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

2SK2836

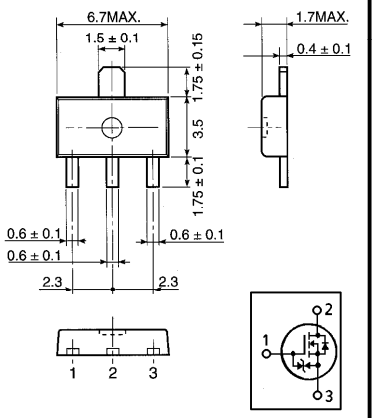
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS\,(ON)}=6.4\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}|=0.85S$ (Typ.)
- Low Leakage Current : $I_{DSS}=100\mu A$ (Max) ($V_{DSS}=600V$)
- Enhancement-Mode : $V_{th}=2.0\sim4.0V$ ($V_{DS}=10V$, $I_D=1mA$)

Unit in mm

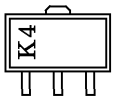


1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

JEDEC	—
EIAJ	—
TOSHIBA	2-7H1B

Weight : 0.12g (Typ.)

MARKING



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Drain-Gate Voltage ($R_{GS}=20k\Omega$)		V_{DGR}	600	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	DC	I_D	1	A
	Pulse	I_{DP}	2	A
Drain Power Dissipation***		P_D	2.5	W
Single Pulse Avalanche Energy**		E_{AS}	56	mJ
Avalanche Current		I_{AR}	1	A
Repetitive Avalanche Energy*		E_{AR}	0.25	mJ
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	$R_{th\,(ch-a)}$	50	°C / W

Note ;

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

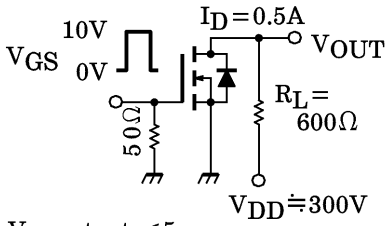
** $V_{DD}=90V$, Starting $T_{ch}=25°C$, $L=100mH$, $R_G=25\Omega$, $I_{AR}=1A$

*** Mounted on ceramic substrate ($1inch^2\times0.8t$)

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

961001EAA1

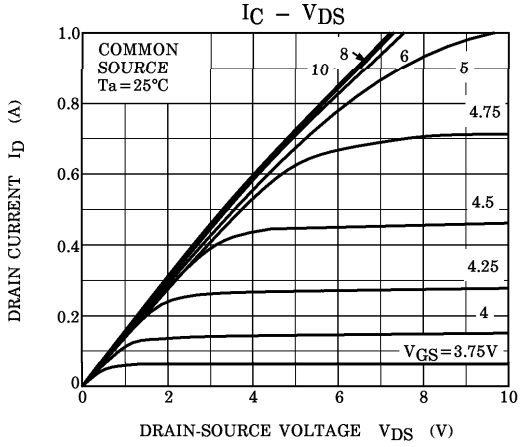
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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}	$V_{DS} = 600V$, $V_{GS} = 0V$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)\,DSS}$	$I_D = 10mA$, $V_{GS} = 0V$	600	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = 10V$, $I_D = 1mA$	2.0	—	4.0	V
Drain-Source ON Resistance		$R_{DS\,(ON)}$	$V_{GS} = 10V$, $I_D = 0.5A$	—	6.4	9.0	Ω
Forward Transfer Admittance		$\|Y_{fs}\|$	$V_{DS} = 10V$, $I_D = 0.5A$	0.4	0.85	—	S
Input Capacitance		C_{iss}	$V_{DS} = 10V$, $V_{GS} = 0V$ f = 1MHz	—	190	—	pF
Reverse Transfer Capacitance		C_{rss}		—	15	—	
Output Capacitance		C_{oss}		—	55	—	
Switching Time	Rise Time	t_r		—	12	—	ns
	Turn-on Time	t_{on}		—	55	—	
	Fall Time	t_f		—	40	—	
	Turn-off Time	t_{off}	V_{IN} : t_r, $t_f < 5ns$, Duty ≦ 1%, $t_w = 10\mu s$	—	90	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \fallingdotseq 400V$, $V_{GS} = 10V$ $I_D = 1A$	—	9	—	nC
Gate-Source Charge		Q_{gs}		—	3.5	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	5.5	—	

