

TENTATIVE TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (U-MOSII)

TPC8303

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

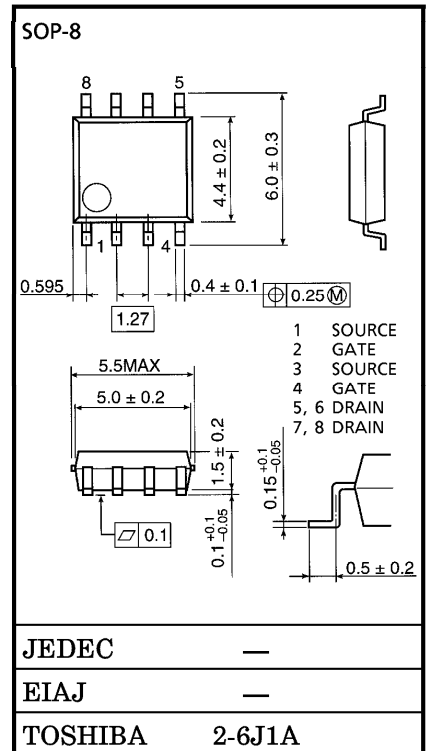
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 27\text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance: $|Y_{fs}| = 7\text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = -10\text{ }\mu\text{A}$ (Max.) ($V_{DS} = -30\text{ V}$)
- Enhancement-Mode : $V_{th} = -0.8 \sim -2.0\text{ V}$
($V_{DS} = -10\text{ V}$, $I_D = -1\text{ mA}$)

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

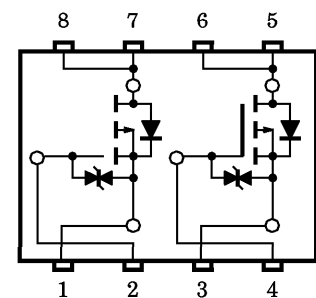
CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	-30	V
Drain-Gate Voltage ($R_{GS} = 20\text{ k}\Omega$)	V_{DGR}	-30	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	DC	I_D	-4.5
	Pulse	I_{DP}	-18
Drain Power Dissipation*** ($T_a = 25^\circ\text{C}$)	P_D	2.0	W
Single Pulse Avalanche Energy**	E_{AS}	26	mJ
Avalanche Current	I_{AR}	-4.5	A
Repetitive Avalanche Energy*	E_{AR}	0.2	mJ
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55~150	$^\circ\text{C}$



THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient***	$R_{th(ch-a)}$	62.5	$^\circ\text{C/W}$

CIRCUIT CONFIGURATION



Note ;

- * Repetitive rating ; Pulse Width Limited by Max. Junction temperature.
- ** $V_{DD} = -24\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0\text{ mH}$, $R_G = 25\text{ }\Omega$, $I_{AR} = -4.5\text{ A}$
- *** Drive operation ; Mount on glass epoxy board [$1\text{ inch}^2 \times 0.8\text{ t}$] in the two devices driving ($t = 10\text{ s}$)

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

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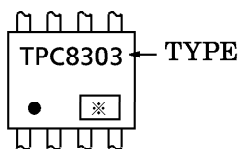
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain Cut-Off Current		I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$	—	—	-10	μA
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -10\text{ mA}, V_{GS} = 0\text{ V}$		-30	—	—	V
	$V_{(BR)DSX}$						
Gate Threshold Voltage		V_{th}	$V_{DS} = -10\text{ V}, I_D = -1\text{ mA}$	-0.8	—	-2.0	V
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = -4\text{ V}, I_D = -2.2\text{ A}$		—	55	65	$\text{m}\Omega$
	$R_{DS(ON)}$						
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -2.2\text{ A}$	3.5	7	—	S
Input Capacitance		C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	—	970	—	pF
Reverse Transfer Capacitance		C_{rss}					
Output Capacitance		C_{oss}					
Switching Time	Rise Time	t_r		—	17	—	ns
	Turn-On Time	t_{on}					
	Fall Time	t_f					
	Turn-Off Time	t_{off}					
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} \cong -24\text{ V}, V_{GS} = -10\text{ V}$ $I_D = -4.5\text{ A}$	—	28	—	nC
Gate-Source Charge		Q_{gs}					
Gate-Drain ("Miller") Charge		Q_{gd}					

