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

2SK2844

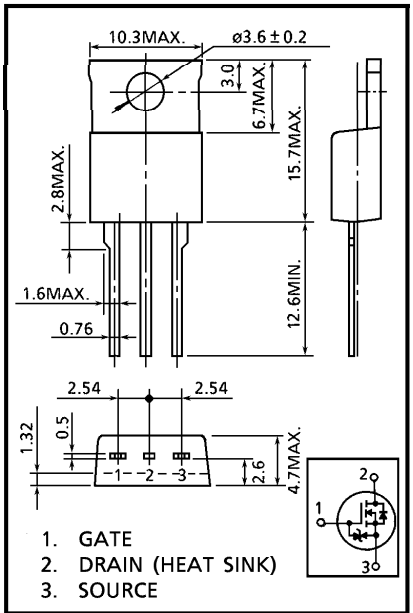
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

- 4V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS\,(ON)}$ = 16mΩ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}|$ = 26S (Typ.)
- Low Leakage Current : I_{DSS} = 100μA (Max.) (V_{DS} = 30V)
- Enhancement-Mode : V_{th} = 0.8~2.0V (V_{DS} = 10V, I_D = 1mA)

Unit in mm



JEDEC	TO-220AB
EIAJ	SC-46
TOSHIBA	2-10P1B

Weight : 2.0g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Drain-Gate Voltage (R_{GS} = 20kΩ)		V_{DGR}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	35	A
	Pulse	I_{DP}	140	A
Drain Power Dissipation (Tc = 25°C)		P_D	60	W
Single Pulse Avalanche Energy**		E_{AS}	259	mJ
Avalanche Current		I_{AR}	35	A
Repetitive Avalanche Energy*		E_{AR}	6	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	$R_{th\,(ch\text{-}c)}$	2.08	°C / W
Thermal Resistance, Channel to Ambient	$R_{th\,(ch\text{-}a)}$	83.3	°C / W

Note ;

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

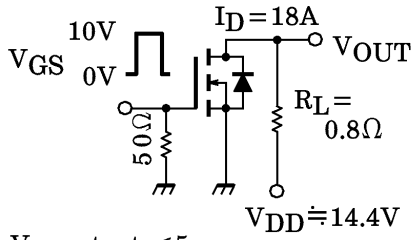
** V_{DD} = 25V, Starting T_{ch} = 25°C, L = 152μH, R_G = 25Ω, I_{AR} = 35A

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

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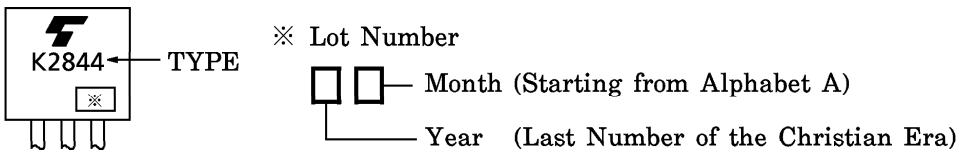
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±16V, V_{DS} = 0V	—	—	±10	μA
Drain Cut-off Current		I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)\,DSS}$	I_D = 10mA, V_{GS} = 0V	30	—	—	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 = 18A	—	26	35	mΩ
			V_{GS} = 10V, I_D = 18A	—	16	20	
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 10V, I_D = 18A	13	26	—	S
Input Capacitance		C_{iss}	V_{DS} = 10V, V_{GS} = 0V f = 1MHz	—	980	—	pF
Reverse Transfer Capacitance		C_{rss}		—	270	—	
Output Capacitance		C_{oss}		—	580	—	
Switching Time	Rise Time	t_r		—	14	—	ns
	Turn-on Time	t_{on}		—	23	—	
	Fall Time	t_f		—	64	—	
	Turn-off Time	t_{off}	V_{IN} : t_r, t_f < 5ns, Duty ≦ 1%, t_w = 10μs	—	190	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} ≒ 24V, V_{GS} = 10V I_D = 35A	—	40	—	nC
Gate-Source Charge		Q_{gs}		—	32	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	8	—	

