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

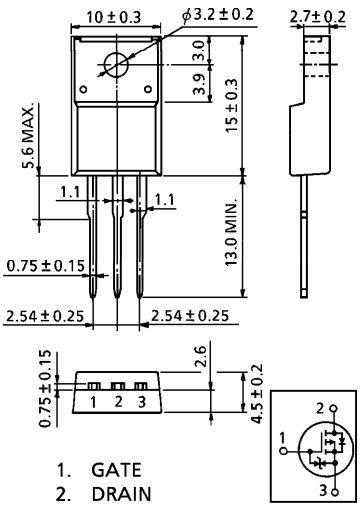
2SJ407

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

INDUSTRIAL APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS\,(ON)} = 0.8\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Yfs| = 4.0S$ (Typ.)
- Low Leakage Current : $I_{DSS} = -100\mu A$ (Max.) ($V_{DS} = -200V$)
- Enhancement-Mode : $V_{th} = -1.5 \sim -3.5V$ ($V_{DS} = -10V$, $I_D = -1mA$)

Unit in mm



JEDEC	—
EIAJ	SC-67
TOSHIBA	2-10R1B

Weight : 1.9g

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	−5	A
	Pulse	I_{DP}	−20	A
Drain Power Dissipation (Tc = 25°C)		P_D	30	W
Single Pulse Avalanche Energy**		E_{AS}	195	mJ
Avalanche Current		I_{AR}	−5	A
Repetitive Avalanche Energy*		E_{AR}	3.0	mJ
Chanel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Chanel To Case	$R_{th\,(ch-c)}$	4.16	°C / W
Thermal Resistance, Chanel to Ambient	$R_{th\,(ch-a)}$	62.5	°C / W

Note ;

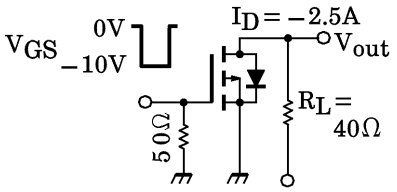
* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

** $V_{DD} = -50V$, Starting $T_{ch} = 25°C$, $L = 12.6mH$, $R_G = 25\Omega$, $I_{AR} = -5A$

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

961001EAA2

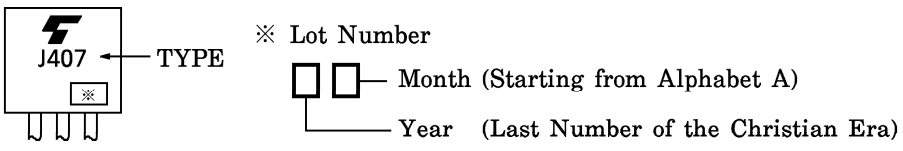
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16V$, $V_{DS} = 0V$	—	—	±10	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = -200V$, $V_{GS} = 0V$	—	—	−100	μA
Drain-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		$R_{DS\ (ON)}$	$V_{GS} = -10V$, $I_D = -2.5A$	—	0.8	1.0	Ω
Forward Transfer Admittance		$\|Yfs\|$	$V_{DS} = -10V$, $I_D = -2.5A$	2.0	4.0	—	S
Input Capacitance		C_{iss}	$V_{DS} = -10V$, $V_{GS} = 0V$ f = 1MHz	—	800	—	pF
Reverse Transfer Capacitance		C_{rss}		—	80	—	
Output Capacitance		C_{oss}		—	270	—	
Switching Time	Rise Time	t_r	 V_{IN} : t_r, $t_f < 5ns$ Duty ≦ 1%, $t_w = 10\mu s$	—	15	—	ns
	Turn-on Time	t_{on}		—	30	—	
	Fall Time	t_f		—	6	—	
	Turn-off Time	t_{off}		—	65	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \fallingdotseq -160V$ $V_{GS} = -10V$ $I_D = -5A$	—	20	—	nC
Gate-Source Charge		Q_{gs}		—	13	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	7	—	