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	-4.5	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	-18	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = -4.5\text{ A}, V_{GS} = 0\text{ V}$	—	—	1.2	V

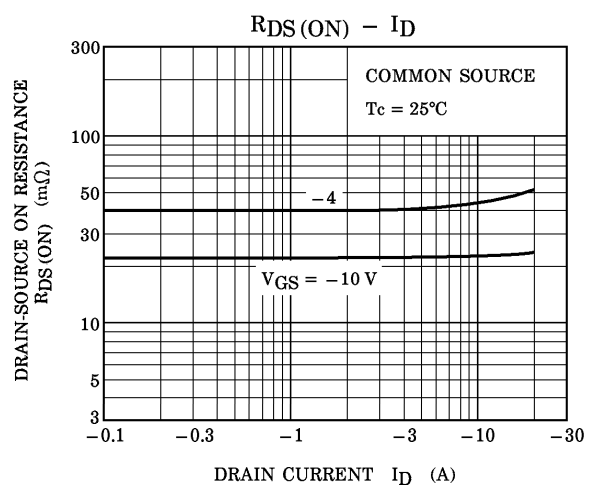
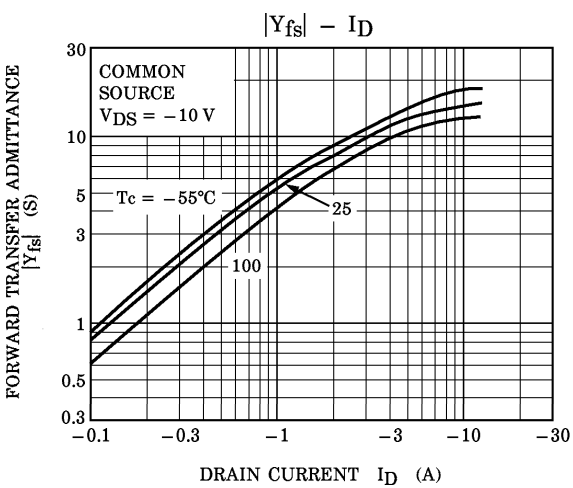
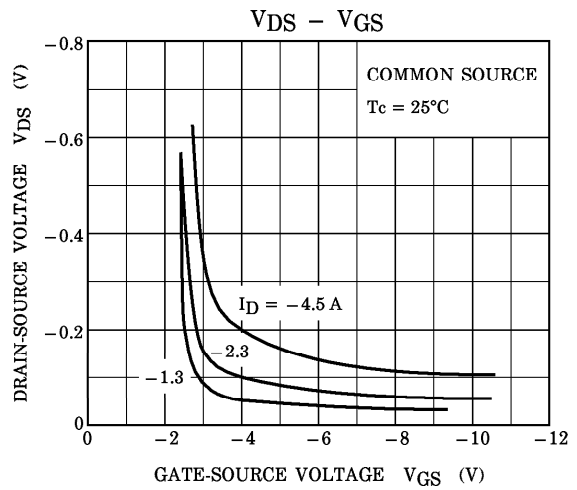
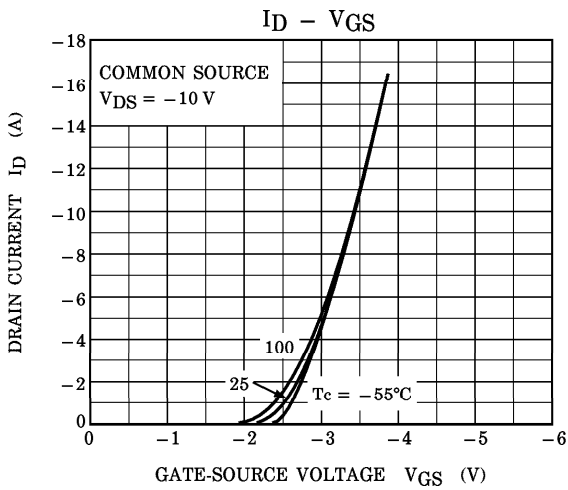
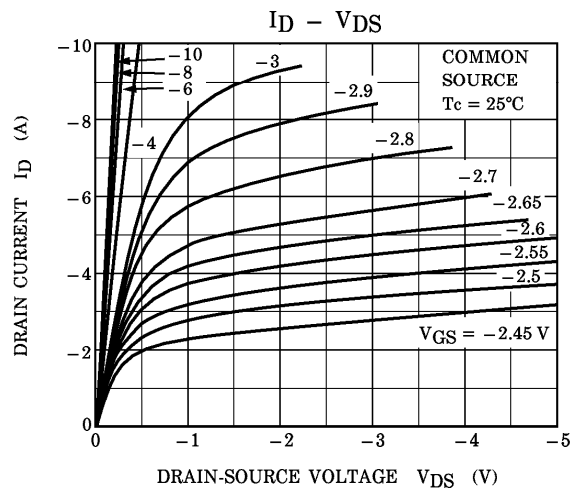
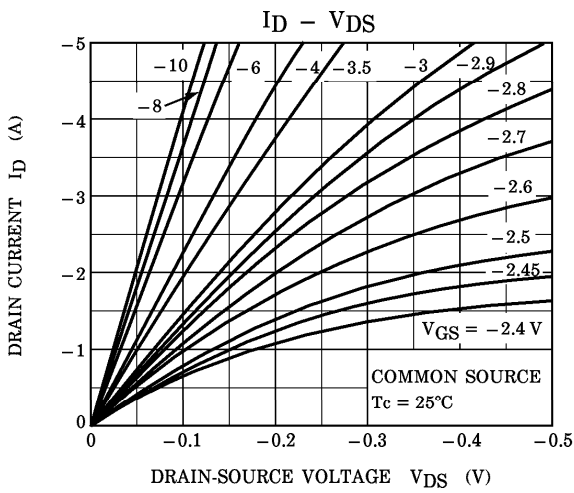
MARKING

