

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

# 2SJ334

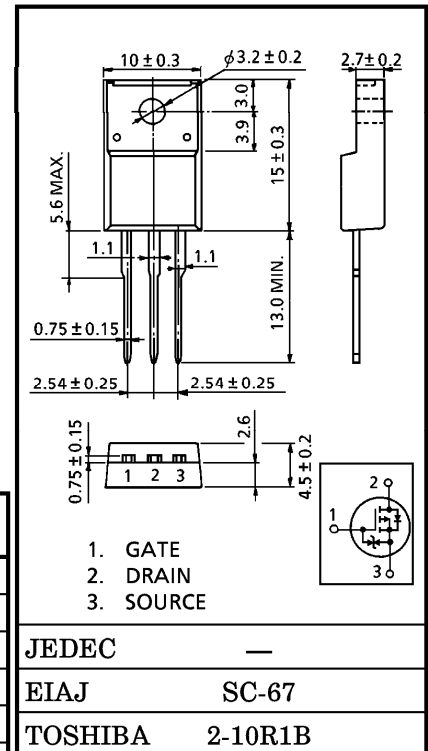
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS  
DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS  
Unit in mm

- 4V Gate Drive
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 29\text{ m}\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 23\text{ S}$  (Typ.)
- Low Leakage Current :  $I_{DSS} = -100\text{ }\mu\text{A}$  (Max.) ( $V_{DS} = -60\text{ V}$ )
- Enhancement-Mode :  $V_{th} = -0.8 \sim -2.0\text{ V}$  ( $V_{DS} = -10\text{ V}$ ,  $I_D = -1\text{ mA}$ )

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	-60	V
Drain-Gate Voltage ( $R_{GS} = 20\text{ k}\Omega$ )		$V_{DGR}$	-60	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	-30	A
	Pulse	$I_{DP}$	-120	A
Drain Power Dissipation ( $T_c = 25^\circ\text{C}$ )		$P_D$	45	W
Single Pulse Avalanche Energy**		$E_{AS}$	936	mJ
Avalanche Current		$I_{AR}$	-30	A
Repetitive Avalanche Energy*		$E_{AR}$	4.5	mJ
Channel Temperature		$T_{ch}$	150	°C
Storage Temperature Range		$T_{stg}$	-55~150	°C



Weight : 1.9 g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	2.78	°C/W
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	62.5	°C/W

Note ;

- \* Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- \*\*  $V_{DD} = -50\text{ V}$ ,  $T_{ch} = 25^\circ\text{C}$  (initial),  $L = 747\text{ }\mu\text{H}$ ,  $R_G = 25\text{ }\Omega$ ,  $I_{AR} = -30\text{ A}$

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

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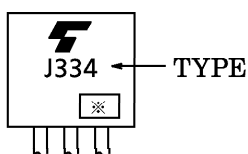
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		$I_{GSS}$	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$
Drain Cut-off Current		$I_{DSS}$	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$	—	—	-100	$\mu\text{A}$
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D = -10\text{ mA}, V_{GS} = 0\text{ V}$	-60	—	—	V
Gate Threshold Voltage		$V_{th}$	$V_{DS} = -10\text{ V}, I_D = -1\text{ mA}$	-0.8	—	-2.0	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$V_{GS} = -4\text{ V}, I_D = -15\text{ A}$	—	46	60	m $\Omega$
			$V_{GS} = -10\text{ V}, I_D = -15\text{ A}$	—	29	38	
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -15\text{ A}$	14	23	—	S
Input Capacitance		$C_{iss}$	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	—	3300	—	pF
Reverse Transfer Capacitance		$C_{rss}$		—	460	—	
Output Capacitance		$C_{oss}$		—	1450	—	
Switching Time	Rise Time	$t_r$		—	20	—	ns
	Turn-on Time	$t_{on}$		—	25	—	
	Fall Time	$t_f$		—	35	—	
	Turn-off Time	$t_{off}$		$V_{IN} : t_r, t_f < 5\text{ ns}$ $Duty \leq 1\%, t_w = 10\text{ }\mu\text{s}$	—	130	
Total Gate Charge (Gate-Source Plus Gate-Drain)		$Q_g$	$V_{DD} \doteq -48\text{ V}, V_{GS} = -10\text{ V},$ $I_D = -30\text{ A}$	—	110	—	nC
Gate-Source Charge		$Q_{gs}$		—	75	—	
Gate-Drain ("Miller") Charge		$Q_{gd}$		—	35	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	30	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	120	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = -30\text{ A}, V_{GS} = 0\text{ V}$	—	—	1.7	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = -30\text{ A}, V_{GS} = 0\text{ V}$ $dI_{DR}/dt = 50\text{ A}/\mu\text{s}$	—	100	—	ns
Reverse Recovery Charge	$Q_{rr}$		—	0.16	—	$\mu\text{C}$

