

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (L<sup>2</sup>-π-MOSV)

# 2SJ511

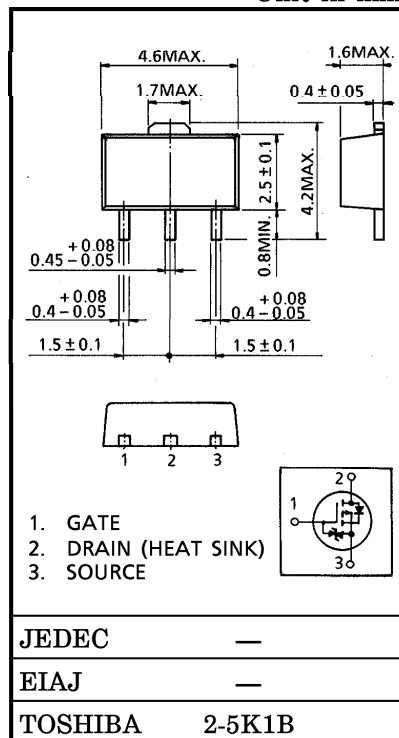
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS  
 CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS  
 Unit in mm

- 4V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 0.32\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 1.4S$  (Typ.)
- Low Leakage Current :  $I_{DSS} = -100\mu A$  (Max.) ( $V_{DS} = -30V$ )
- Enhancement-Mode :  $V_{th} = -0.8 \sim -2.0V$   
 ( $V_{DS} = -10V, I_D = -1mA$ )

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	-30	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )		$V_{DGR}$	-30	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	-2	A
	Pulse	$I_{DP}$	-6	A
Drain Power Dissipation***		$P_D$	1.5	W
Single Pulse Avalanche Energy**		$E_{AS}$	55	mJ
Avalanche Current		$I_{AR}$	-2	A
Repetitive Avalanche Energy*		$E_{AR}$	0.15	mJ
Channel Temperature		$T_{ch}$	150	°C
Storage Temperature Range		$T_{stg}$	-55~150	°C



Weight : 0.05g (Typ.)

MARKING



THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	250	°C/W

Note ;

- \* Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- \*\*  $V_{DD} = -25V$ , Starting  $T_{ch} = 25°C$ ,  $L = 10mH$ ,  $R_G = 25\Omega$ ,  $I_{AR} = -2A$
- \*\*\* Mounted on ceramic substrate (1inch<sup>2</sup>×0.8t)

