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

2SK2886

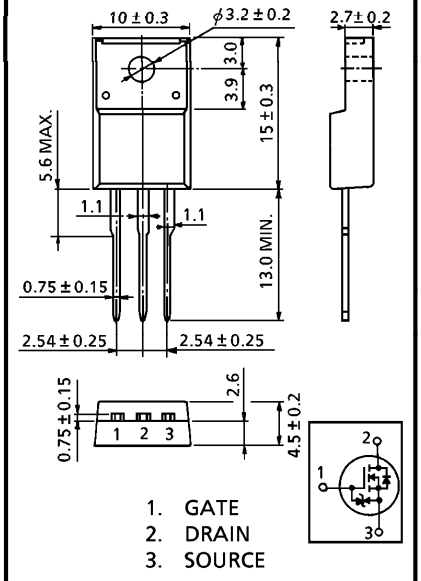
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATORS, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS\,(ON)} = 14\,m\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 31\,S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\,\mu A$ (Max.) ($V_{DS} = 50\,V$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.0\,V$ ($V_{DS} = 10\,V$, $I_D = 1\,mA$)

Unit in mm



JEDEC	—
EIAJ	SC-67
TOSHIBA	2-10R1B

Weight : 1.9 g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	50	V
Drain-Gate Voltage ($R_{GS} = 20\,k\Omega$)		V_{DGR}	50	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	45	A
	Pulse	I_{DP}	135	A
Drain Power Dissipation (Tc = 25°C)		P_D	40	W
Single Pulse Avalanche Energy**		E_{AS}	350	mJ
Avalanche Current		I_{AR}	45	A
Repetitive Avalanche Energy*		E_{AR}	4	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 Case	$R_{th\,(ch\text{-}c)}$	3.125	°C / W
Thermal Resistance, Channel to Ambient	$R_{th\,(ch\text{-}a)}$	62.5	°C / W

Note ;

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

** $V_{DD} = 25\,V$, $T_{ch} = 25°C$ (initial), $L = 213\,\mu H$, $R_G = 25\,\Omega$, $I_{AR} = 45\,A$

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

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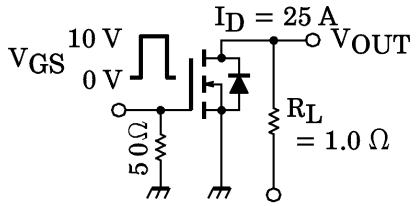
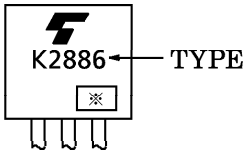
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±16 V, V_{DS} = 0 V	—	—	±10	μA
Drain Cut-off Current		I_{DSS}	V_{DS} = 50 V, V_{GS} = 0 V	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)\,DSS}$	I_D = 10 mA, V_{GS} = 0 V	50	—	—	V
Gate Threshold Voltage		V_{th}	V_{DS} = 10 V, I_D = 1 mA	0.8	—	2.0	V
Drain-Source ON Resistance		$R_{DS\,(ON)}$	V_{GS} = 4 V, I_D = 25 A	—	27	36	mΩ
		$R_{DS\,(ON)}$	V_{GS} = 10 V, I_D = 25 A	—	14	20	
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 10 V, I_D = 25 A	18	31	—	S
Input Capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	—	2200	—	pF
Reverse Transfer Capacitance		C_{rss}		—	390	—	
Output Capacitance		C_{oss}		—	1090	—	
Switching Time	Rise Time	t_r	 V_{IN} : t_r, t_f < 5 ns, Duty ≦ 1%, t_w = 10 μs	—	40	—	ns
	Turn-on Time	t_{on}		—	70	—	
	Fall Time	t_f		—	130	—	
	Turn-off Time	t_{off}		—	360	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} ≒ 40 V, V_{GS} = 10 V, I_D = 45 A	—	66	—	nC
Gate-Source Charge		Q_{gs}		—	43	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	23	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	45	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	135	A
Diode Forward Voltage	V_{DSF}	I_{DR} = 45 A, V_{GS} = 0 V	—	—	−1.7	V
Reverse Recovery Time	t_{rr}	I_{DR} = 45 A, V_{GS} = 0 V	—	78	—	ns
Reverse Recovery Charge	Q_{rr}	dI_{DR}/dt = 50 A/μs	—	90	—	nC

