TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (L^2-π-MOSV)

2SK2961

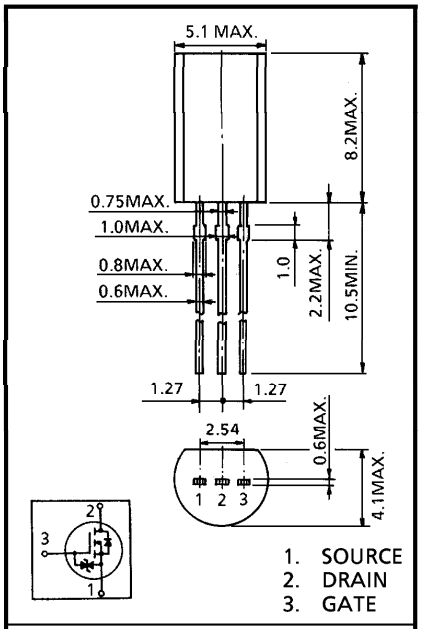
HIGH SPEED SWITCHING APPLICATIONS

RELAY DRIVE, MOTOR DRIVE AND DC-DC CONVERTER APPLICATION

INDUSTRIAL APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS\,(ON)} = 0.2\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 2.0S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ ($V_{DS} = 60V$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.0V$ ($V_{DS} = 10V$, $I_D = 1mA$)

Unit in mm



JEDEC	TO-92MOD
EIAJ	—
TOSHIBA	2-5J1C

MAXIMUM RATINGS (Ta = 25°C)

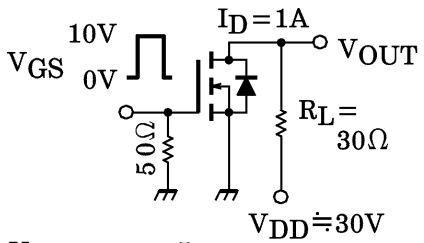
CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)		V_{DGR}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	2.0	A
	Pulse	I_{DP}	6.0	
Drain Power Dissipation		P_D	0.9	W
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th\,(ch\text{-}a)}$	138	°C / W

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

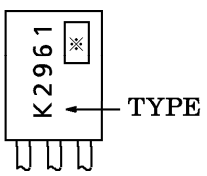
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±16V, V_{DS} = 0V	—	—	±10	μA
Drain Cut-off Current		I_{DSS}	V_{DS} = 60V, V_{GS} = 0V	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)\ DSS}$	I_D = 10mA, V_{GS} = 0V	60	—	—	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 = 1.0A	—	0.26	0.38	Ω
			V_{GS} = 10V, I_D = 1.0A	—	0.20	0.27	
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 10V, I_D = 1.0A	1.0	2.0	—	S
Input Capacitance		C_{iss}	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz	—	170	—	pF
Reverse Transfer Capacitance		C_{rss}		—	25	—	
Output Capacitance		C_{oss}		—	75	—	
Switching Time	Rise Time	t_r		—	10	—	ns
	Turn-on Time	t_{on}		—	15	—	
	Fall Time	t_f		—	50	—	
	Turn-off Time	t_{off}	V_{IN} : t_r, t_f < 5ns, Duty ≦ 1%, t_w = 10μs	—	170	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} ≒ 48V, V_{GS} = 10V, I_D = 2A	—	5.8	—	nC
Gate-Source Charge		Q_{gs}		—	4.1	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	1.7	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	2.0	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	6.0	A
Diode Forward Voltage	V_{DSF}	I_{DR} = 2A, V_{GS} = 0V	—	—	−1.5	V
Reverse Recovery Time	t_{rr}	I_{DR} = 2A, V_{GS} = 0V	—	45	—	ns
Reverse Recovery Charge	Q_{rr}	dI_{DR} / dt = 50A / μs	—	40.5	—	nC

