

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

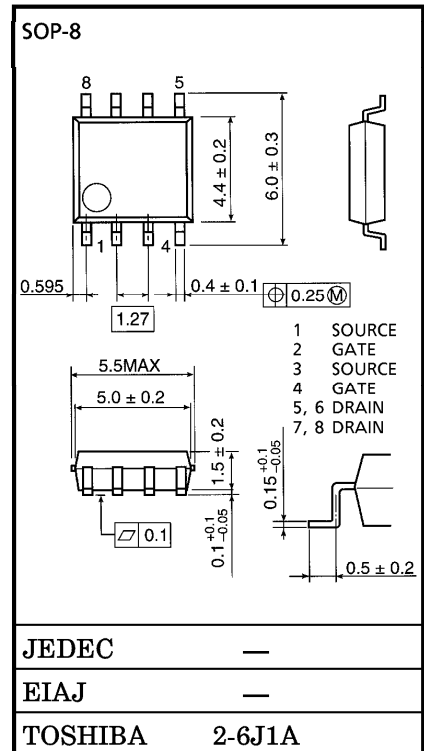
INDUSTRIAL APPLICATIONS

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

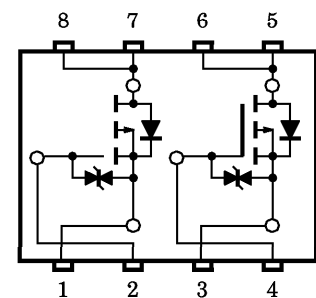
CHARACTERISTIC	SYMBOL	RATING	UNIT	
Drain-Source Voltage	V_{DSS}	-30	V	
Drain-Gate Voltage ($R_{GS} = 20\text{ k}\Omega$)	V_{DGR}	-30	V	
Gate-Source Voltage	V_{GSS}	± 20	V	
Drain Current	DC	I_D	-4.5	A
	Pulse	I_{DP}	-18	A
Drain Power Dissipation*** ($T_a = 25^\circ\text{C}$)	P_D	2.0	W	
Single Pulse Avalanche 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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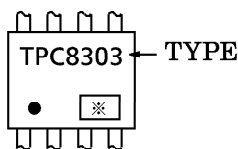
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	—	—	±10	μA
Drain Cut-Off Current		I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V	—	—	-10	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I _D = -10 mA, V _{GS} = 0 V	-30	—	—	V
		V (BR) DSX	I _D = 10 mA, V _{GS} = 20 V	15	—	—	
Gate Threshold Voltage		V _{th}	V _{DS} = -10 V, I _D = -1 mA	-0.8	—	-2.0	V
Drain-Source ON Resistance		R _{DS (ON)}	V _{GS} = -4 V, I _D = -2.2 A	—	55	65	mΩ
		R _{DS (ON)}	V _{GS} = -10 V, I _D = -2.2 A	—	27	35	
Forward Transfer Admittance		Y _{fs}	V _{DS} = -10 V, I _D = -2.2 A	3.5	7	—	S
Input Capacitance		C _{iSS}	V _{DS} = -10 V, V _{GS} = 0 V, f = 1 MHz	—	970	—	pF
Reverse Transfer Capacitance		C _{rSS}		—	180	—	
Output Capacitance		C _{oss}		—	370	—	
Switching Time	Rise Time	t _r	<p>V_{GS} 0 V, -10 V, I_D = -2.2 A, V_{OUT}, R_L = 6.8 Ω, V_{DD} ≐ -15 V</p> <p>V_{IN} : t_r, t_f < 5 ns, Duty ≤ 1%, t_w = 10 μs</p>	—	17	—	ns
	Turn-On Time	t _{on}		—	20	—	
	Fall Time	t _f		—	75	—	
	Turn-Off Time	t _{off}		—	160	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q _g	V _{DD} ≐ -24 V, V _{GS} = -10 V I _D = -4.5 A	—	28	—	nC
Gate-Source Charge		Q _{gs}		—	16	—	
Gate-Drain ("Miller") Charge		Q _{gd}		—	12	—	