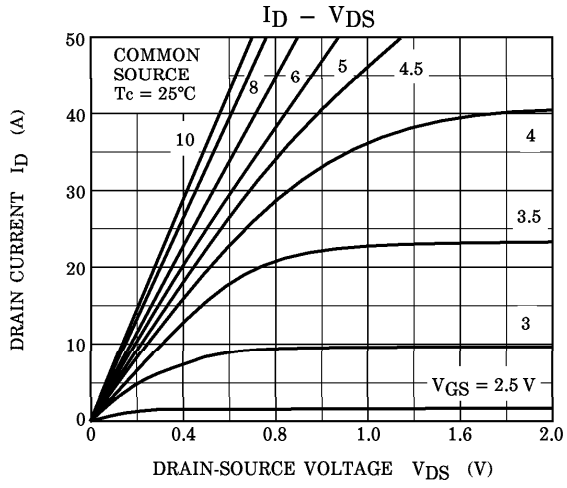
MARKING

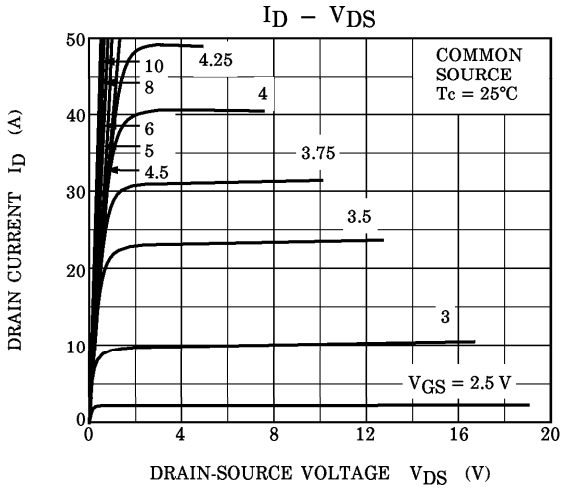


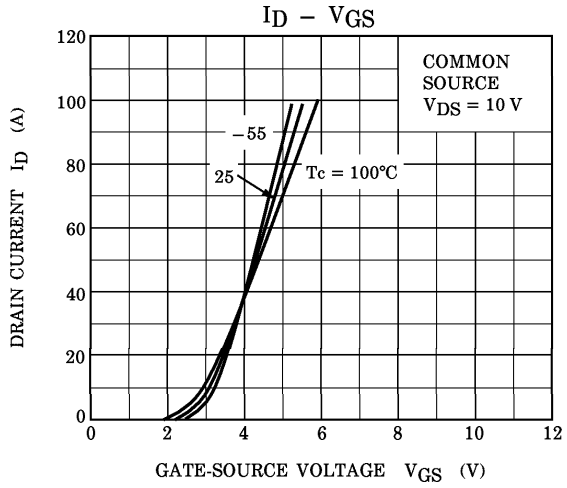
※ Lot Number

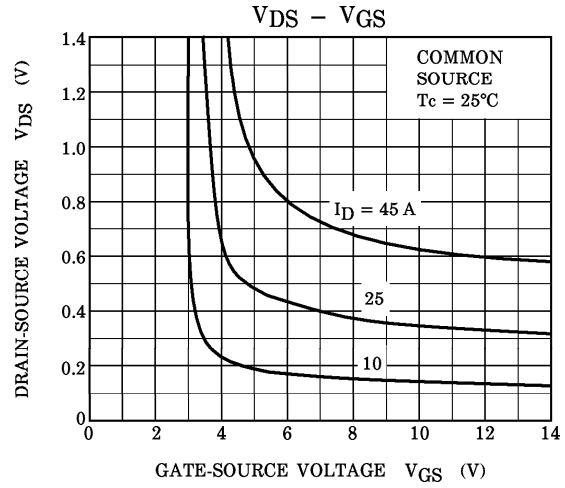
□□ — Month (Starting from Alphabet A)

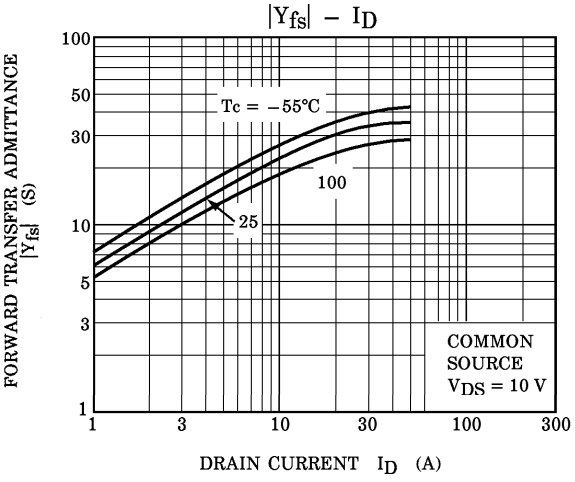
— Year (Last Number of the Christian Era)