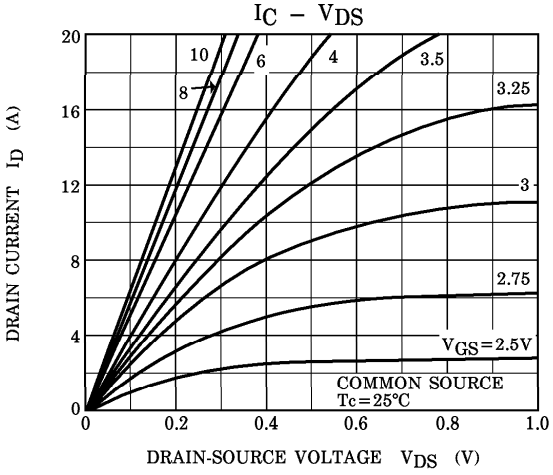
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

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} = 35A, V_{GS} = 0V	—	—	−1.7	V
Reverse Recovery Time	t_{rr}	I_{DR} = 35A, V_{GS} = 0V	—	120	—	ns
Reverse Recovery Charge	Q_{rr}	dI_{DR}/dt = 50A/μs	—	180	—	nC

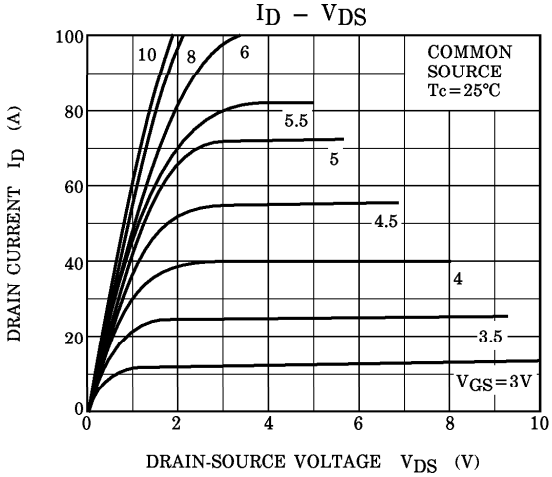