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 A, V _{GS} = 0 V	—	—	1.2	V

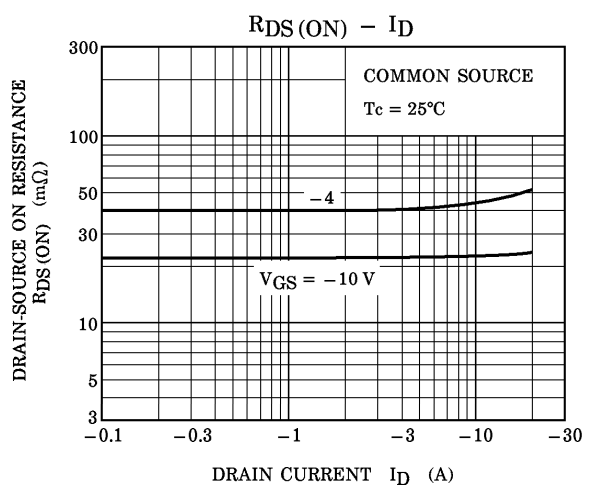
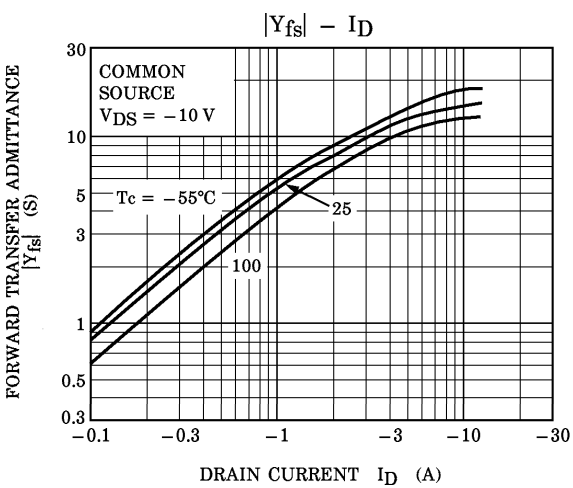
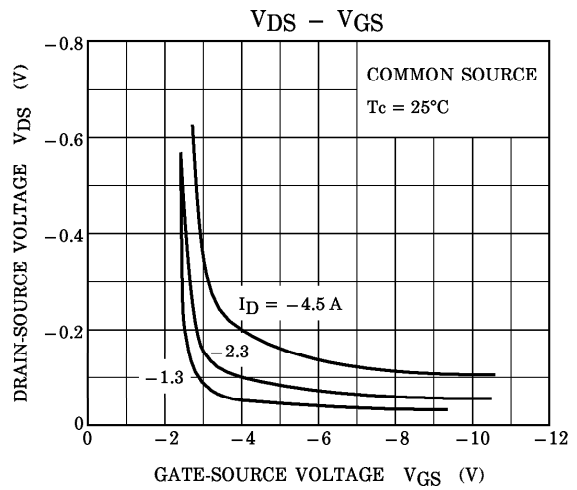
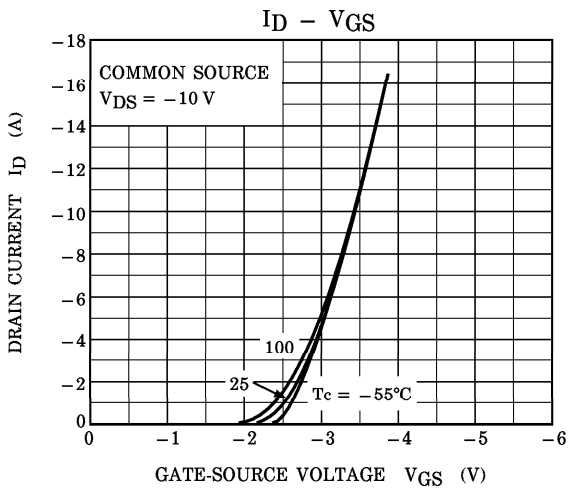
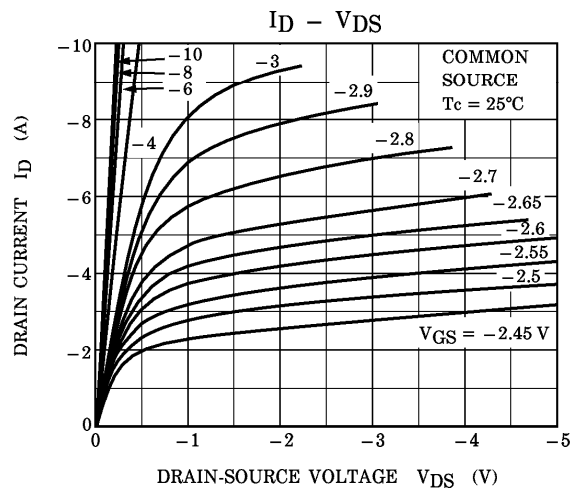
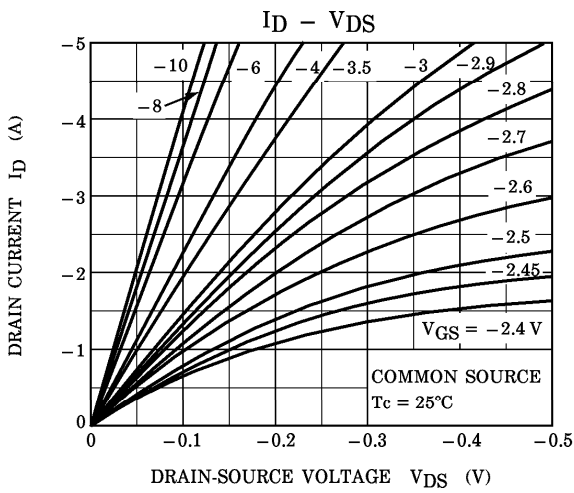
MARKING