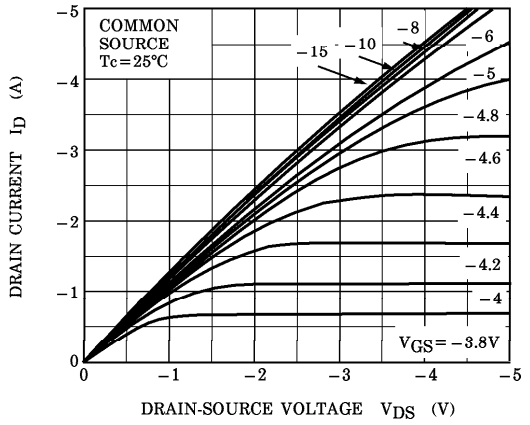
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	−5	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	−20	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = -5A$, $V_{GS} = 0V$	—	—	2.0	V
Reverse Recovery Time	t_{rr}	$I_{DR} = -5A$, $V_{GS} = 0V$ $dI_{DR}/dt = 100A/\mu s$	—	210	—	ns
Reverse Recovery Charge	Q_{rr}		—	1.2	—	μC

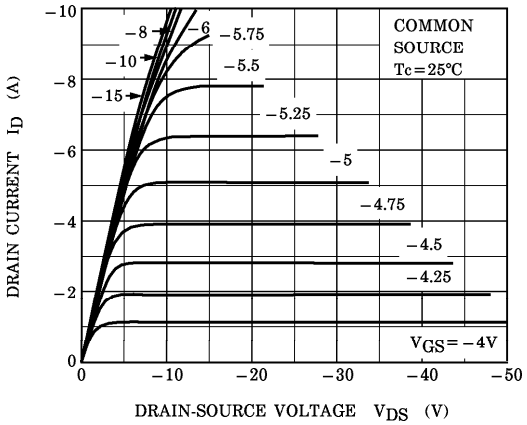
MARKING



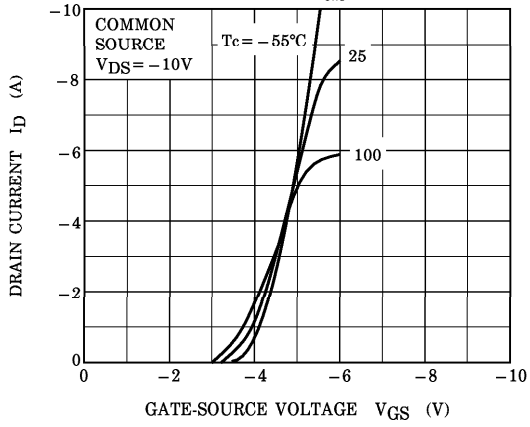