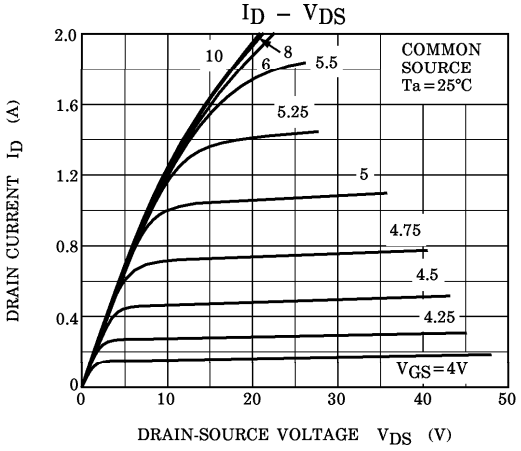
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	1	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	2	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 1A$, $V_{GS} = 0V$	—	—	−1.7	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 1A$, $V_{GS} = 0V$ $dI_{DR}/dt = 100A/\mu s$	—	145	—	ns
Reverse Recovery Charge	Q_{rr}		—	0.46	—	μC

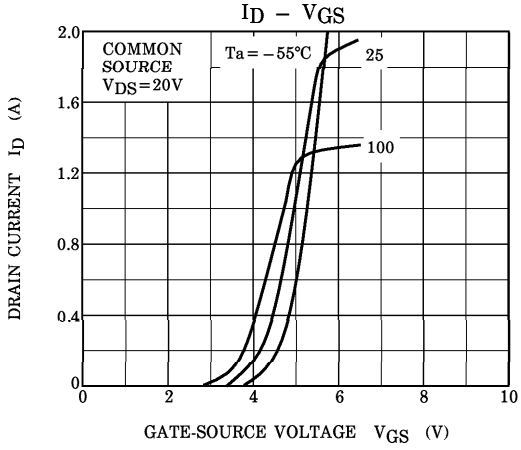
I_C – V_{DS}