MARKING

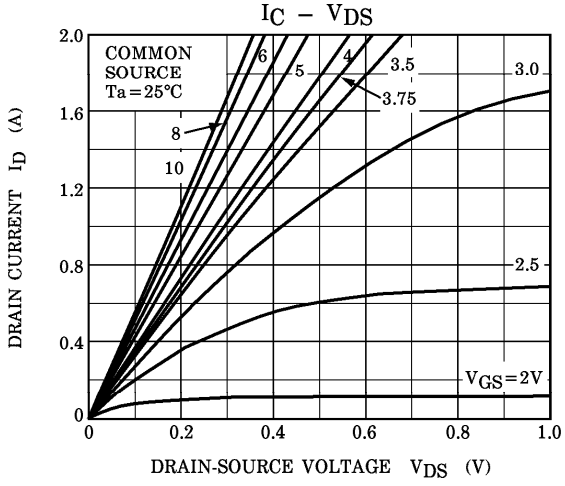


※ Lot Number

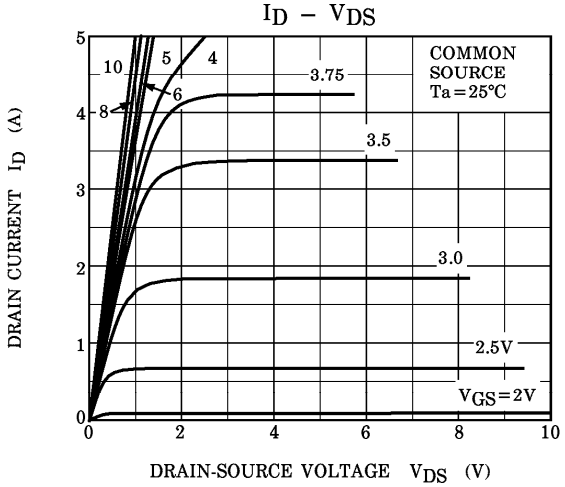
□□ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)

