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

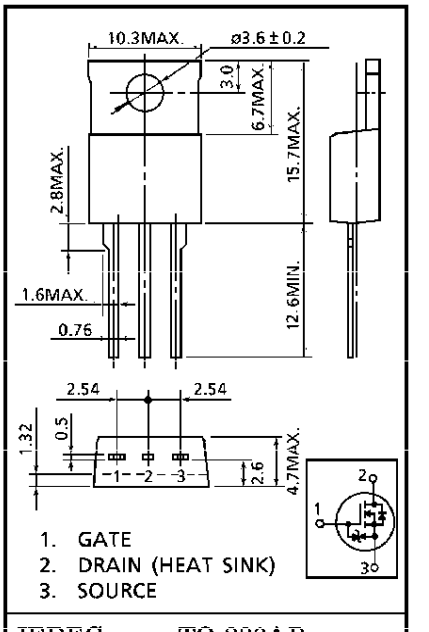
YTA630

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS
SWITCHING REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS\,(ON)}=0.26\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}|=8S$ (Typ.)
- Low Leakage Current : $I_{DSS}=100\mu A$ (Max.) ($V_{DS}=200V$)
- Enhancement-Mode : $V_{th}=1.5\sim3.5V$ ($V_{DS}=10V$, $I_D=1mA$)

Unit in mm



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

Weight : 2.0g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	200	V
Drain-Gate Voltage ($R_{GS}=20k\Omega$)		V_{DGR}	200	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	10	A
	Pulse	I_{DP}	40	A
Drain Power Dissipation (Tc=25°C)		P_D	40	W
Single Pulse Avalanche Energy**		E_{AS}	98	mJ
Avalanche Current		I_{AR}	10	A
Repetitive Avalanche Energy*		E_{AR}	4	mJ
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

THERMAL CHARACTERISTICS

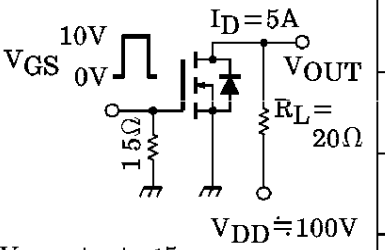
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th\,(ch-c)}$	3.125	°C / W
Thermal Resistance, Channel to Ambient	$R_{th\,(ch-a)}$	83.3	°C / W

Note ;
* Repetitive rating ; Pulse Width Limited by Max. junction temperature.
** $V_{DD}=50V$, $T_{ch}=25°C$, $L=1.58mH$, $R_G=25\Omega$, $I_{AR}=10A$

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

961001EAA2

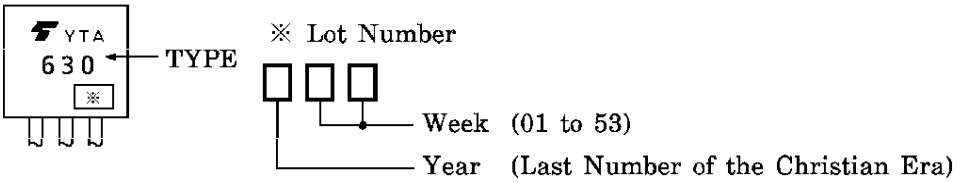
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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} = 200V, V_{GS} = 0V	—	—	100	μA
Gate-Source Breakdown Voltage		$V_{(BR)DSS}$	I_D = 10mA, V_{GS} = 0V	200	—	—	V
Gate Threshold Voltage		V_{th}	V_{DS} = 10V, I_D = 1mA	1.5	—	3.5	V
Drain-Source ON Resistance		$R_{DS(ON)}$	V_{GS} = 10V, I_D = 5A	—	0.26	0.4	Ω
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 10V, I_D = 5A	4	8	—	S
Input Capacitance		C_{iss}	V_{DS} = 10V, V_{GS} = 0V f = 1MHz	—	700	—	pF
Reverse Transfer Capacitance		C_{rss}		—	80	—	
Output Capacitance		C_{oss}		—	270	—	
Switching Time	Rise Time	t_r		—	15	—	ns
	Turn-on Time	t_{on}		—	25	—	
	Fall Time	t_f		—	15	—	
	Turn-off Time	t_{off}	V_{IN} : t_r, t_f < 5ns, Duty ≦ 1%, t_w = 10μs	—	70	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} ≒ 160V, V_{GS} = 10V I_D = 10A	—	17	—	nC
Gate-Source Charge		Q_{gs}		—	10	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	7	—	