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

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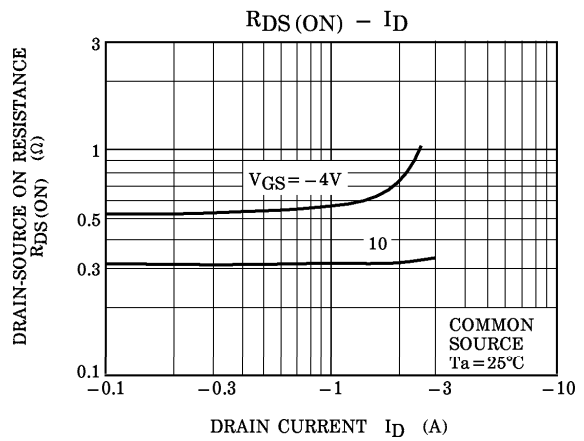
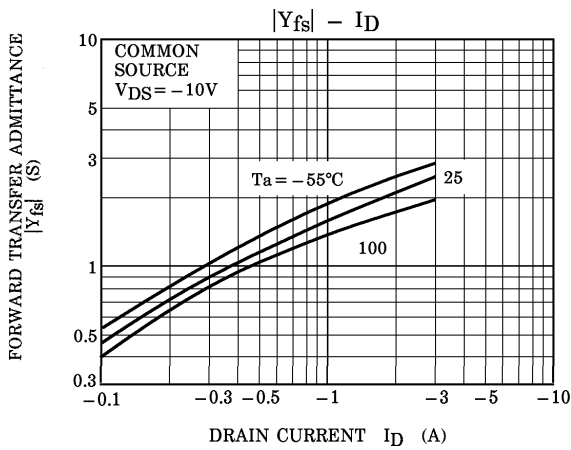
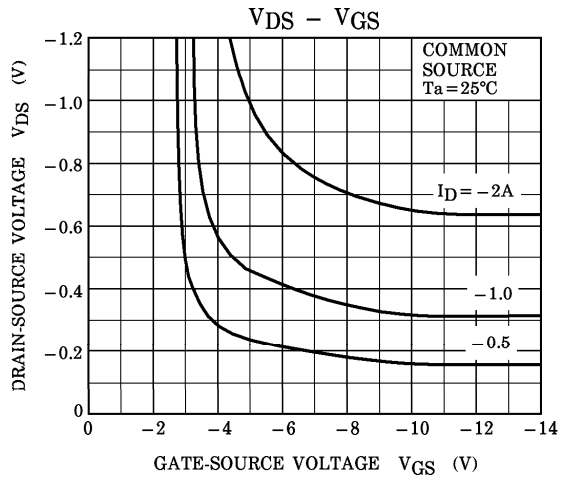