MARKING



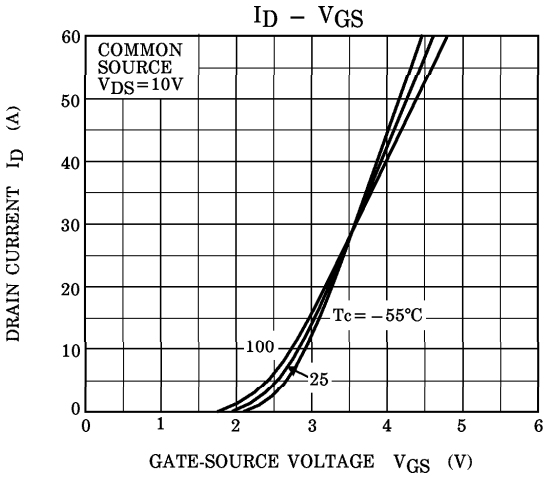
$I_C - V_{DS}$



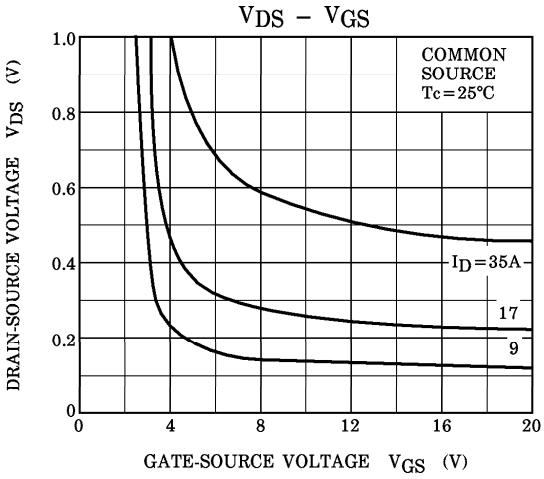
$I_D - V_{DS}$



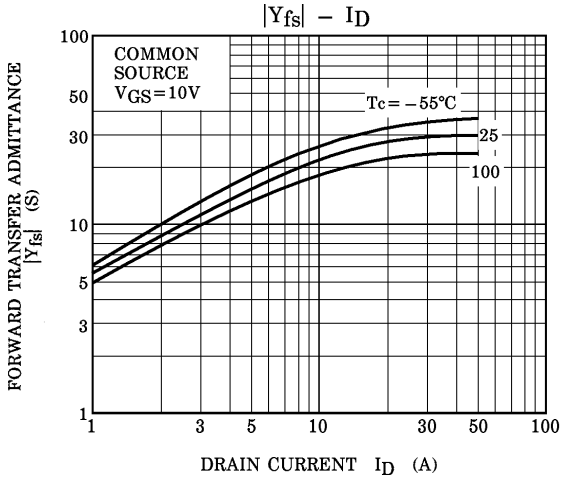
$I_D - V_{GS}$



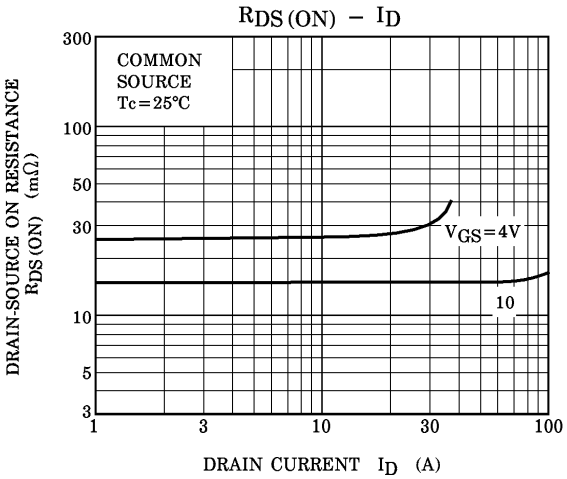
$V_{DS} - V_{GS}$



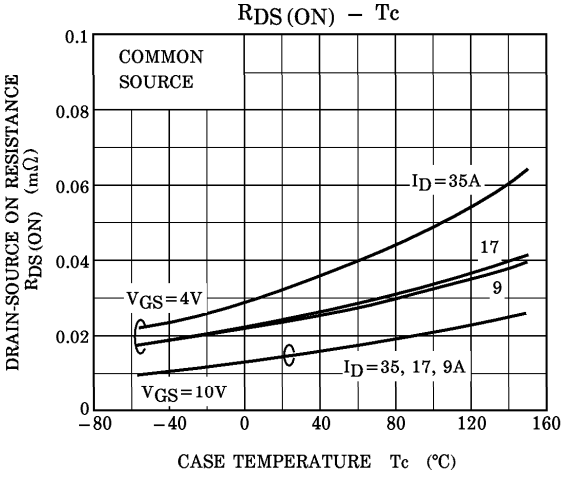
$|Y_{fs}| - I_D$



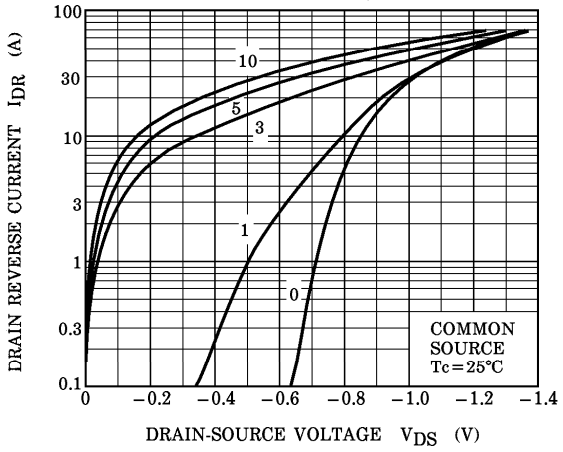