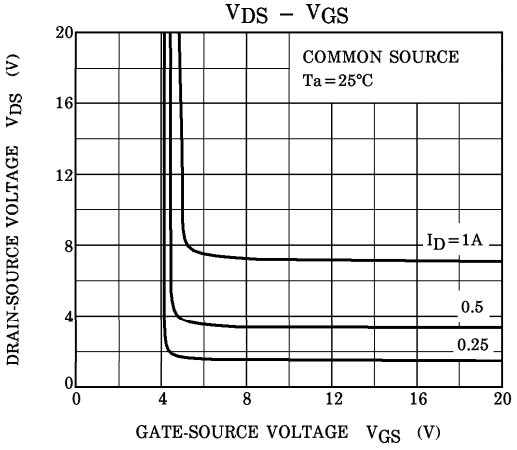
I_D – V_{DS}



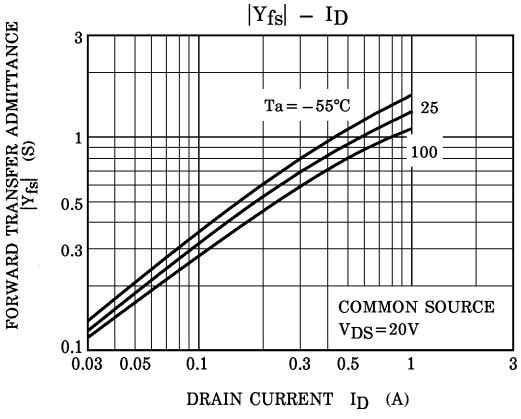
I_D – V_{GS}



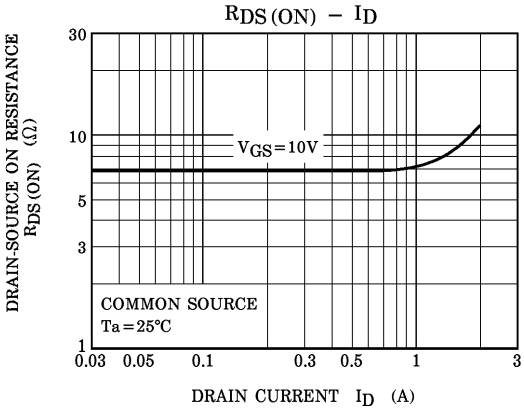
V_{DS} – V_{GS}



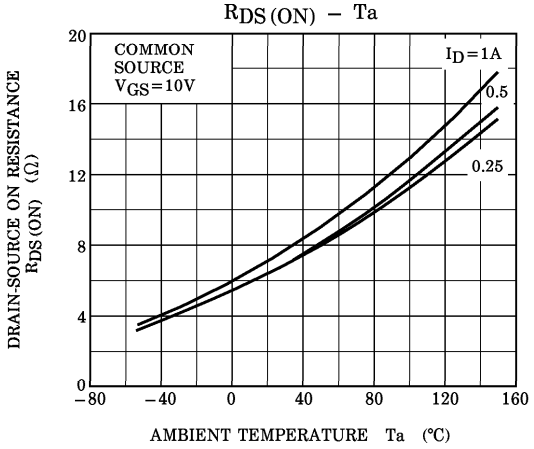
$|Y_{fs}|$ – I_D



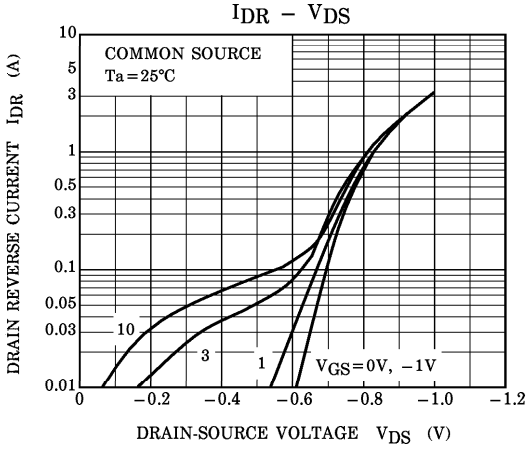
$R_{DS(ON)}$ – I_D



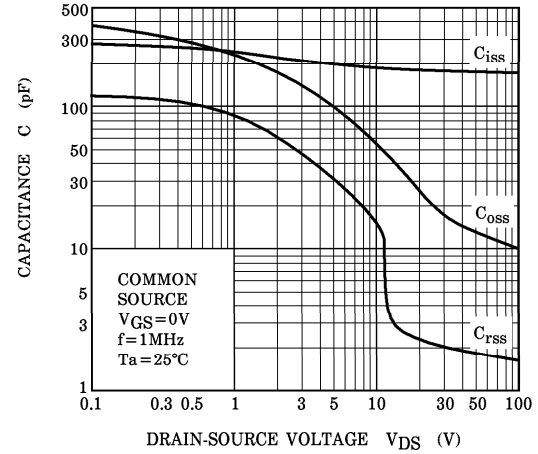
$R_{DS\,(ON)}$ – Ta



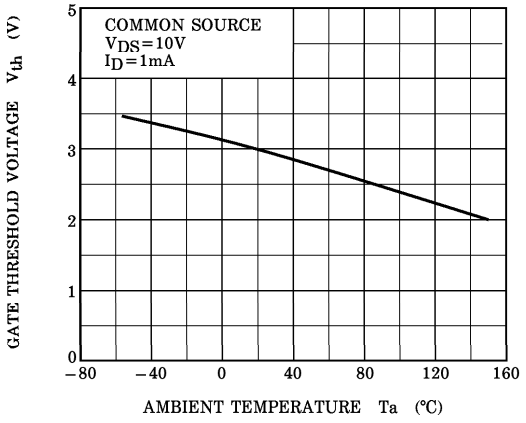
I_{DR} – V_{DS}



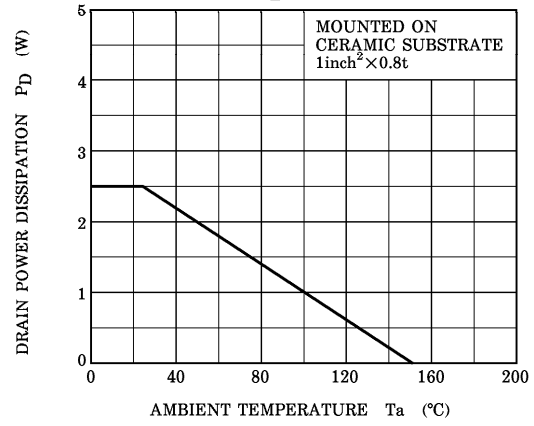
CAPACITANCE – V_{DS}