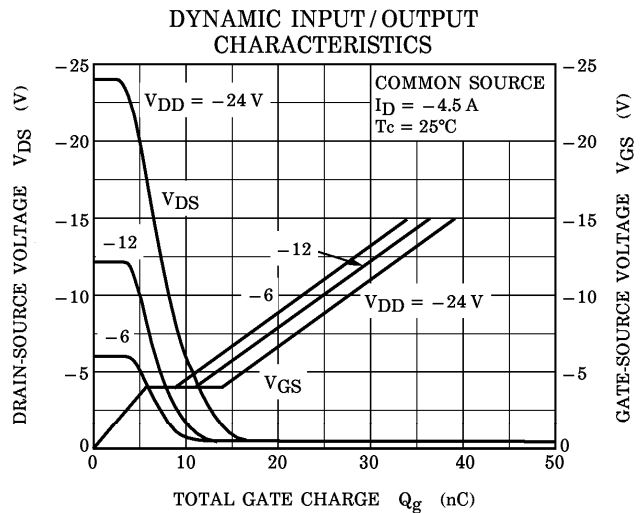
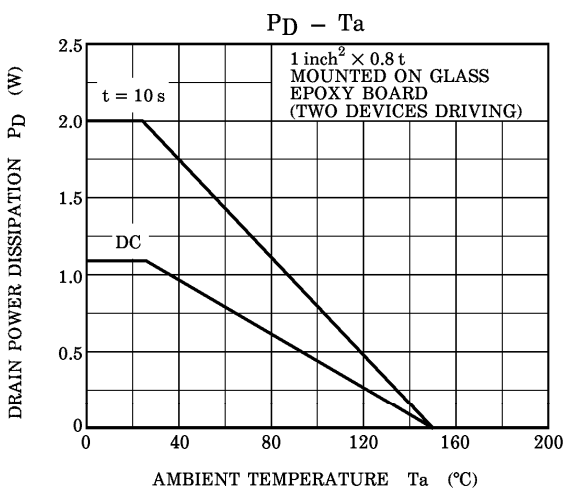
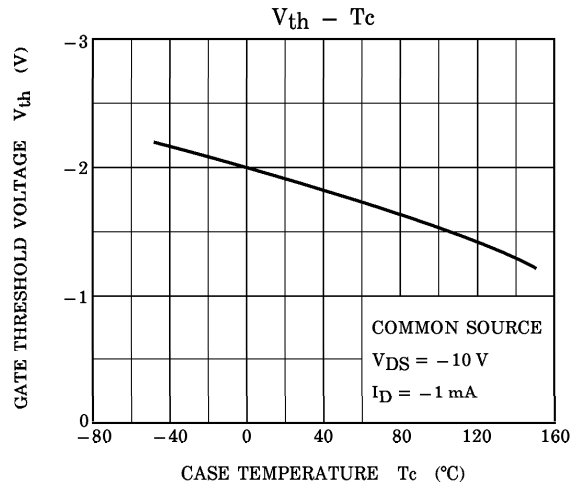
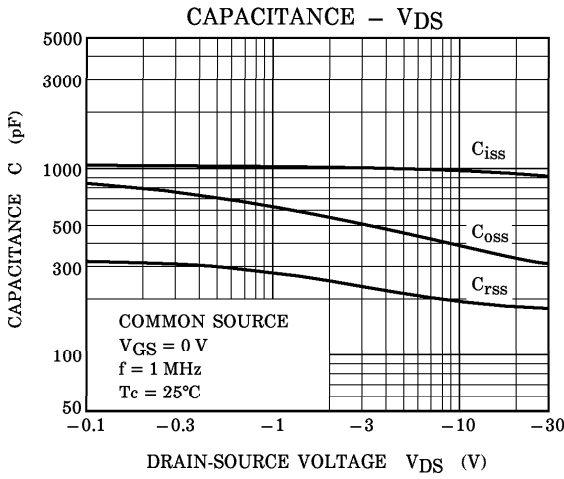
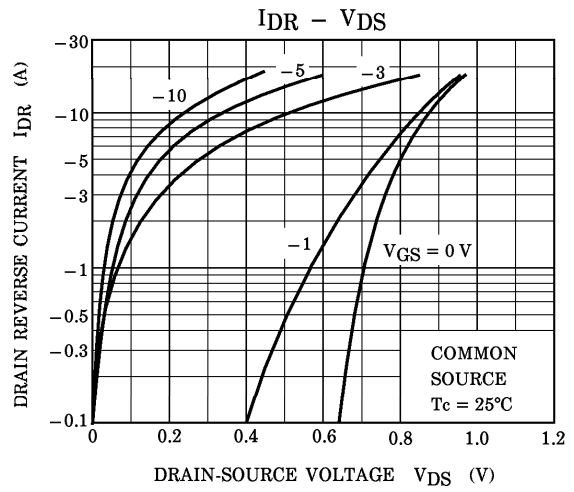
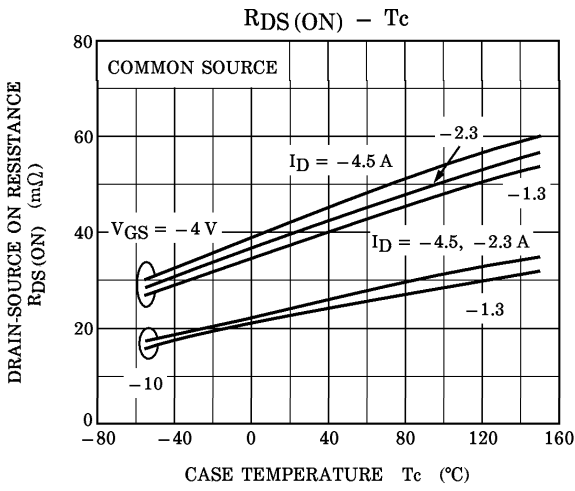


