

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

2SJ512

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

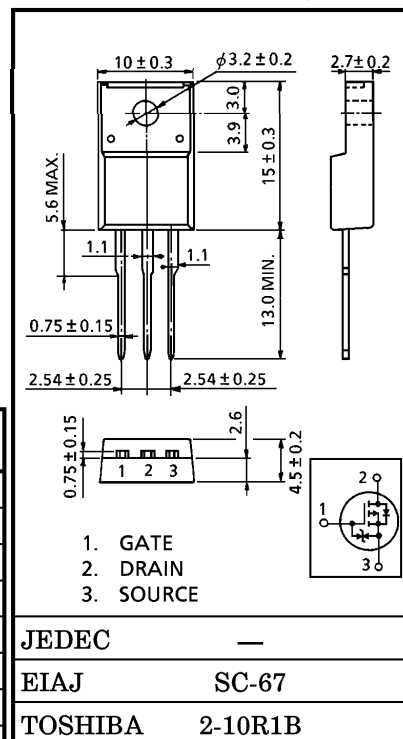
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 1.0\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 3.7S$ (Typ.)
- Low Leakage Current : $I_{DSS} = -100\mu A$ (Max.) ($V_{DS} = -250V$)
- Enhancement-Mode : $V_{th} = -1.5 \sim -3.5V$
($V_{DS} = -10V, I_D = -1mA$)

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	-250	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)	V_{DGR}	-250	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	DC	I_D	-5 A
	Pulse	I_{DP}	-20 A
Drain Power Dissipation ($T_c = 25^\circ C$)	P_D	30	W
Single Pulse Avalanche Energy**	E_{AS}	155	mJ
Avalanche Current	I_{AR}	-5	A
Repetitive Avalanche Energy*	E_{AR}	3.0	mJ
Chanel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature Range	T_{stg}	-55~150	$^\circ C$



JEDEC	—
EIAJ	SC-67
TOSHIBA	2-10R1B

THERMAL CHARACTERISTICS

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

Note ;

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

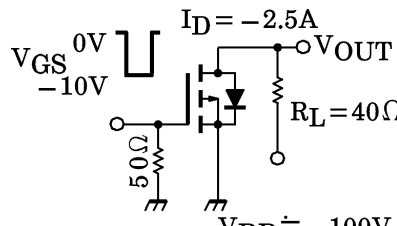
** $V_{DD} = -50V$, Starting $T_{ch} = 25^\circ C$, $L = 10.5mH$, $R_G = 25\Omega$, $I_{AR} = -5A$

This transistor is an electrostatic sensitive device.

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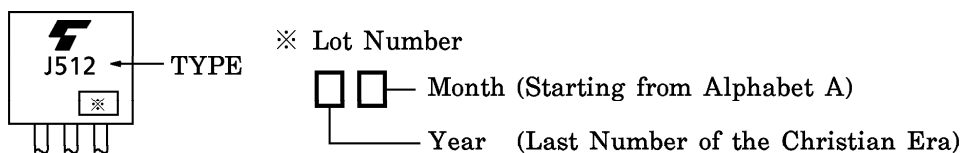
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