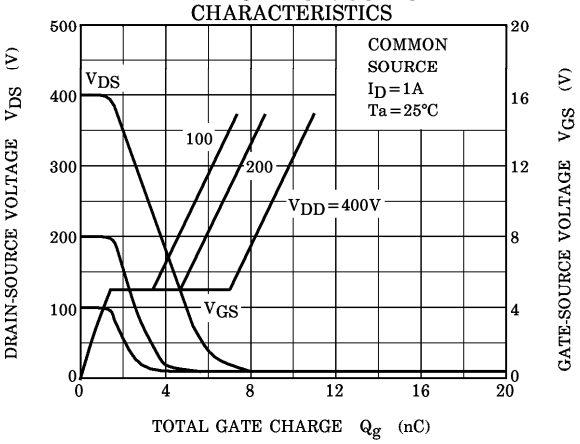
V_{th} – Ta



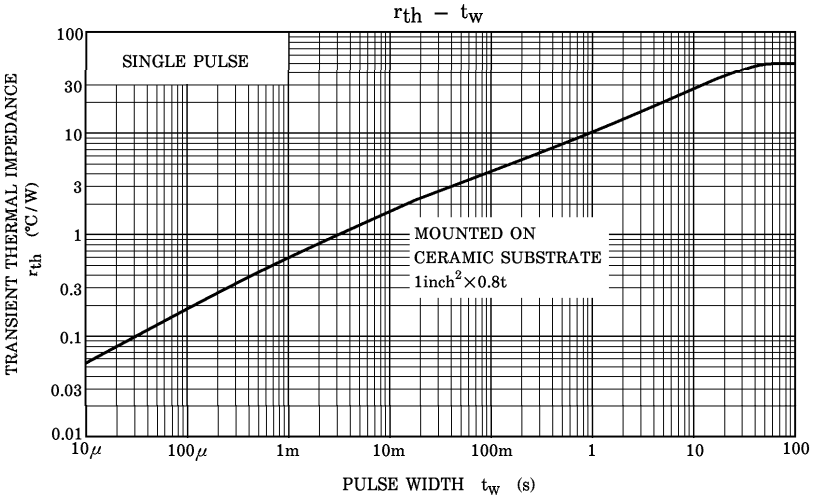
P_D – Ta



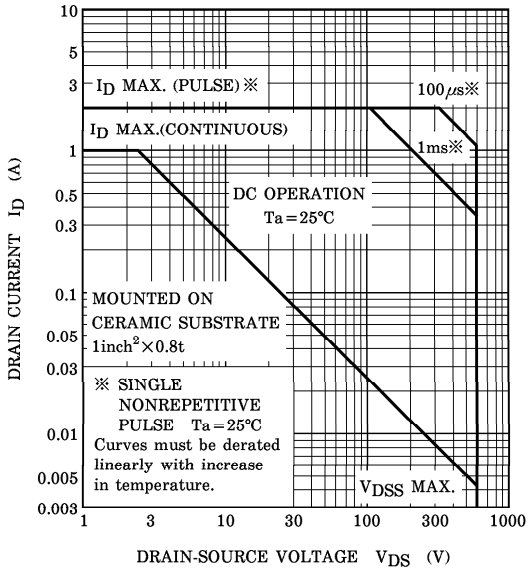
DYNAMIC INPUT / OUTPUT CHARACTERISTICS



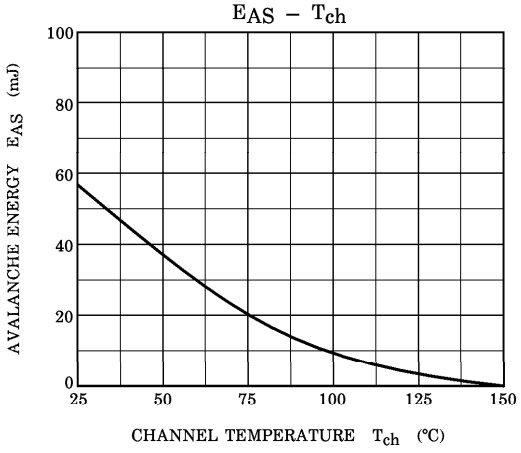
r_{th} – t_w

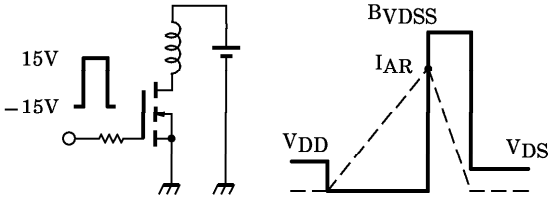


SAFE OPERATING AREA



E_{AS} – T_{ch}





TEST CIRCUIT WAVE FORM

Peak I_{AR}=1A, R_G=25Ω
V_{DD}=90V, L=100mH

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