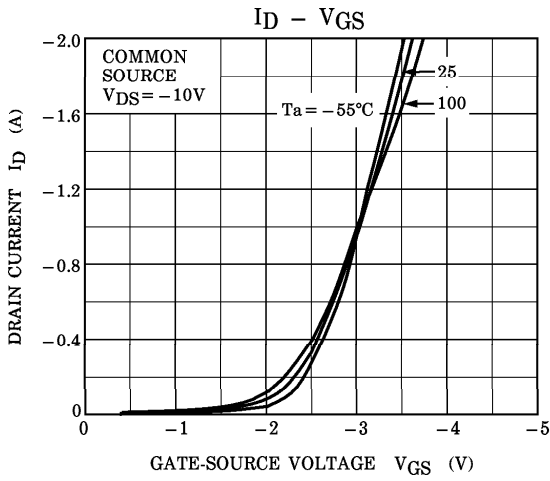
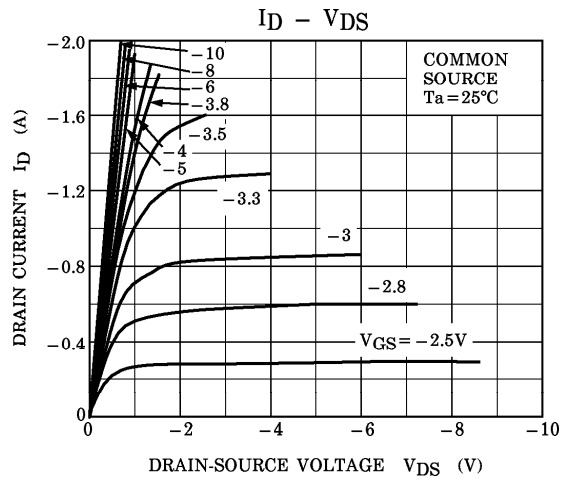
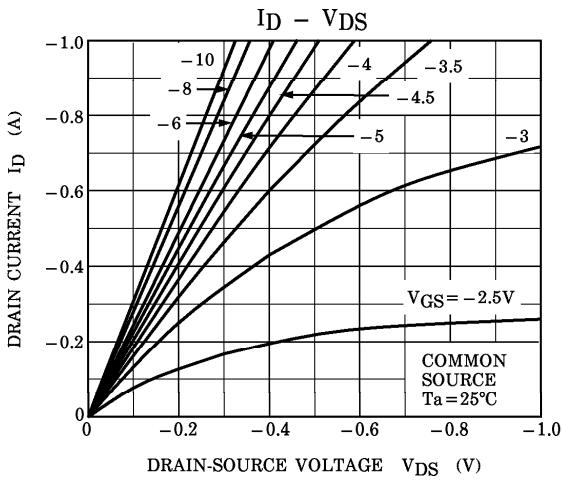
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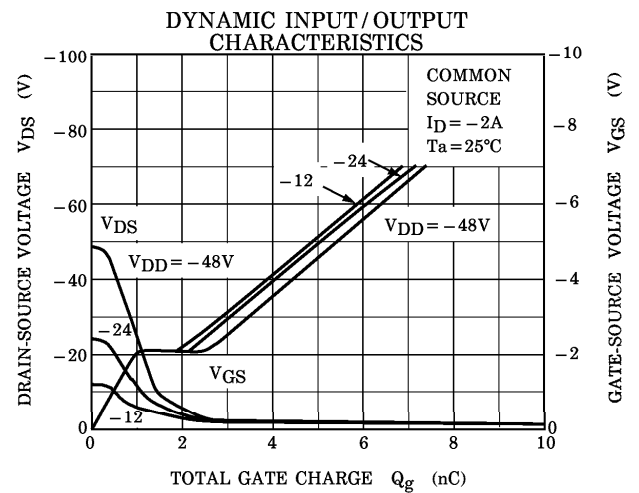
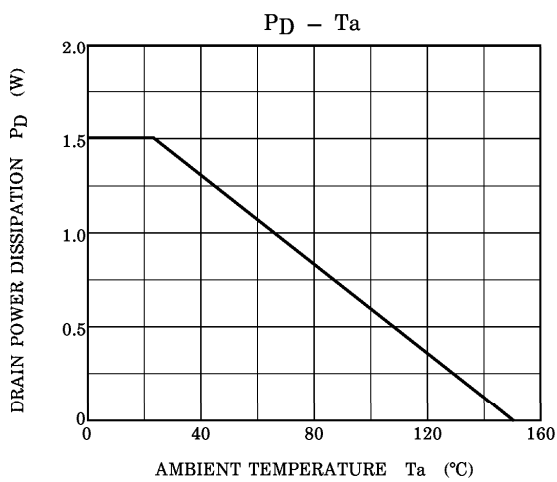