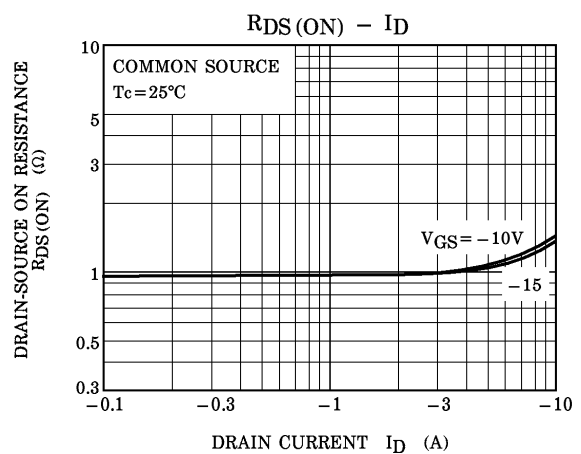
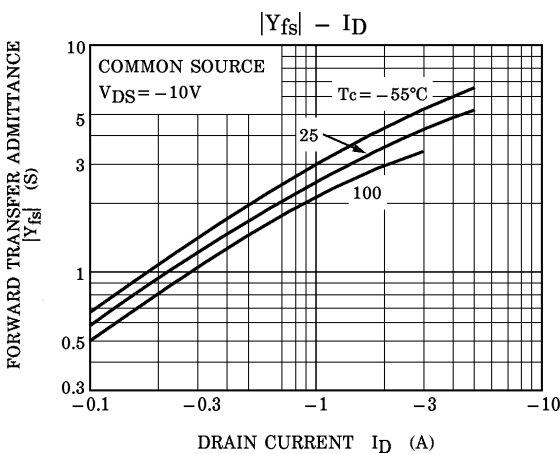
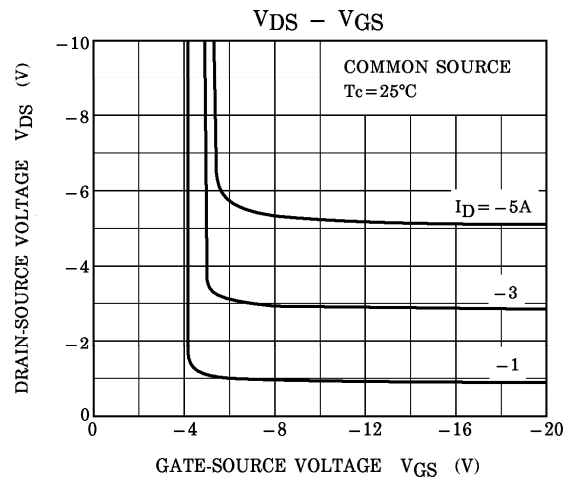
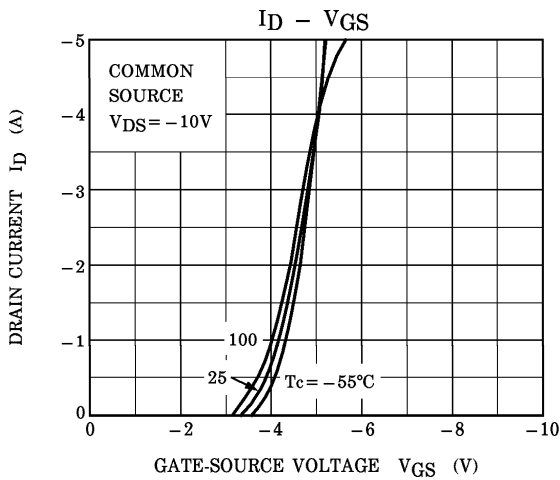
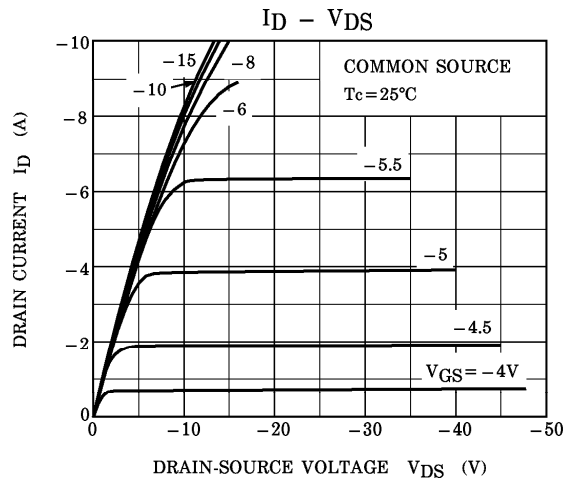
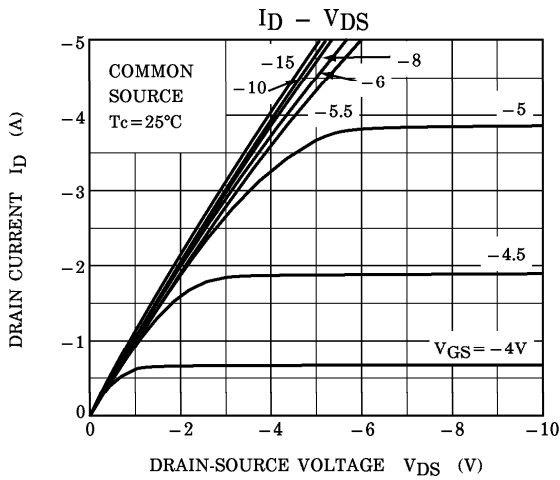
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	± 10	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = -250V, V_{GS} = 0V$	—	—	-100	μA
Drain-Source Breakdown Voltage		$V(BR)_{DSS}$	$I_D = -10mA, V_{GS} = 0V$	-250	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = -10V, I_D = -1mA$	-1.5	—	-3.5	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -2.5A$	—	1.0	1.25	Ω
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = -10V, I_D = -2.5A$	1.8	3.7	—	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}		—	250	—	
Switching Time	Rise Time	t_r	 <p>$I_D = -2.5A$ $V_{GS} = 0V, -10V$ $V_{DD} = -100V$ $R_L = 40\Omega$ 50Ω</p> <p>入力 : $t_r, t_f < 5ns$, Duty $\leq 1\%$, $t_w = 10\mu s$</p>	—	16	—	ns
	Turn-on Time	t_{on}		—	35	—	
	Fall Time	t_f		—	9	—	
	Turn-off Time	t_{off}		—	70	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} = -200V, V_{GS} = -10V$ $I_D = -5A$	—	22	—	nC
Gate-Source Charge		Q_{gs}		—	14	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	8	—	