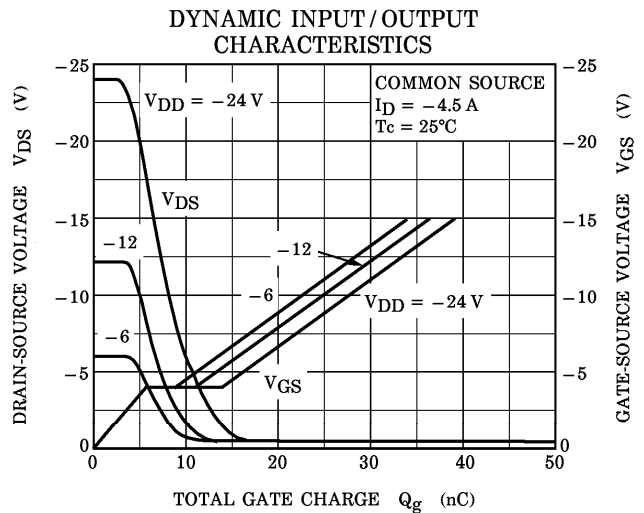
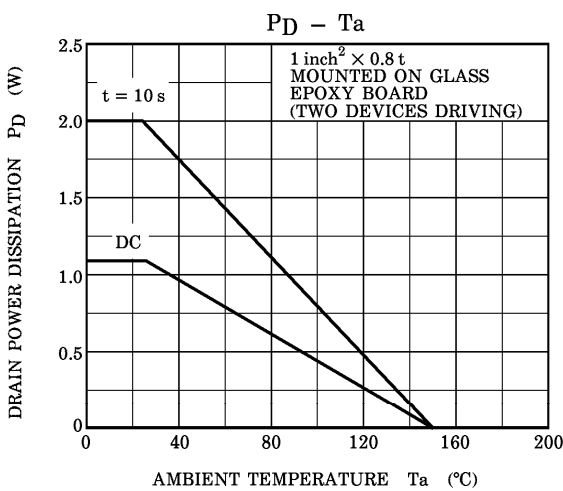
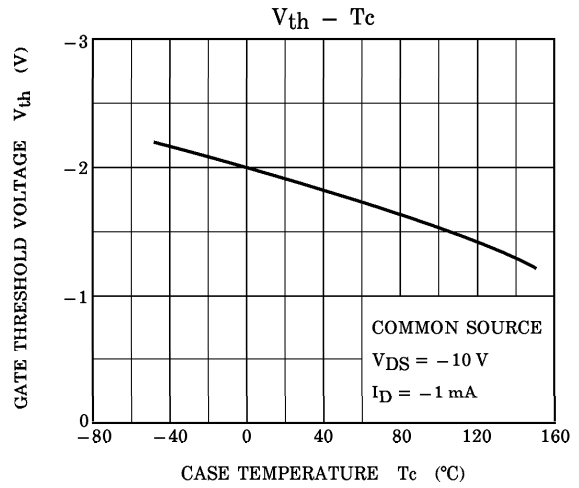