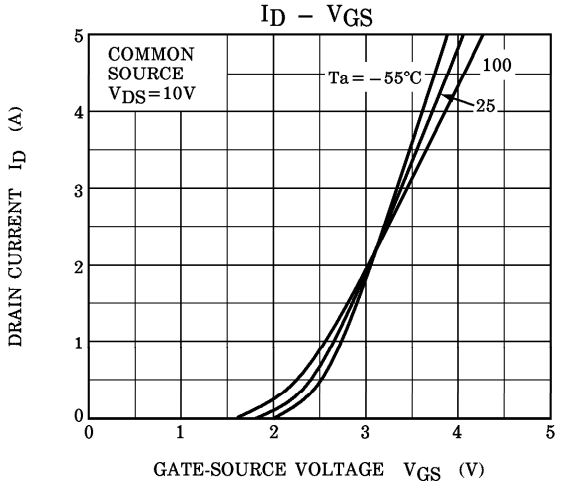
$I_C - V_{DS}$



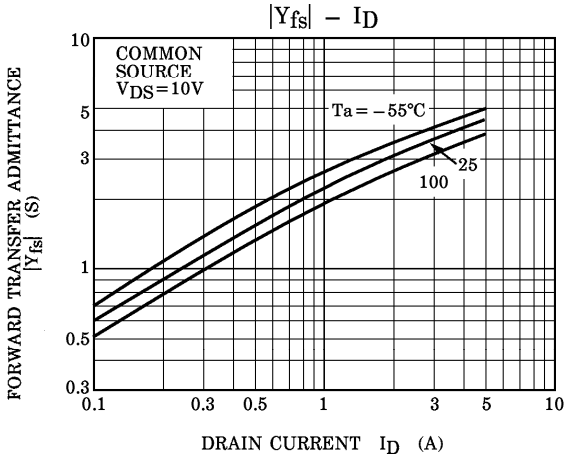
$I_D - V_{DS}$



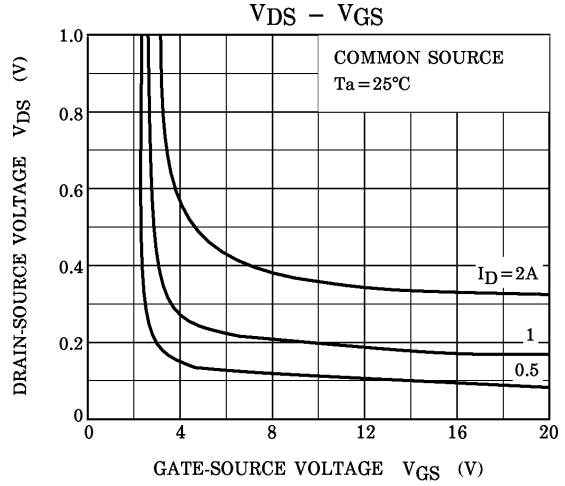
$I_D - V_{GS}$



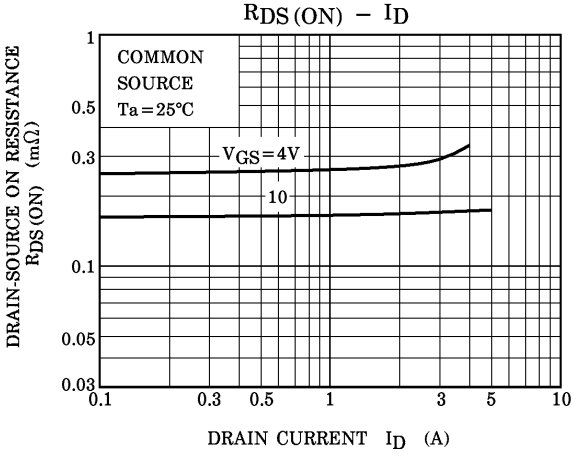
$|Y_{fs}| - I_D$



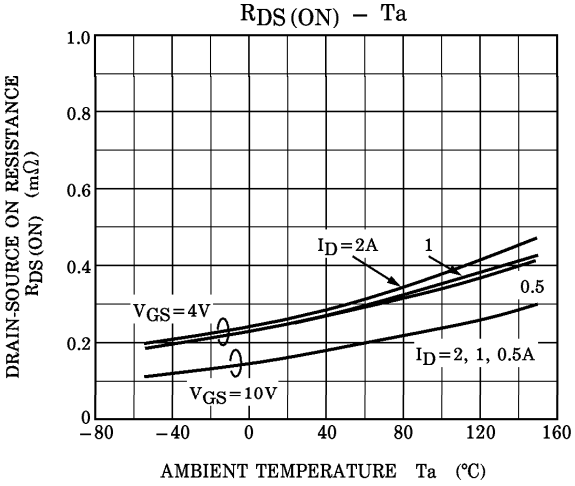
$V_{DS} - V_{GS}$



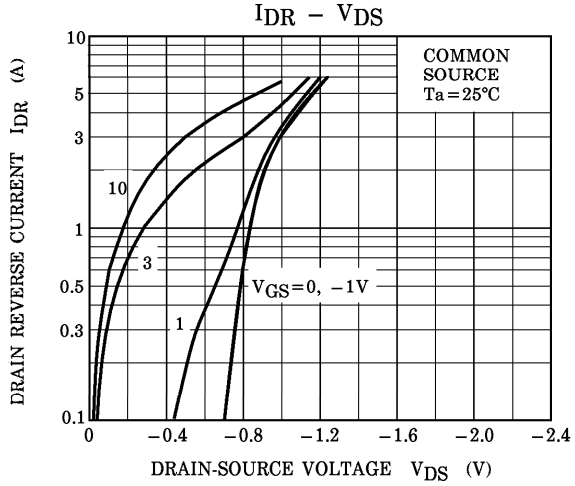
$R_{DS(ON)} - I_D$



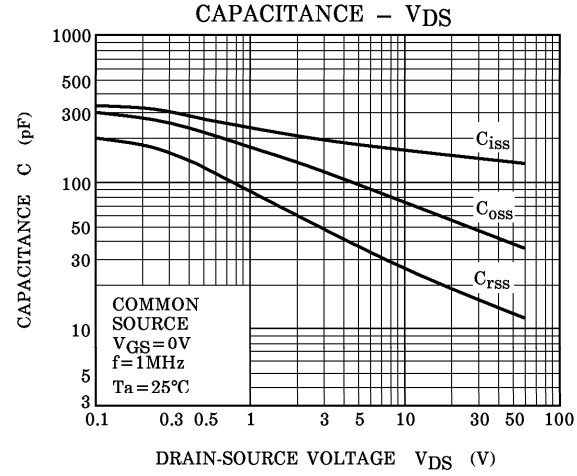
$R_{DS\,(ON)}$ – Ta



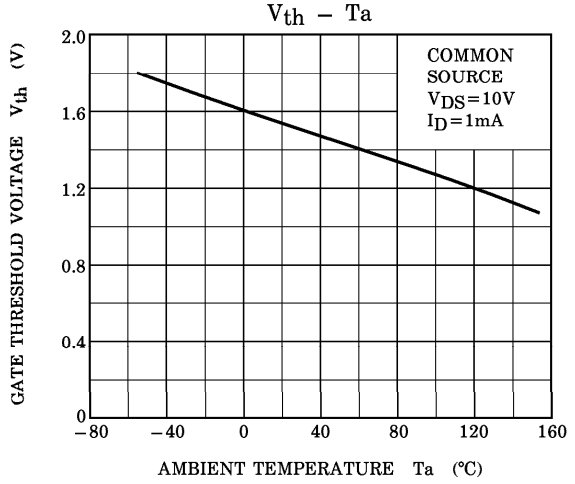
I_{DR} – V_{DS}



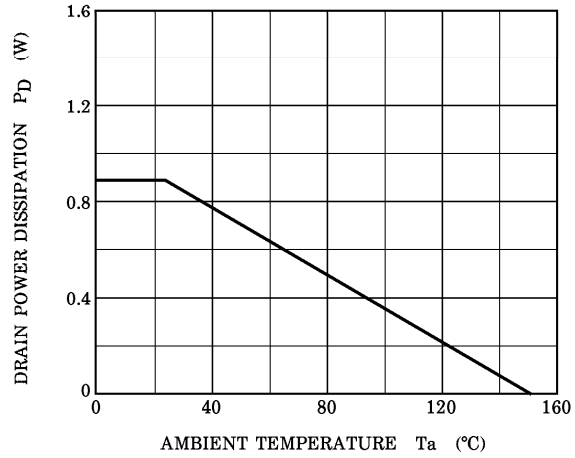
CAPACITANCE – V_{DS}



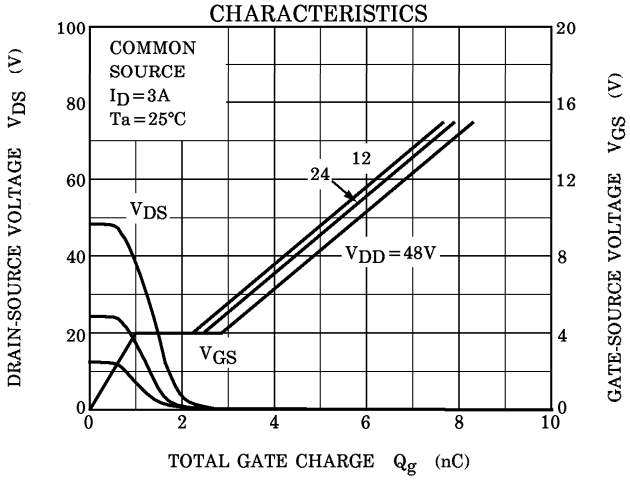
V_{th} – Ta