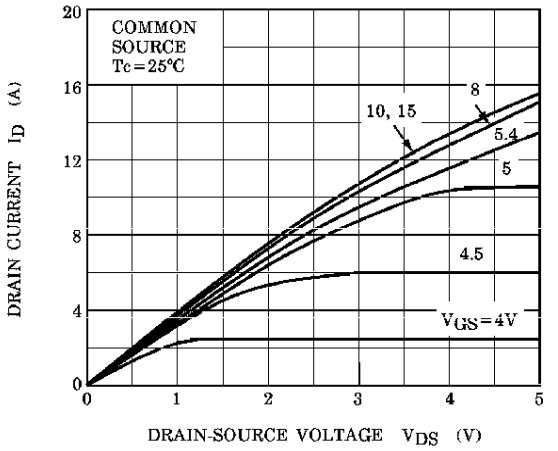
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	10	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	40	A
Diode Forward Voltage	V_{DSF}	I_{DR} = 10A, V_{GS} = 0V	—	—	−2.0	V
Reverse Recovery Time	t_{rr}	I_{DR} = 10A, V_{GS} = 0V dI_{DR}/dt = 100A/μs	—	150	—	ns
Reverse Recovery Charge	Q_{rr}		—	0.8	—	μC

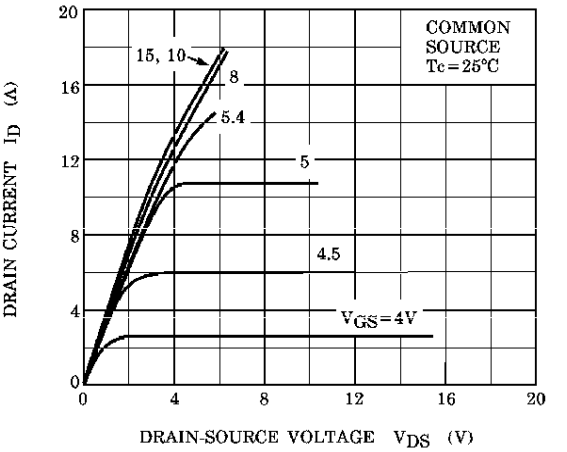
MARKING



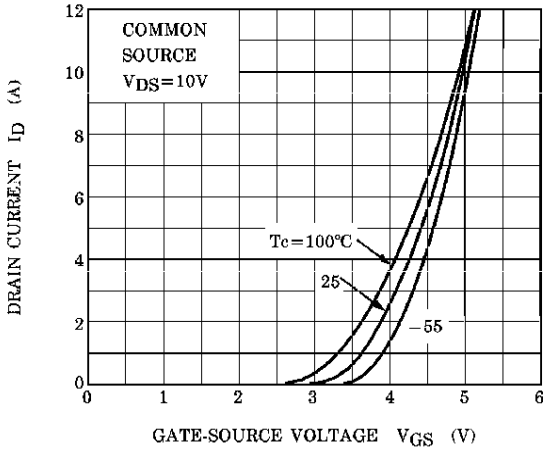
$I_D - V_{DS}$



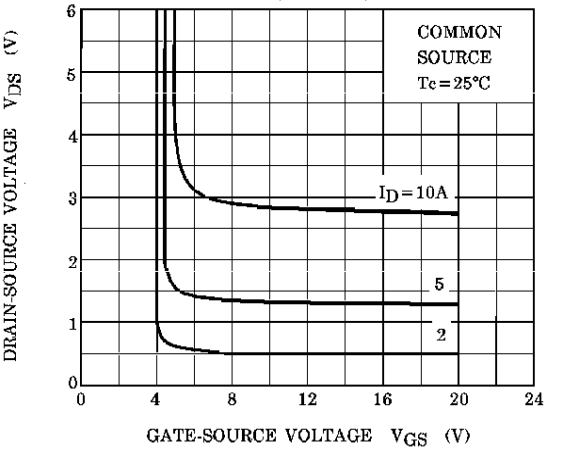
$I_D - V_{DS}$



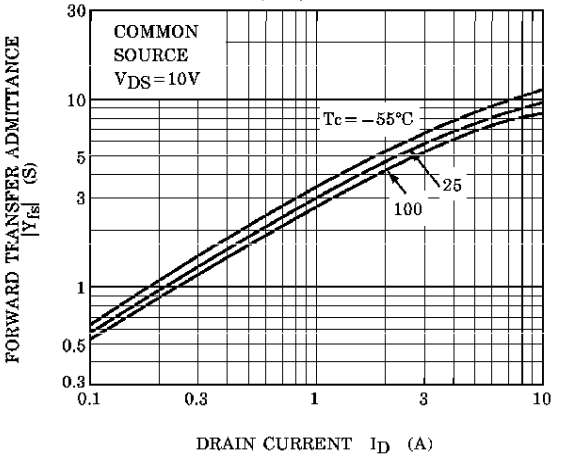
$I_D - V_{GS}$



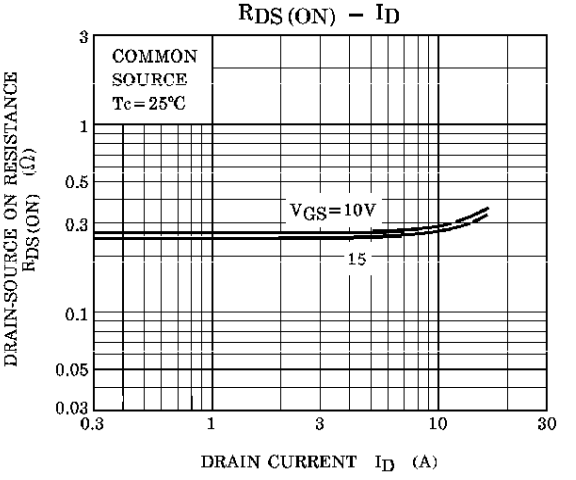
$V_{DS} - V_{GS}$



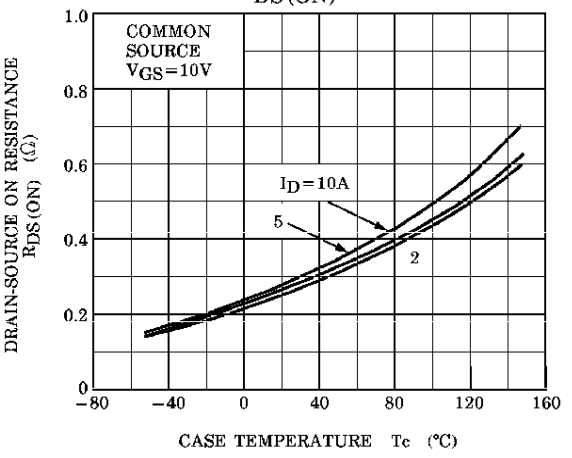
$|Y_{fs}| - I_D$