$I_D - V_{DS}$



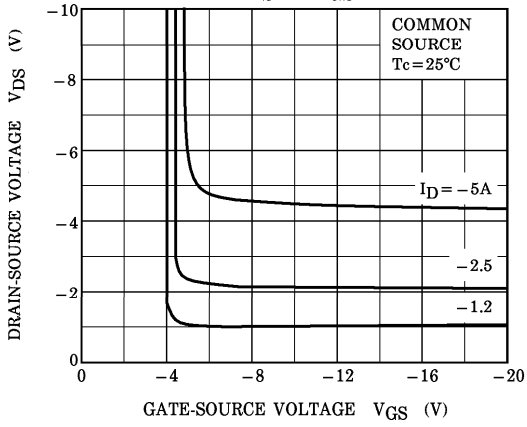
$I_D - V_{DS}$



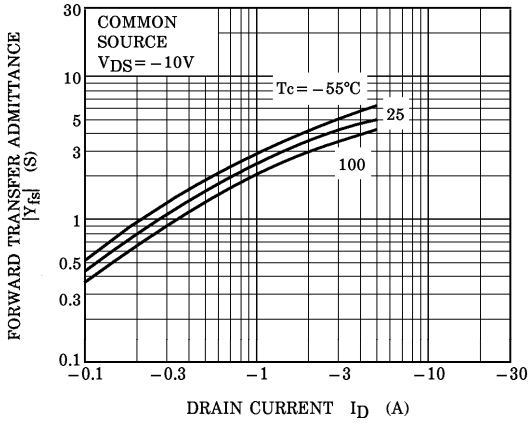
$I_D - V_{GS}$



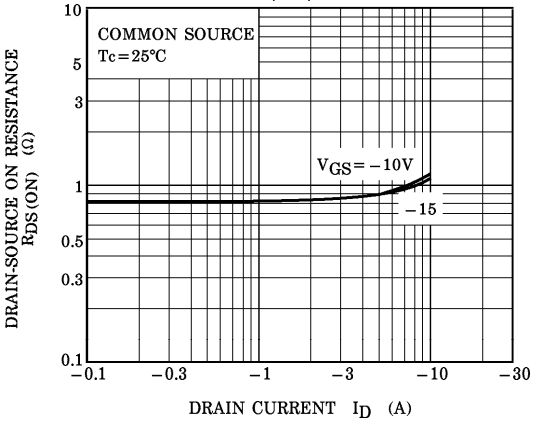
$V_{DS} - V_{GS}$



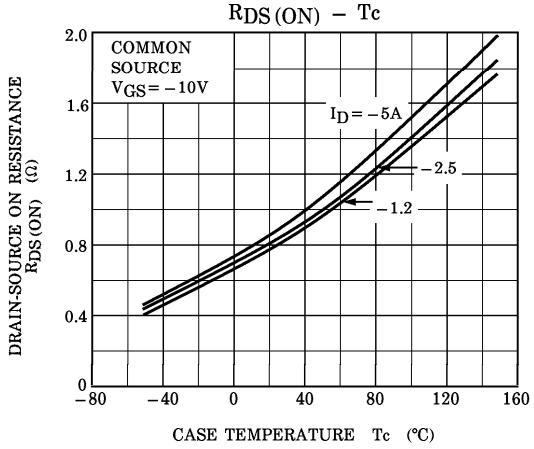
$|Y_{fs}| - I_D$



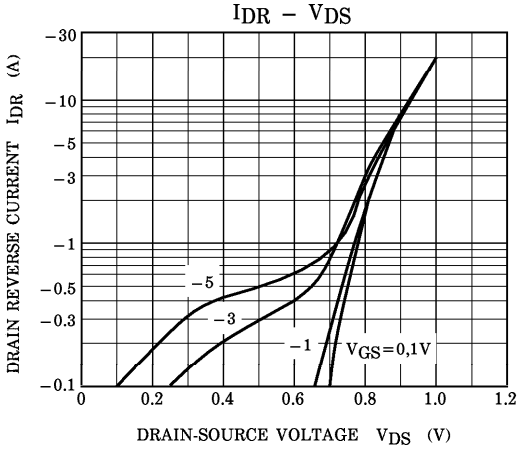
$R_{DS(ON)} - I_D$



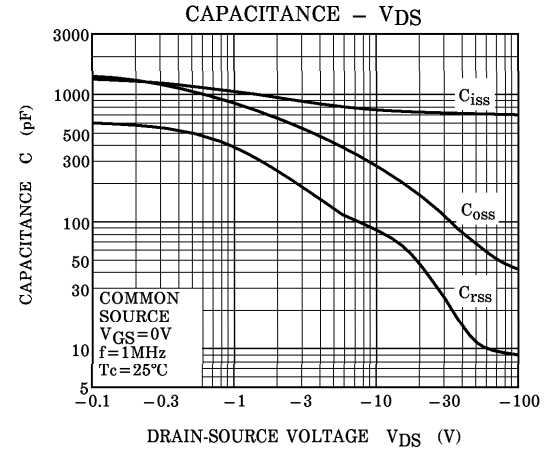
$R_{DS\,(ON)}$ – Tc



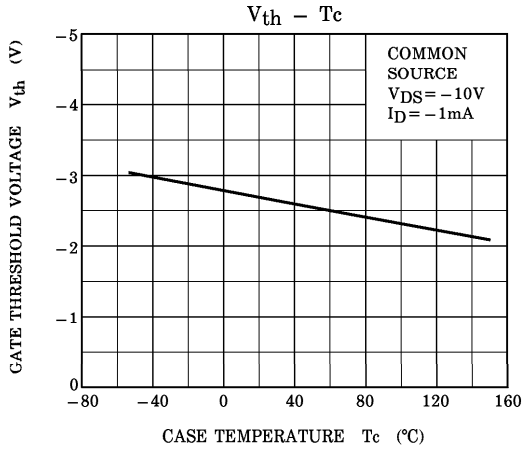
I_{DR} – V_{DS}