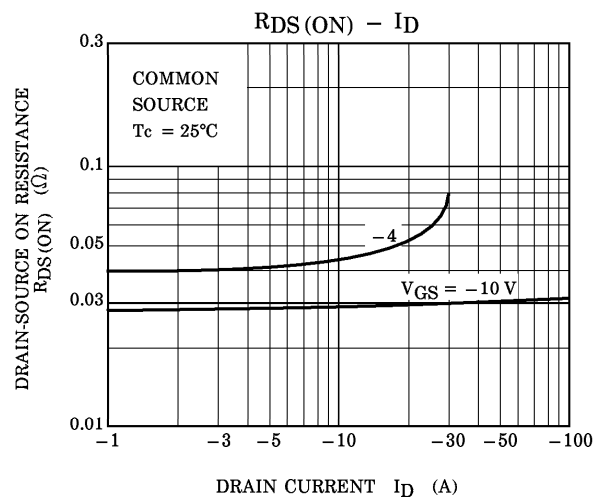
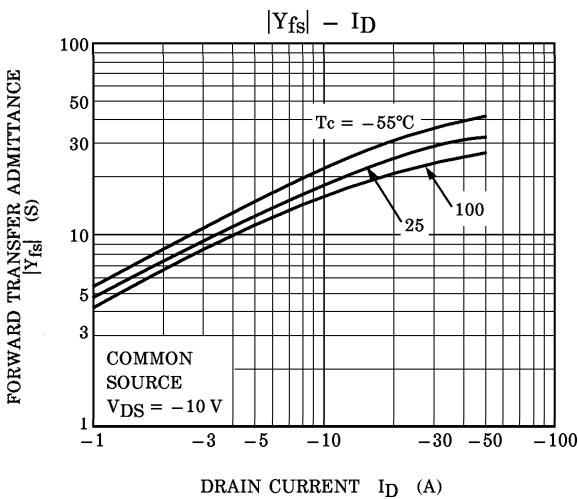
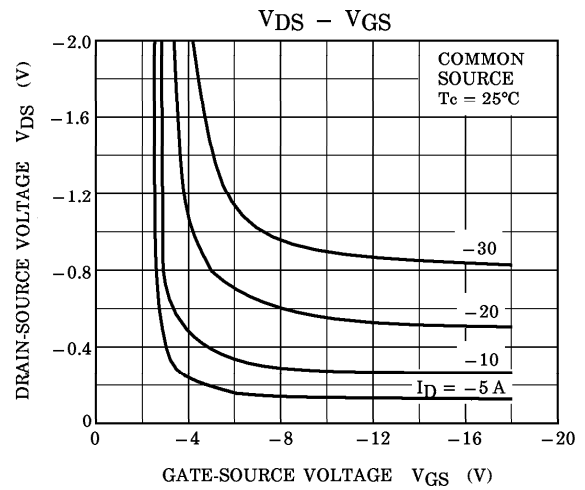
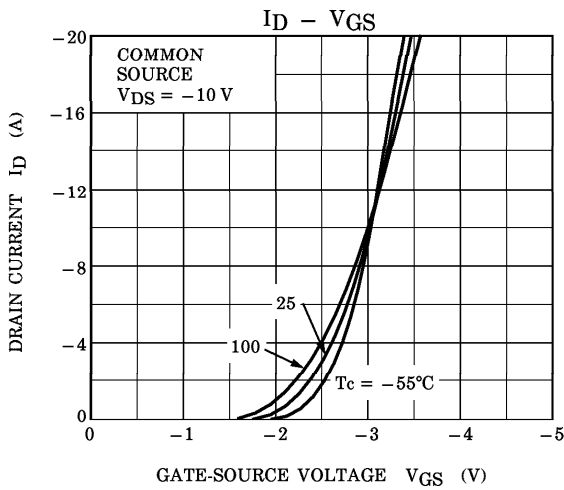