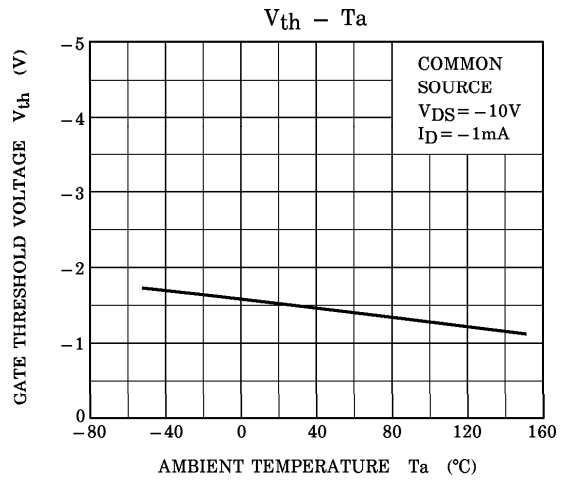
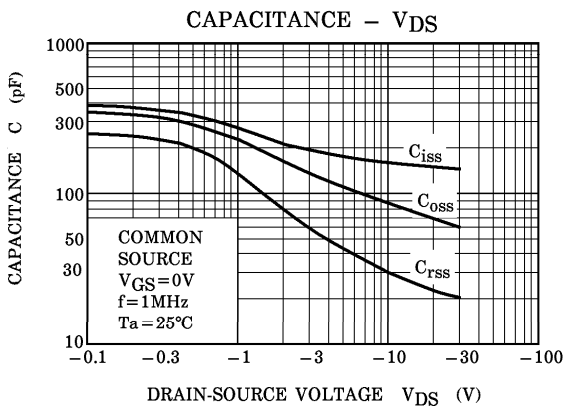
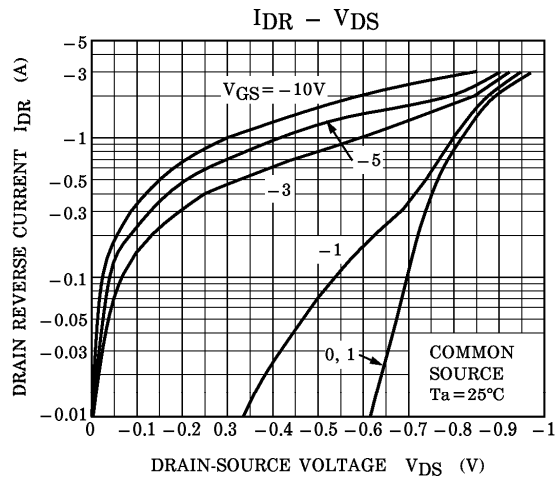
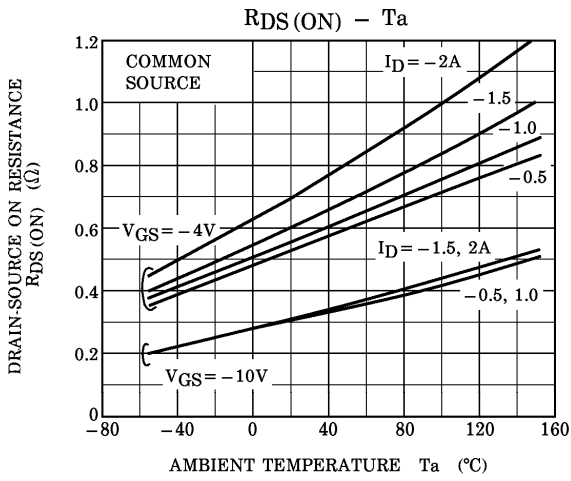
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