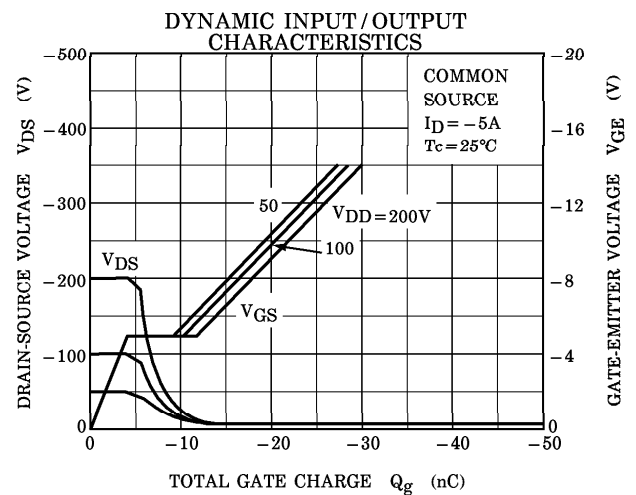
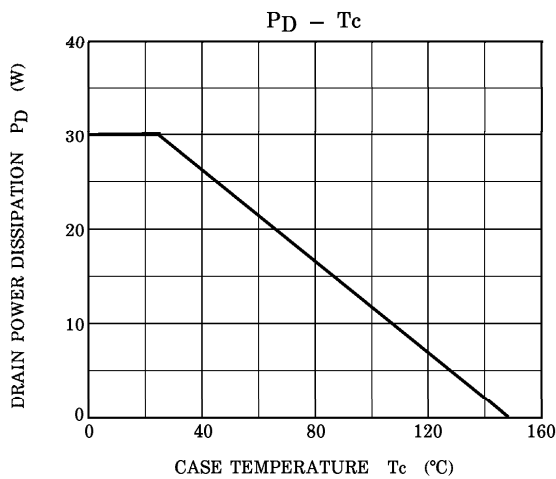
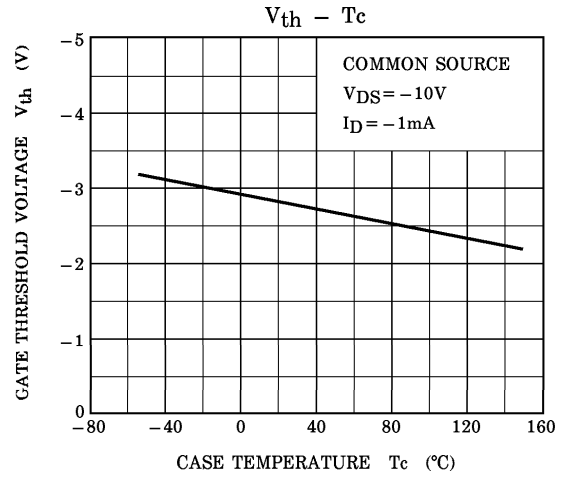
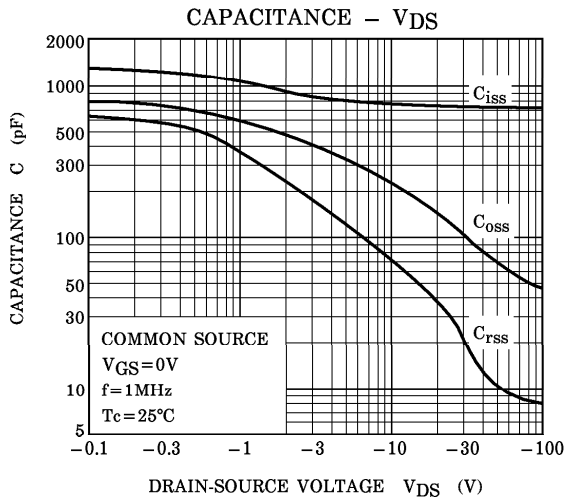
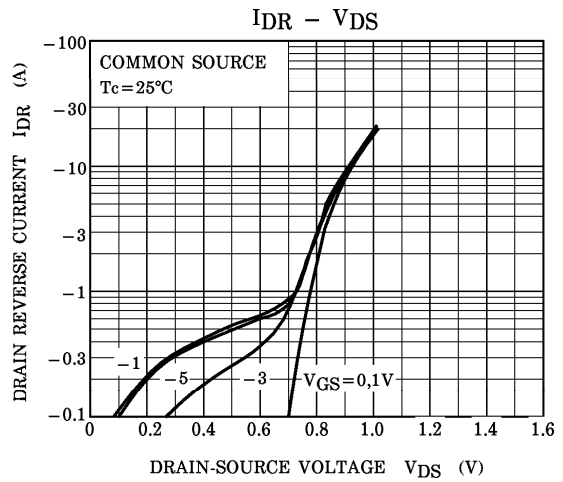
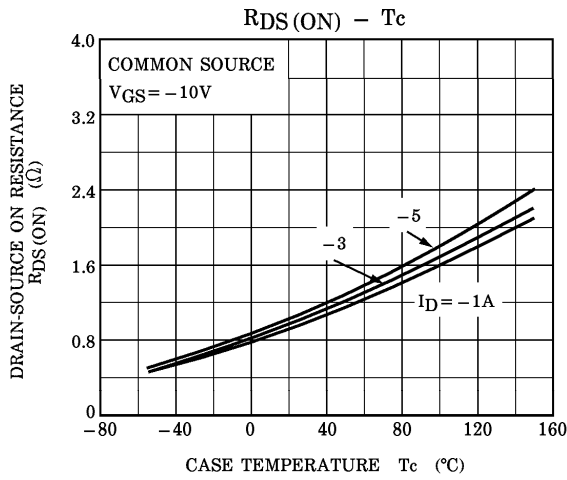
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