$R_{DS\,(ON)} - I_D$



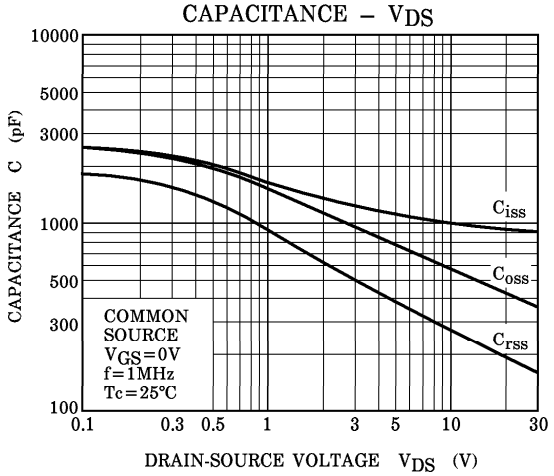
$R_{DS\,(ON)}$ – Tc



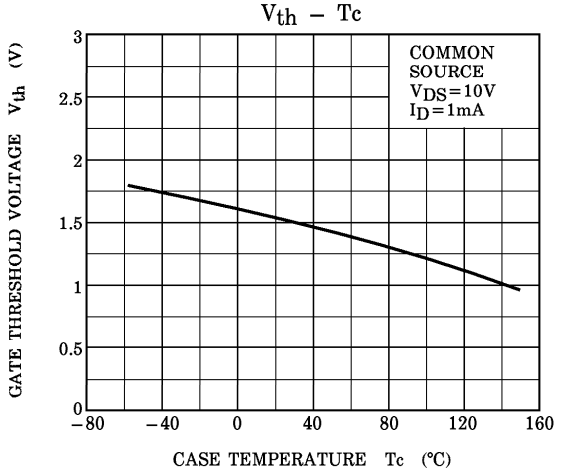
I_{DR} – V_{DS}



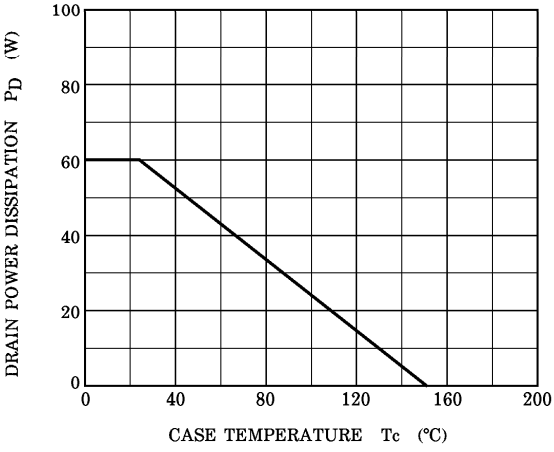
CAPACITANCE – V_{DS}



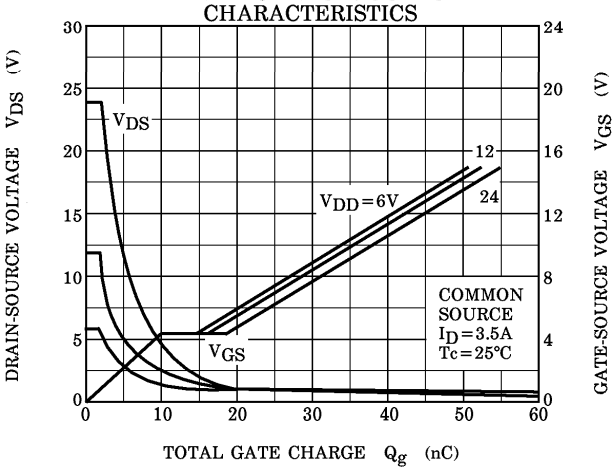
V_{th} – Tc



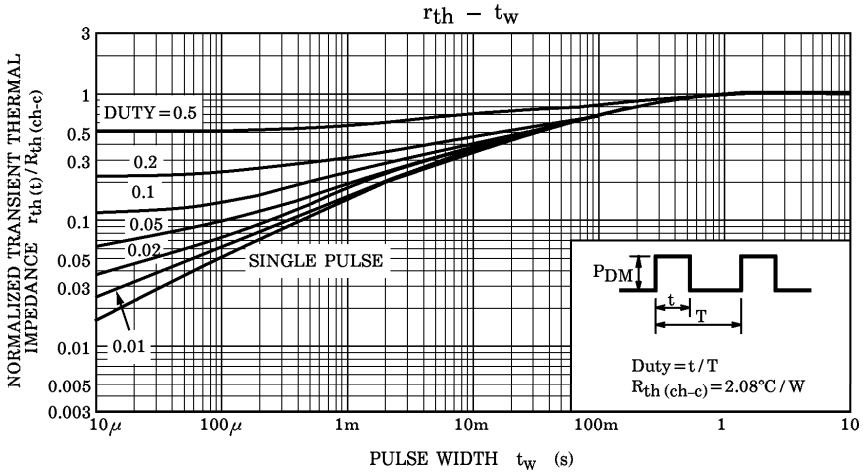
P_D – Tc