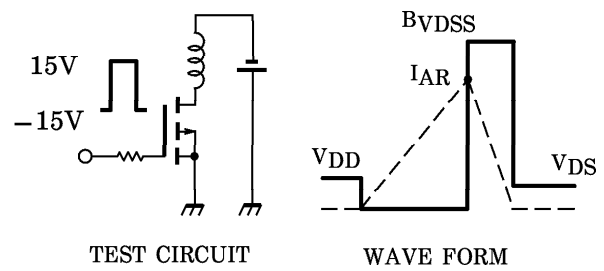
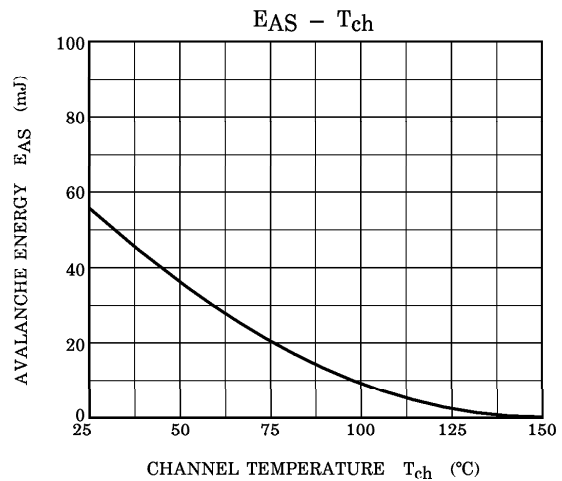
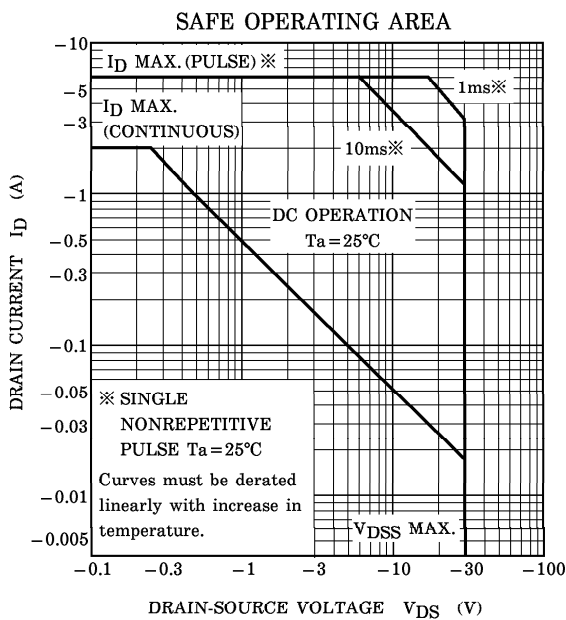
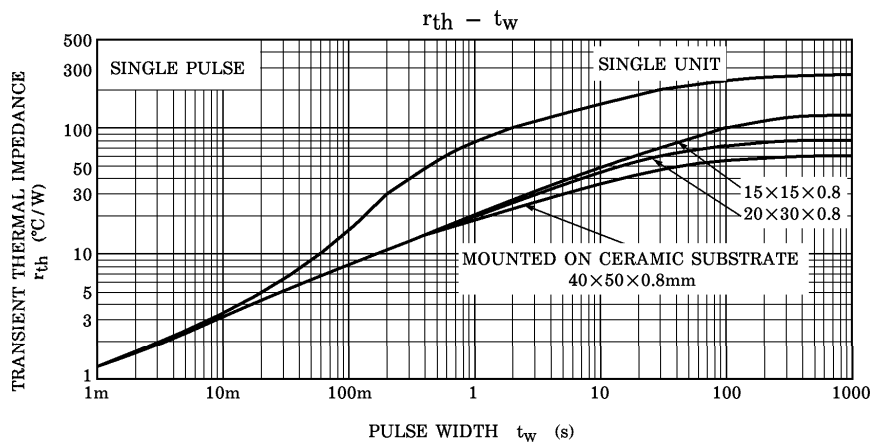
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		$I_{GSS}$	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	$\pm 10$	$\mu A$
Drain Cut-off Current		$I_{DSS}$	$V_{DS} = -30V, V_{GS} = 0V$	—	—	-100	$\mu A$
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D = -10mA, V_{GS} = 0V$	-30	—	—	V
Gate Threshold Voltage		$V_{th}$	$V_{DS} = -10V, I_D = -1mA$	-0.8	—	-2.0	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = -4V, I_D = -1A$	—	0.55	0.76	$\Omega$
			$V_{GS} = -10V, I_D = -1A$	—	0.32	0.45	
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = -10V, I_D = -1A$	0.7	1.4	—	S
Input Capacitance		$C_{iss}$	$V_{DS} = -10V, V_{GS} = 0V,$ $f = 1MHz$	—	160	—	pF
Reverse Transfer Capacitance		$C_{rss}$		—	30	—	
Output Capacitance		$C_{oss}$		—	85	—	
Switching Time	Rise Time	$t_r$	<p><math>V_{GS} = -10V, 0V</math> <math>I_D = -1A</math> <math>R_L = 15\Omega</math> <math>V_{DD} = -15V</math></p>	—	30	—	ns
	Turn-on Time	$t_{on}$		—	45	—	
	Fall Time	$t_f$		—	30	—	
	Turn-off Time	$t_{off}$		$V_{IN} : t_r, t_f < 5ns,$ $Duty \leq 1\%, t_w = 10\mu s$	—	120	
Total Gate Charge (Gate-Source Plus Gate-Drain)		$Q_g$	$V_{DD} = -24V, V_{GS} = -10V,$ $I_D = -2A$	—	5.5	—	nC
Gate-Source Charge		$Q_{gs}$		—	4.3	—	
Gate-Drain (“Miller”) Charge		$Q_{gd}$		—	1.2	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	-2	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	-6	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = -2A, V_{GS} = 0V$	—	—	1.5	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = -2A, V_{GS} = 0V$	—	40	—	ns
Reverse Recovery Charge	$Q_{rr}$	$dI_{DR} / dt = 50A / \mu s$	—	18	—	nC







Peak  $I_{AR} = -2A$ ,  $R_G = 25\Omega$ ,  $V_{DD} = -25V$ ,  $L = 10mH$

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