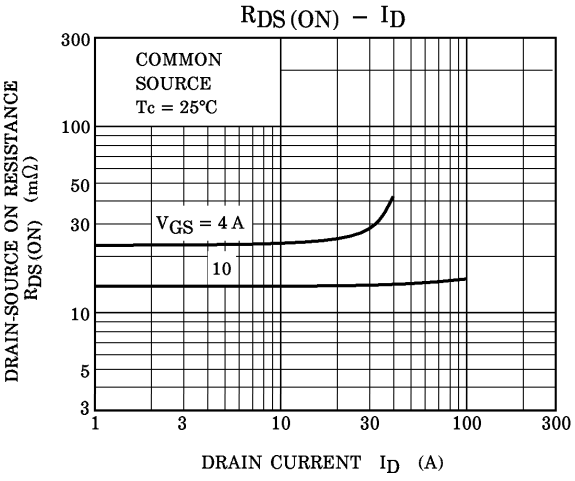

$I_D - V_{DS}$
COMMON SOURCE
Tc = 25°C
10
8
6
5
4.5
4
3.5
3
V_{GS} = 2.5 V
DRAIN CURRENT I_D (A)
DRAIN-SOURCE VOLTAGE V_{DS} (V)


$I_D - V_{DS}$
COMMON SOURCE
Tc = 25°C
10
8
6
5
4.5
4.25
4
3.75
3.5
3
V_{GS} = 2.5 V
DRAIN CURRENT I_D (A)
DRAIN-SOURCE VOLTAGE V_{DS} (V)

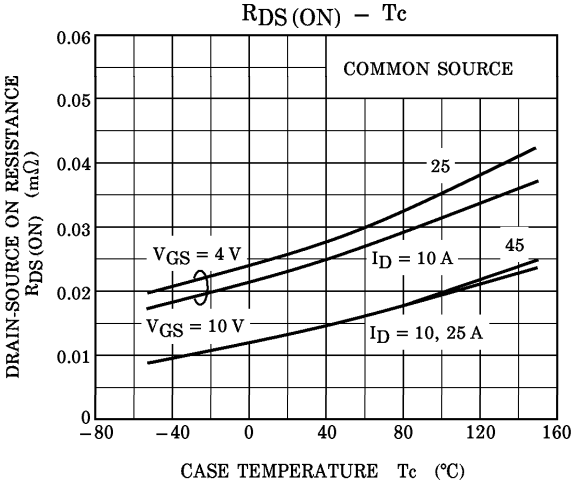

$I_D - V_{GS}$
COMMON SOURCE
V_{DS} = 10 V
−55
25
Tc = 100°C
DRAIN CURRENT I_D (A)
GATE-SOURCE VOLTAGE V_{GS} (V)


$V_{DS} - V_{GS}$
COMMON SOURCE
Tc = 25°C
I_D = 45 A
25
10
DRAIN-SOURCE VOLTAGE V_{DS} (V)
GATE-SOURCE VOLTAGE V_{GS} (V)

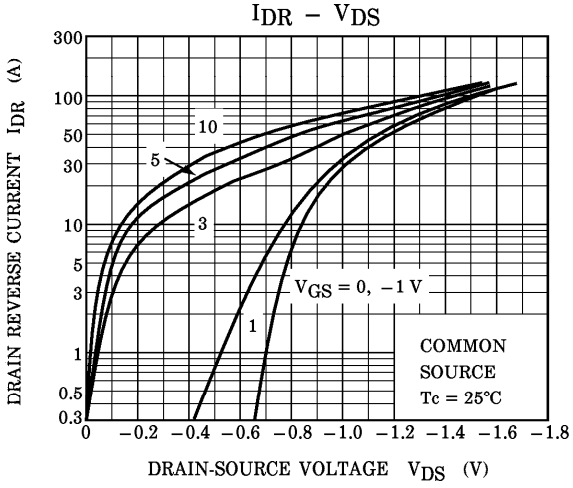

$|Y_{fs}| - I_D$
Tc = −55°C
100
25
COMMON SOURCE
V_{DS} = 10 V
FORWARD TRANSFER ADMITTANCE $|Y_{fs}|$ (S)
DRAIN CURRENT I_D (A)


