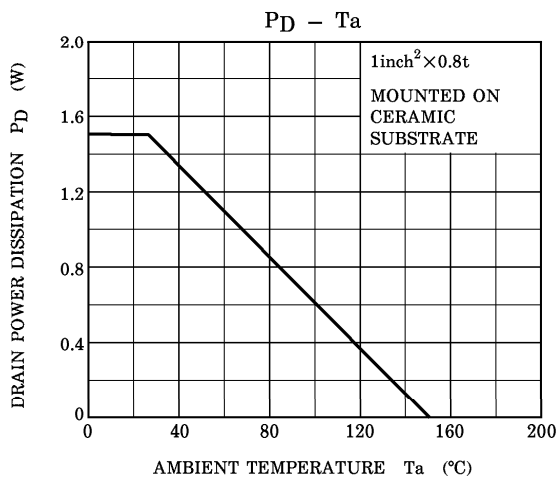
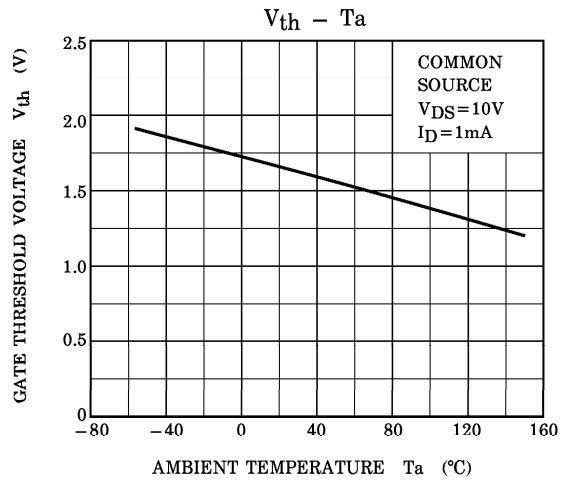
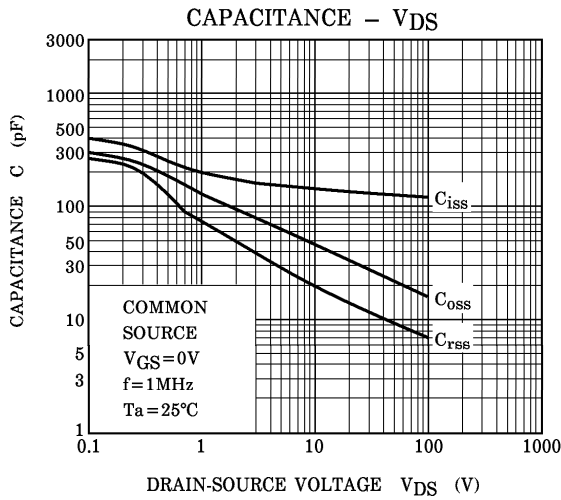
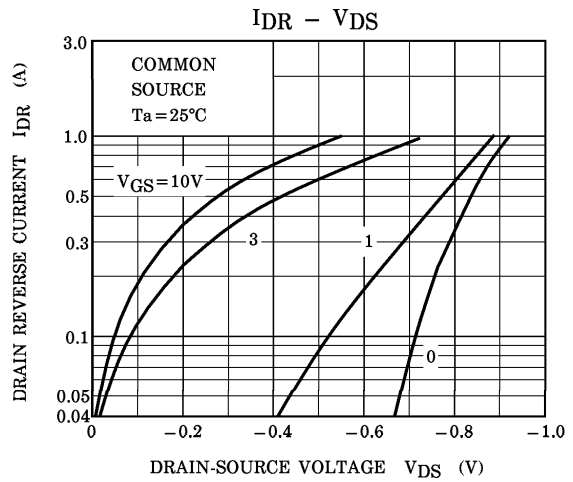
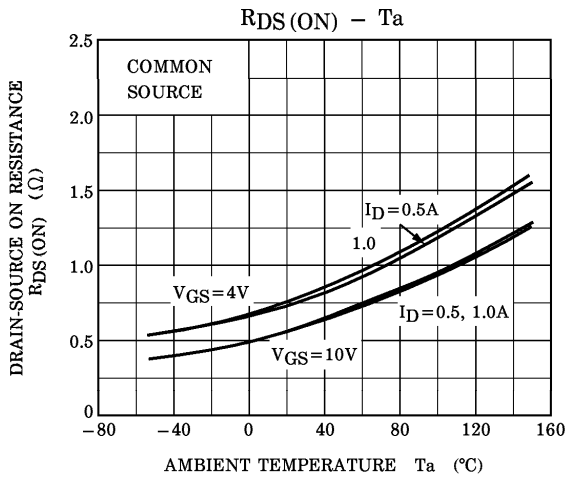
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