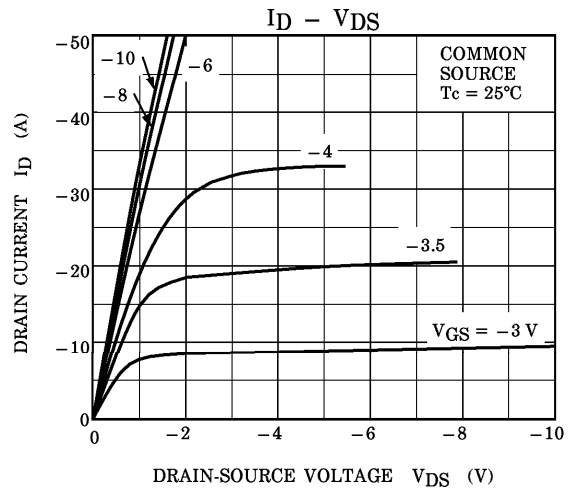
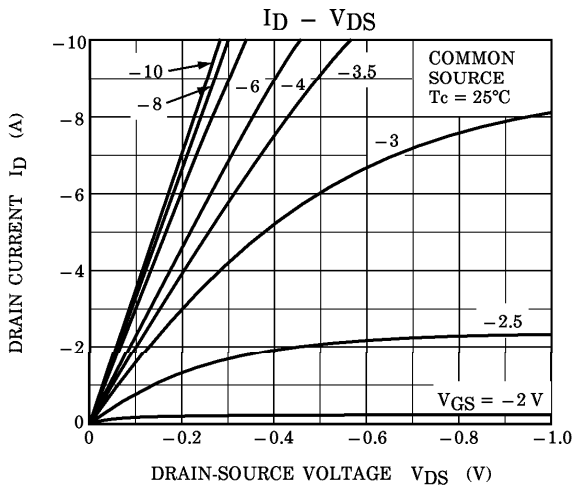
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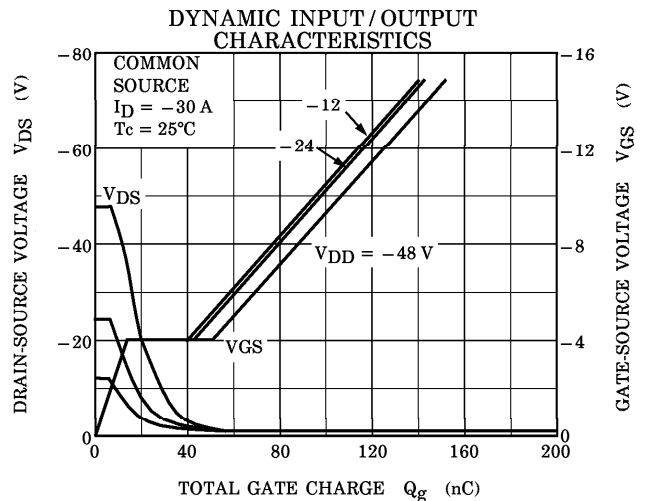
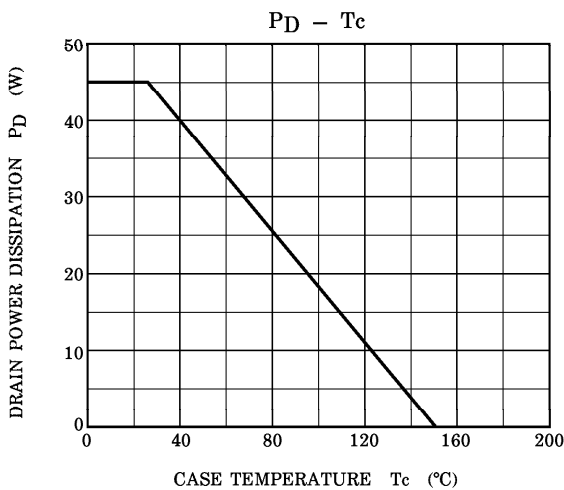