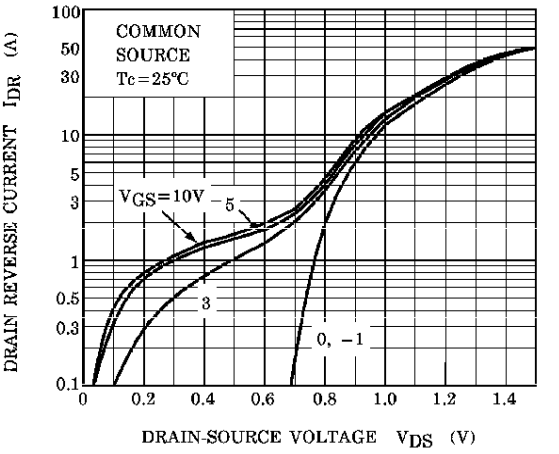
$R_{DS\,(ON)} - I_D$



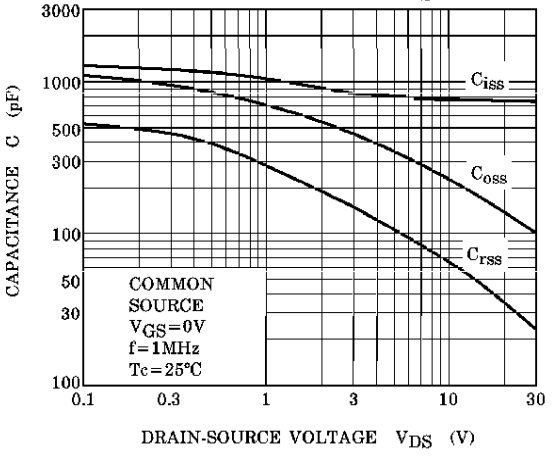
$R_{DS(ON)}$ – Tc



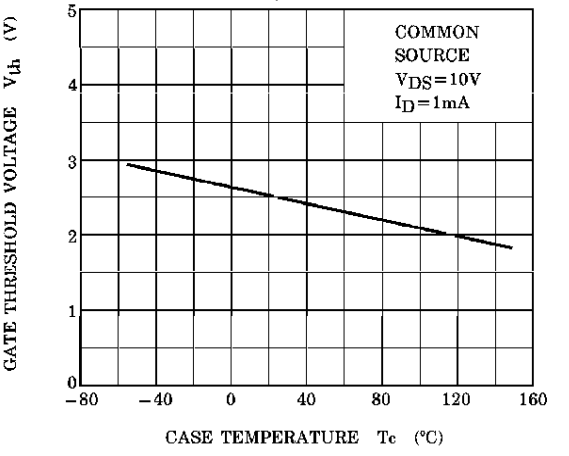
I_{DR} – V_{DS}



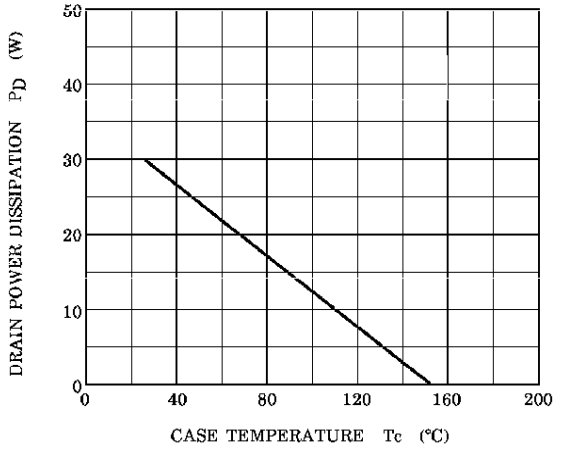
CAPACITANCE – V_{DS}



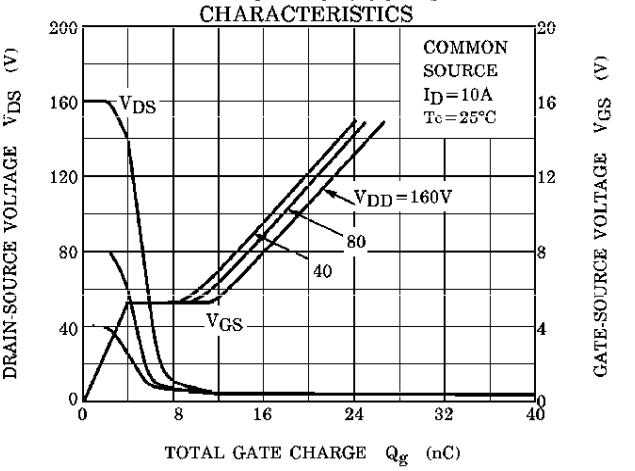
V_{th} – Tc



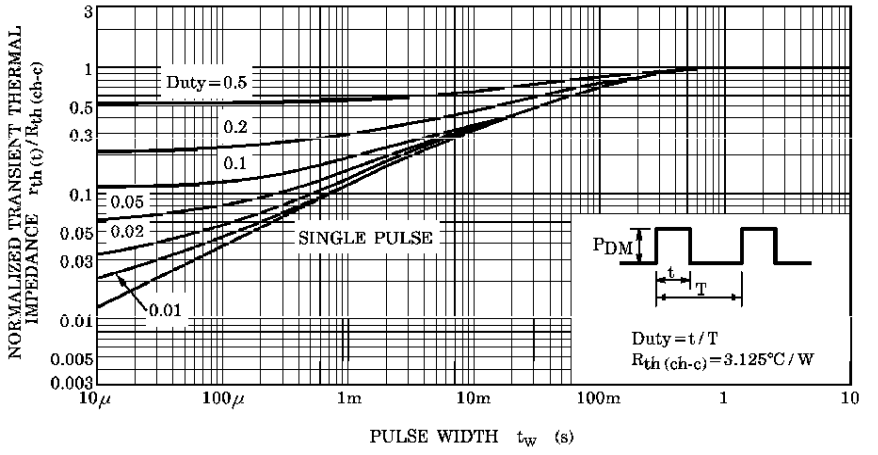
P_D – Tc