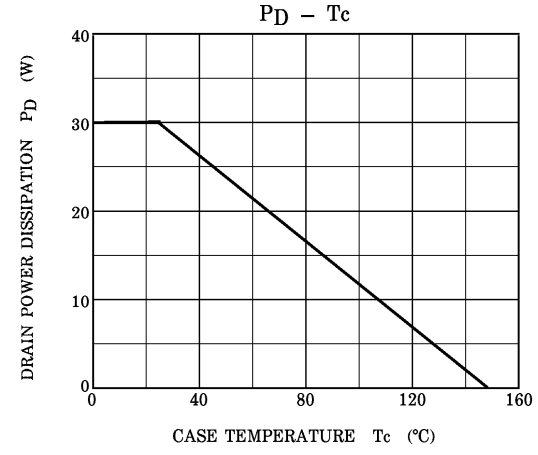
CAPACITANCE – V_{DS}



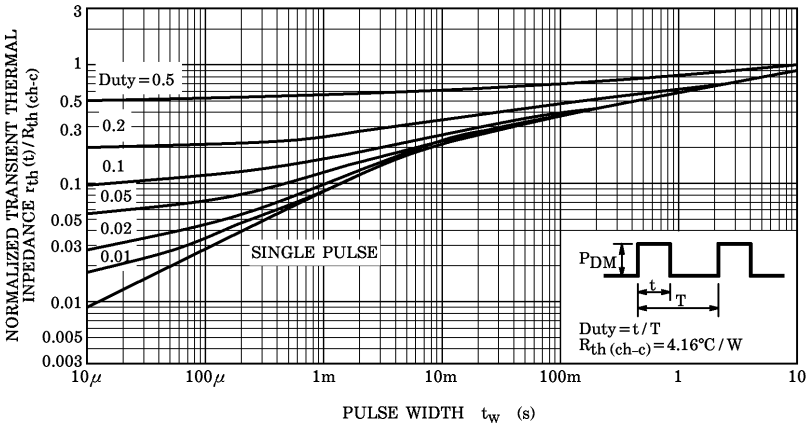
V_{th} – Tc



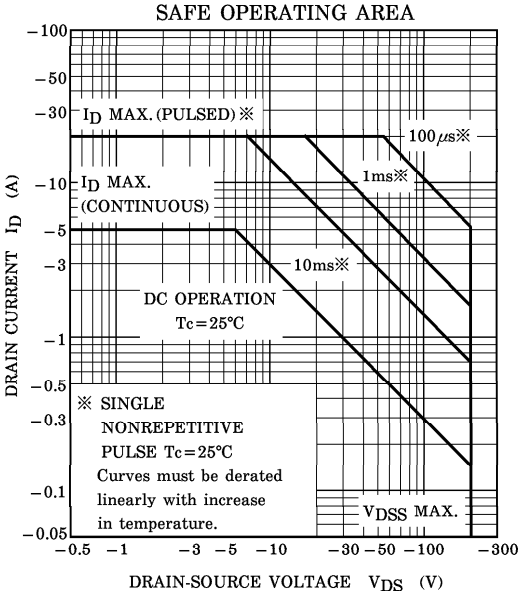
P_D – Tc



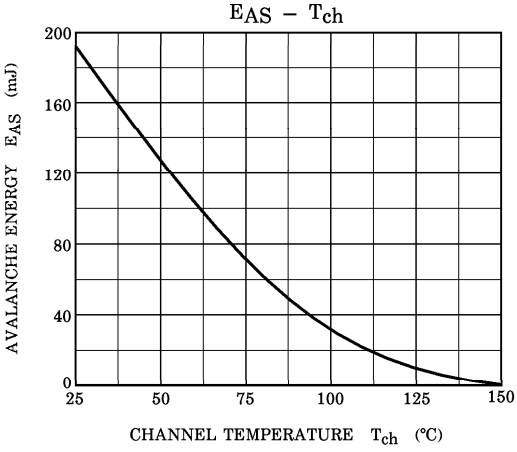
$r_{th} - t_w$

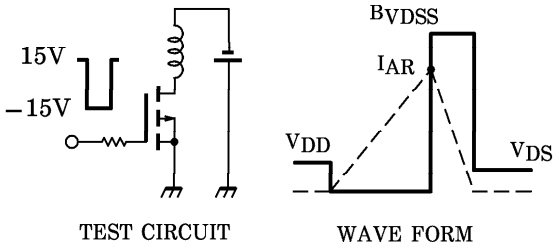


SAFE OPERATING AREA



$E_{AS} - T_{ch}$





TEST CIRCUIT WAVE FORM

Peak I_{AR} = −5A, R_G = 25Ω
V_{DD} = −50V, L = 12.6mH

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