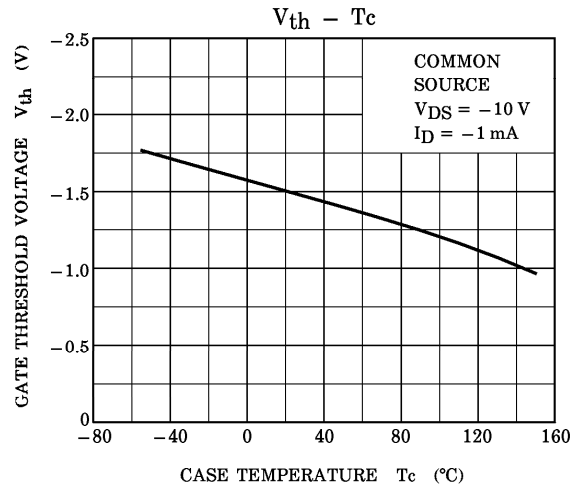
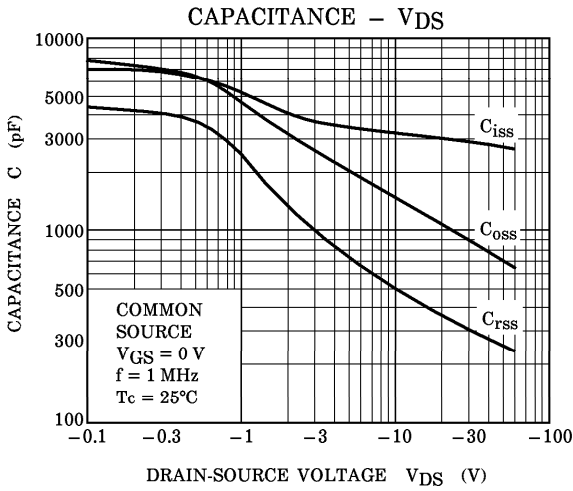
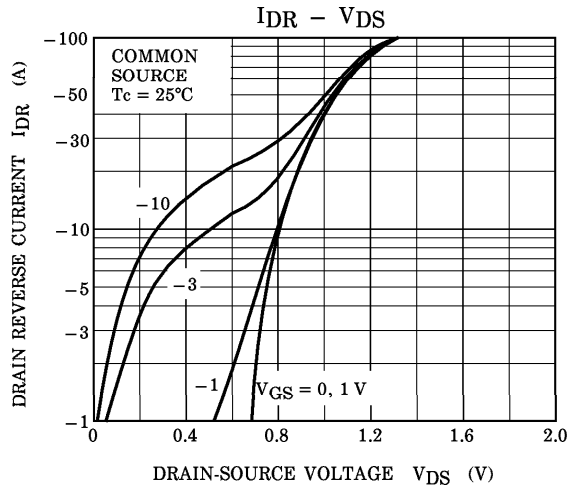
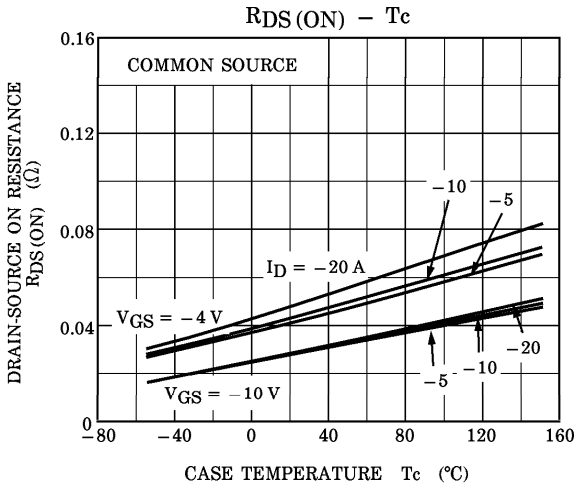