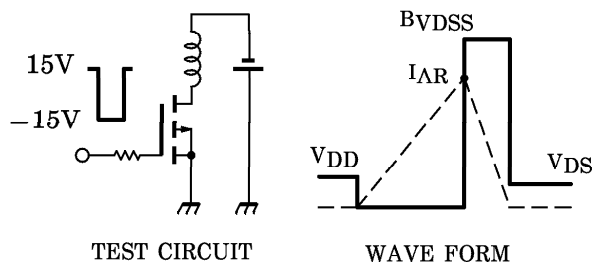
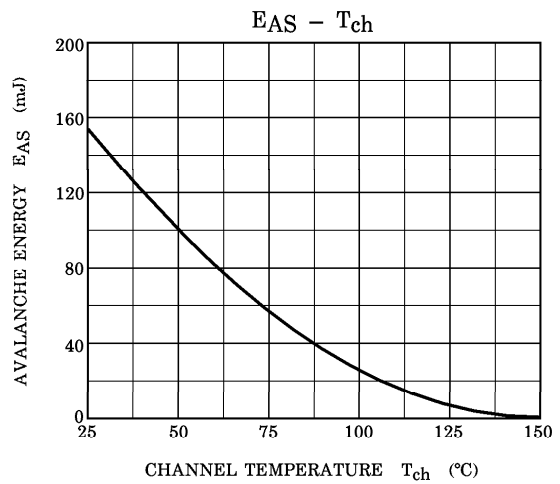
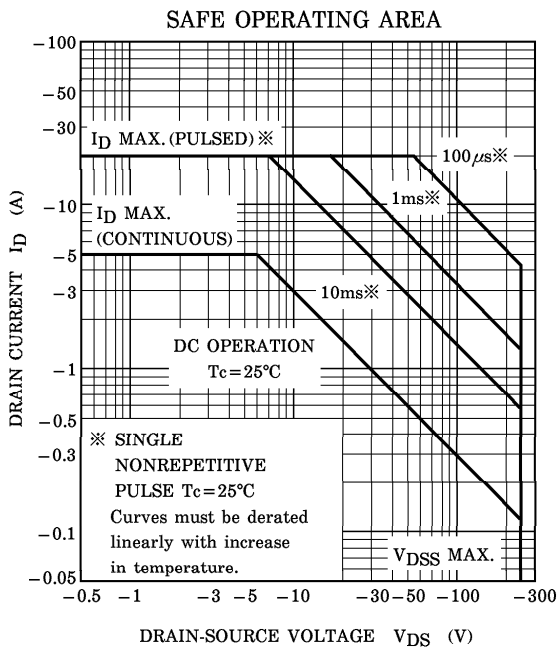
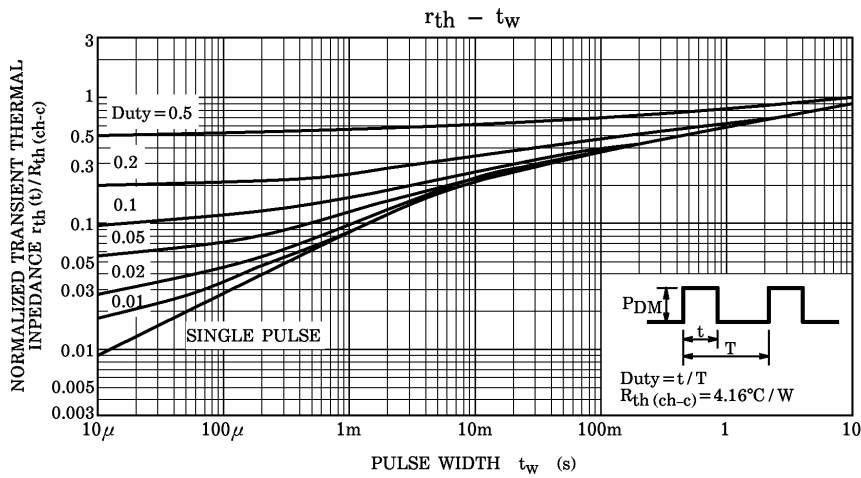
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	-5	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	-20	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = -5A, V_{GS} = 0V$	—	—	2.0	V
Reverse Recovery Time	t_{rr}	$I_{DR} = -5A, V_{GS} = 0V$	—	205	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR} / dt = 100A / \mu s$	—	2.1	—	μC

MARKING









$$\text{Peak } I_{AR} = -5\text{A}, R_G = 25\Omega, V_{DD} = -50\text{V}, L = 10.5\text{mH}$$

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