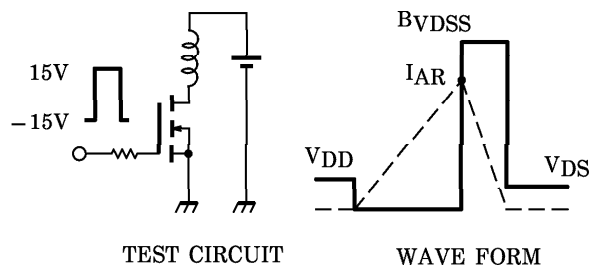
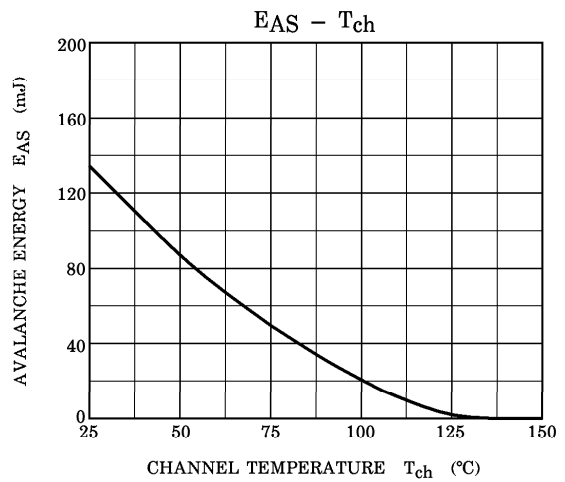
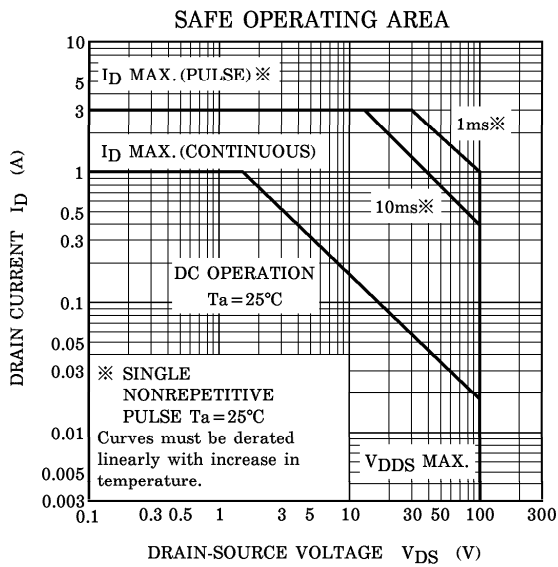
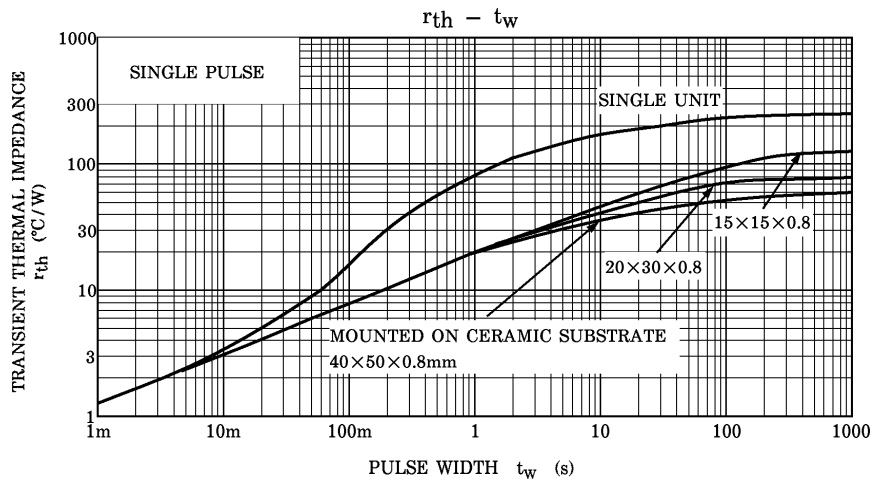
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	± 10	μA	
Drain Cut-off Current		I_{DSS}	$V_{DS} = 100V, V_{GS} = 0V$	—	—	100	μA	
Drain-Source Breakdown Voltage		$V_{(BR) DSS}$	$I_D = 10mA, V_{GS} = 0V$	100	—	—	V	
Gate Threshold Voltage		V_{th}	$V_{DS} = 10V, I_D = 1mA$	0.8	—	2.0	V	
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = 4V, I_D = 0.5A$	—	0.65	0.95	Ω	
			$V_{DS} = 10V, I_D = 0.5A$	—	0.5	0.7		
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = 10V, I_D = 0.5A$	0.6	1.2	—	S	
Input Capacitance		C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	—	140	—	pF	
Reverse Transfer Capacitance		C_{rss}		—	20	—		
Output Capacitance		C_{oss}		—	45	—		
Switching Time	Rise Time	t_r	<p>$V_{GS} = 10V, 0V$ pulse, $I_D = 0.5A$, $R_L = 50\Omega$, $V_{DD} \cong 50V$</p>	—	8	—	ns	
	Turn-on Time	t_{on}		—	13	—		
	Fall Time	t_f		—	—	45		—
	Turn-off Time	t_{off}		INPUT : $t_r, t_f < 5ns$, Duty $\leq 1\%$, $t_w = 10\mu s$	—	175		—
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \cong 80V, V_{GS} = 10V, I_D = 1A$	—	6.3	—	nC	
Gate-Source Charge		Q_{gs}		—	4.3	—		
Gate-Drain ("Miller") Charge		Q_{gd}		—	2	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	1	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	3	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 1A, V_{GS} = 0V$	—	—	-1.5	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 1A, V_{GS} = 0V$	—	80	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR} / dt = 50A / \mu s$	—	140	—	μC







Peak $I_{AR} = 1A$, $R_G = 25\Omega$
 $V_{DD} = 25V$, $L = 221mH$

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