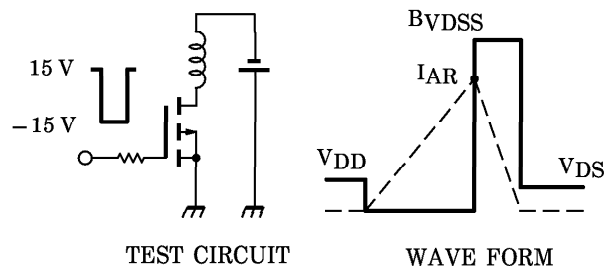
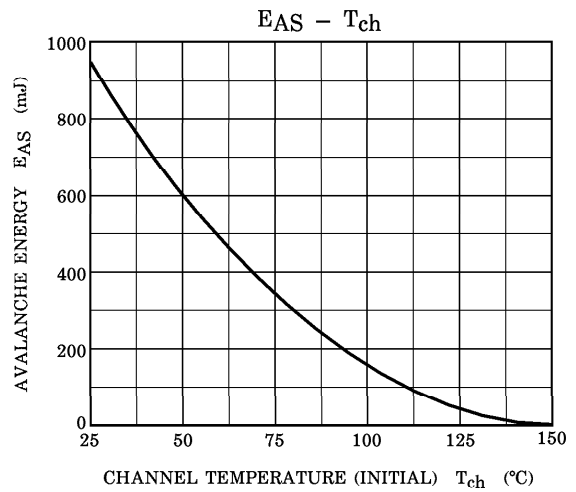
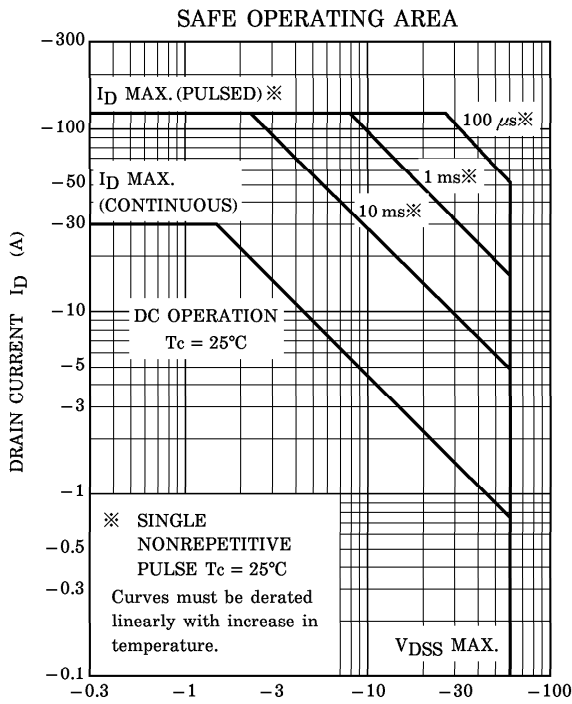
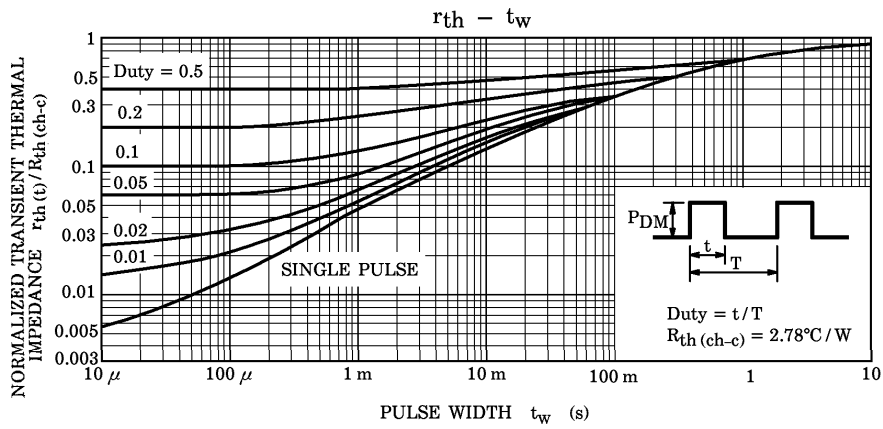
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak  $I_{AR} = -30$  A,  $R_G = 25 \Omega$   
 $V_{DD} = -50$  V,  $L = 747 \mu H$

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