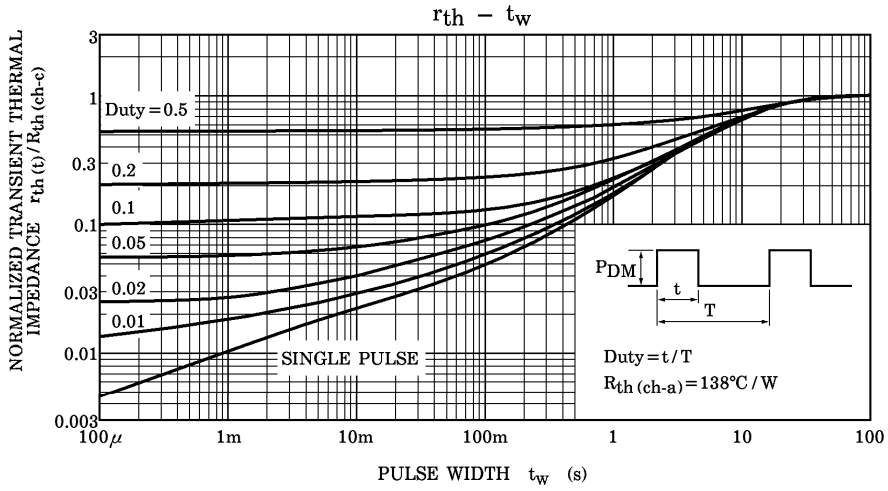


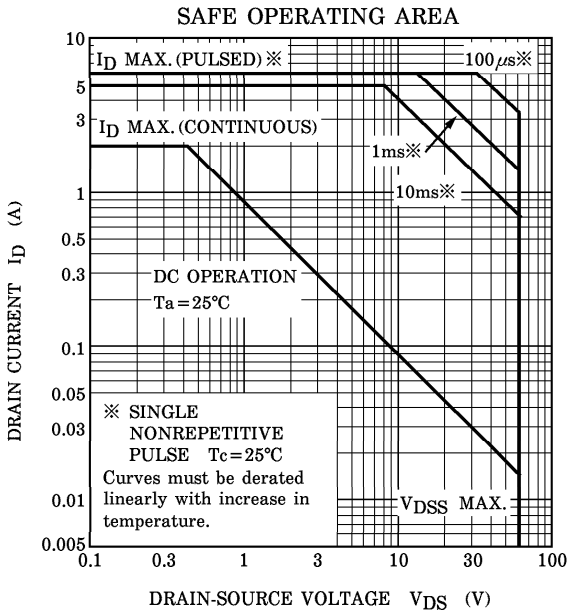
P_D – Ta



DYNAMIC INPUT / OUTPUT CHARACTERISTICS




r_{th} – t_W
NORMALIZED TRANSIENT THERMAL IMPEDANCE r_{th} (t)/R_{th} (ch-c)
Duty = 0.5
0.2
0.1
0.05
0.02
0.01
SINGLE PULSE
P_{DM}
t
T
Duty = t / T
R_{th} (ch-a) = 138°C / W
PULSE WIDTH t_W (s)


SAFE OPERATING AREA
I_D MAX. (PULSED) ※
100μs※
I_D MAX. (CONTINUOUS)
1ms※
10ms※
DC OPERATION
Ta = 25°C
※ SINGLE NONREPETITIVE PULSE Tc = 25°C
Curves must be derated linearly with increase in temperature.
V_{DSS} MAX.
DRAIN CURRENT I_D (A)
DRAIN-SOURCE VOLTAGE V_{DS} (V)