$R_{DS\,(ON)} - I_D$
COMMON SOURCE
Tc = 25°C
V_{GS} = 4 A
10
DRAIN-SOURCE ON RESISTANCE $R_{DS\,(ON)}$ (mΩ)
DRAIN CURRENT I_D (A)

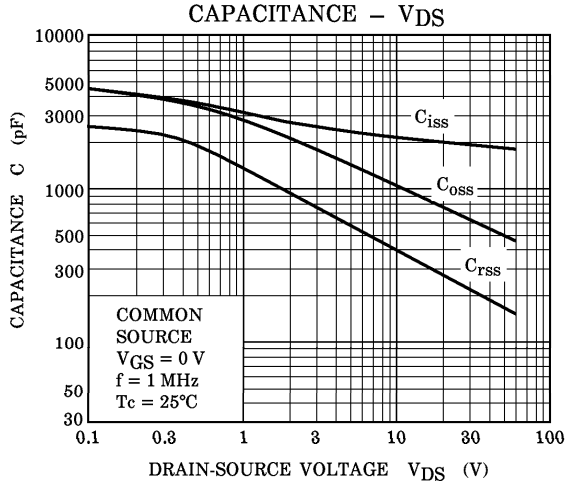
$R_{DS\,(ON)}$ – Tc



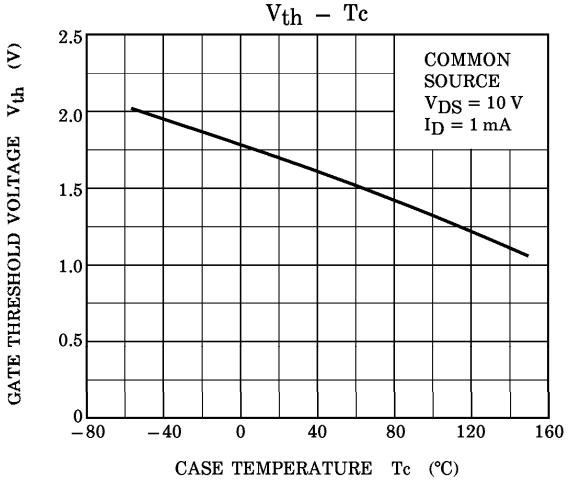
I_{DR} – V_{DS}



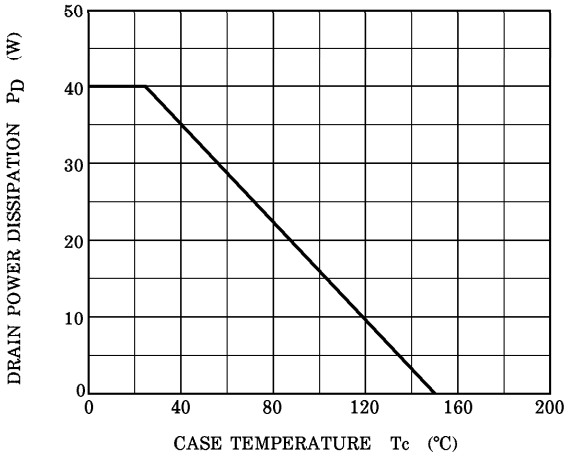
CAPACITANCE – V_{DS}



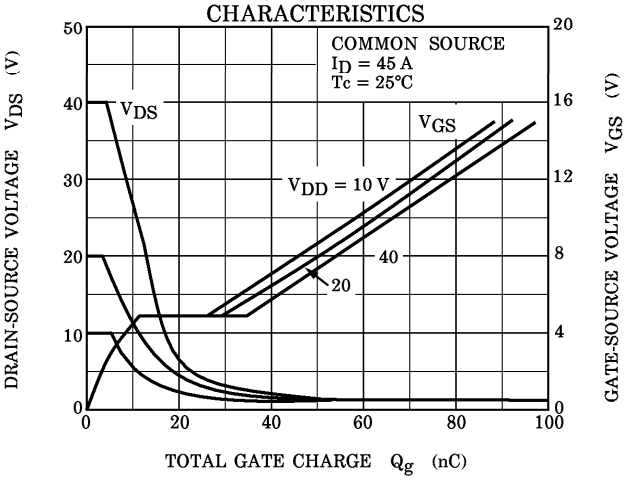
V_{th} – Tc