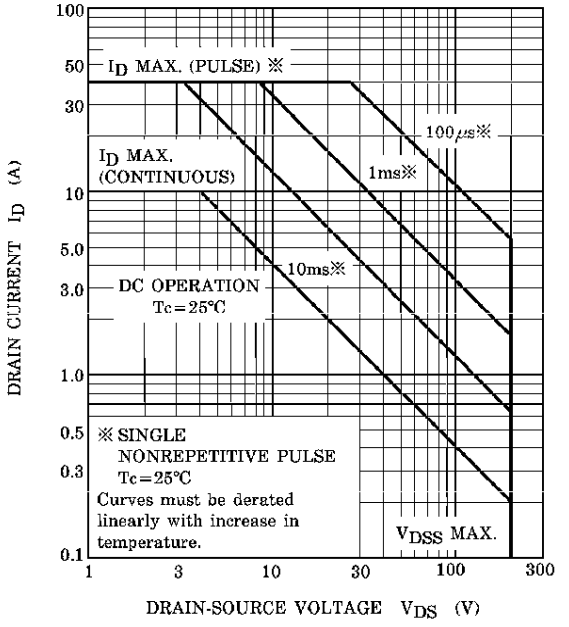
DYNAMIC INPUT / OUTPUT CHARACTERISTICS



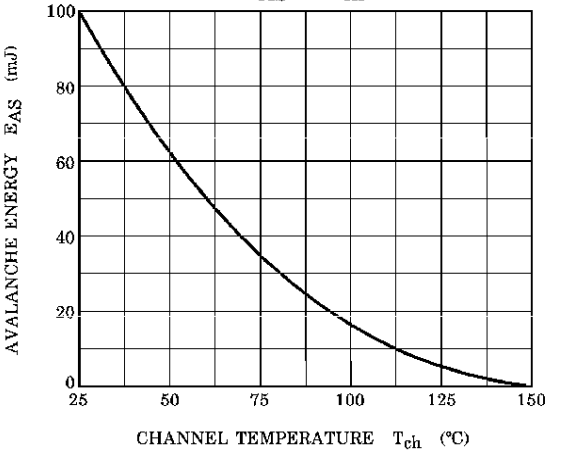
r_{th} – t_w

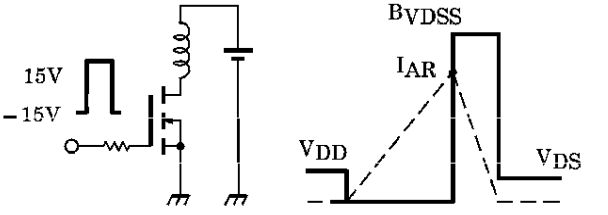


SAFE OPERATING AREA



E_{AS} – T_{ch}





TEST CIRCUIT WAVE FORM

Peak I_{AR}=10A, R_G=25Ω
V_{DD}=50V, L=1.58mH

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