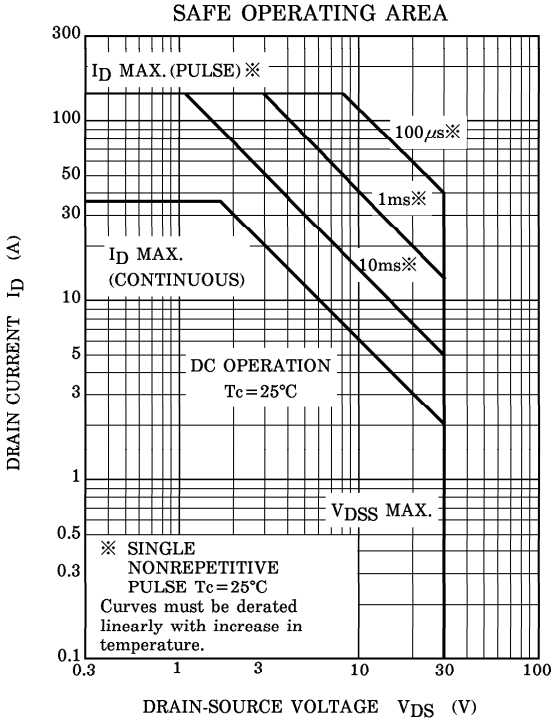
DYNAMIC INPUT / OUTPUT CHARACTERISTICS



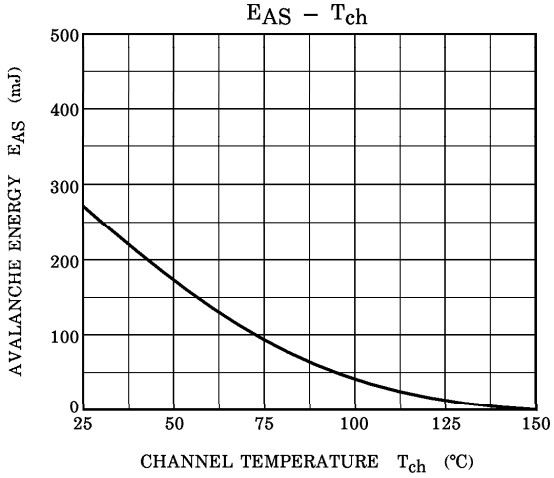
$r_{th} - t_w$

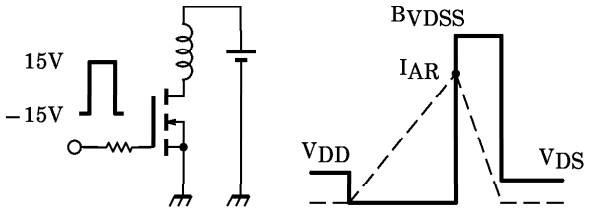


SAFE OPERATING AREA



$E_{AS} - T_{ch}$





TEST CIRCUIT WAVE FORM

Peak I_{AR} = 35A, R_G = 25Ω
V_{DD} = 25V, L = 152μH

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