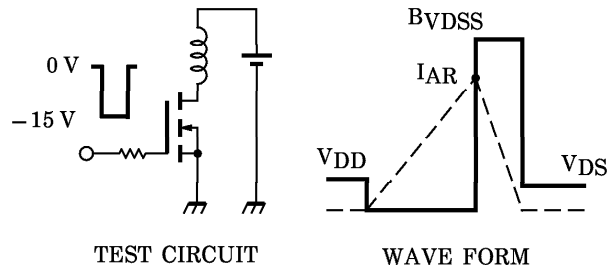
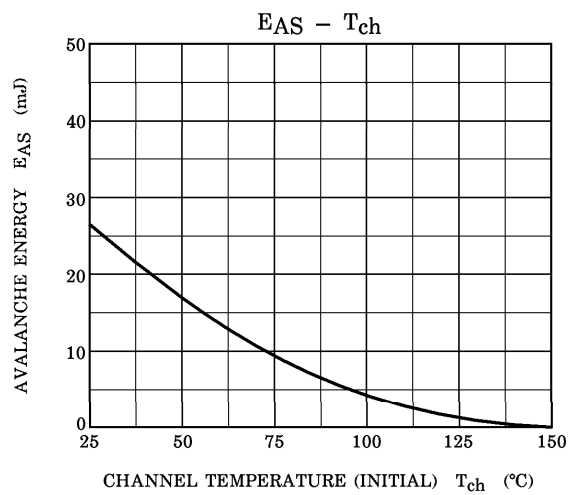
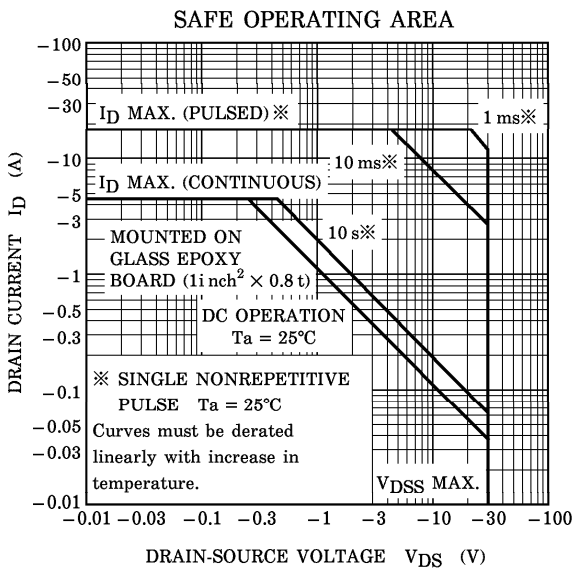
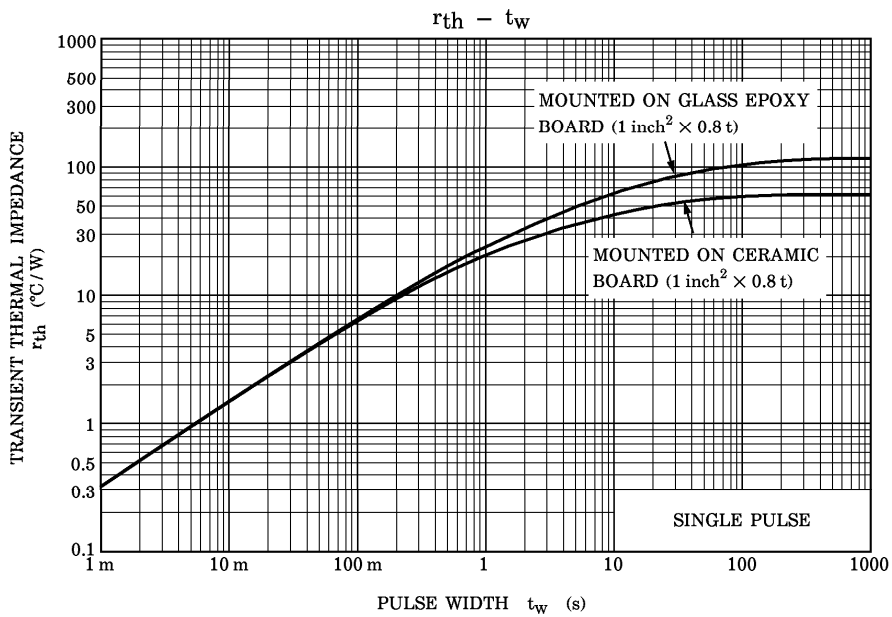
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR} = -4.5 \text{ A}$, $R_G = 25 \Omega$, $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$
 $V_{DD} = -24 \text{ V}$, $L = 1.0 \text{ mH}$