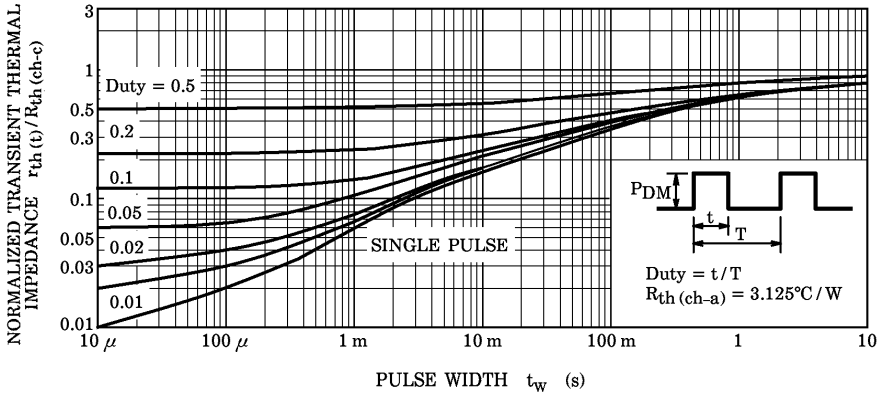
P_D – Tc



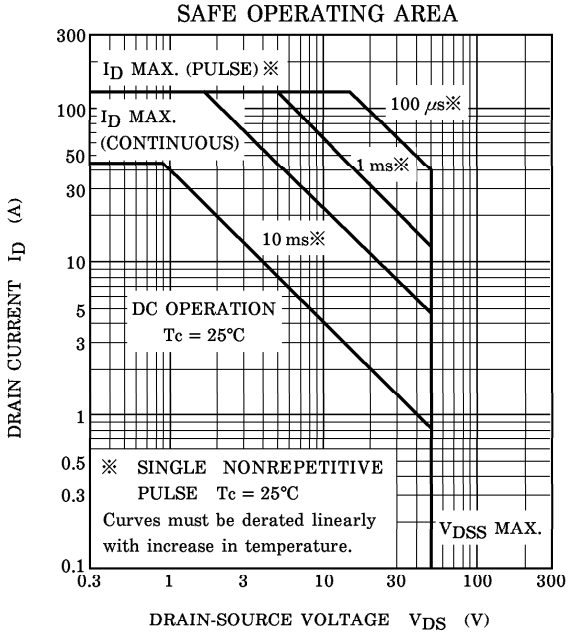
DYNAMIC INPUT / OUTPUT CHARACTERISTICS



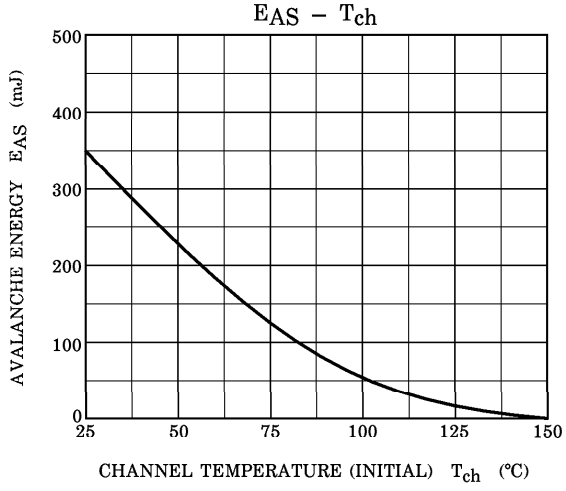
r_{th} – t_w

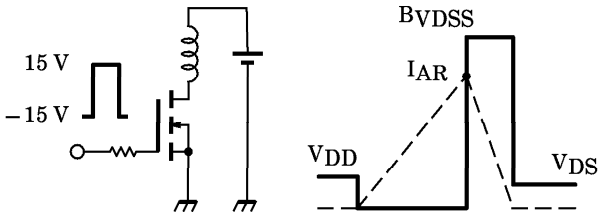


SAFE OPERATING AREA



E_{AS} – T_{ch}





Peak I_{AR} = 45 A, R_G = 25 Ω
V_{DD} = 25 V, L = 213 μH

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