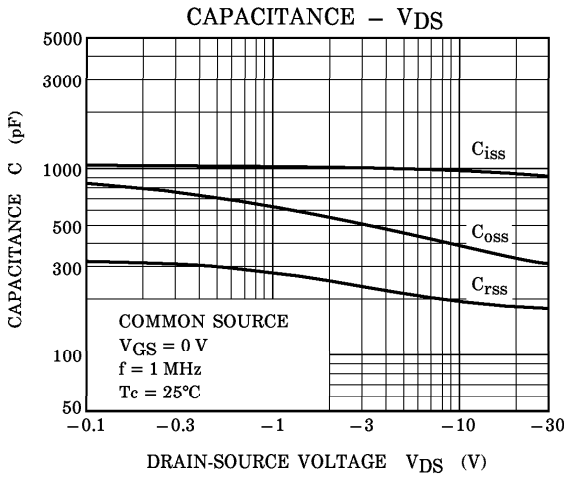
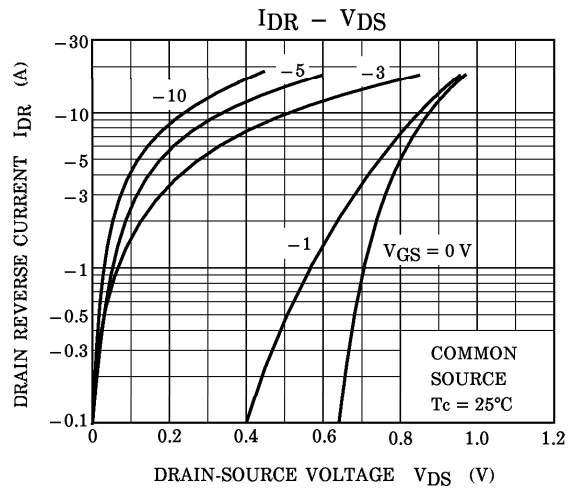
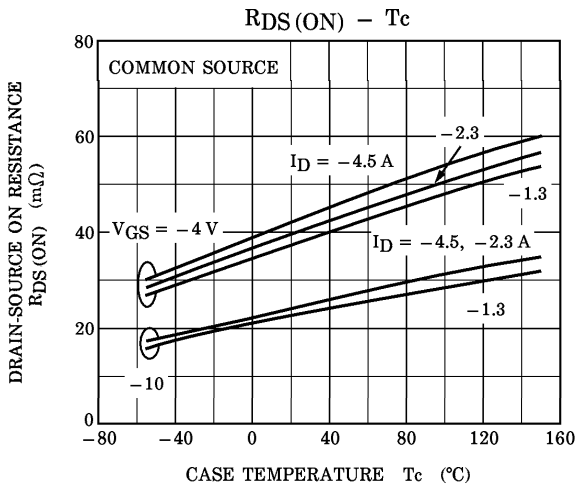


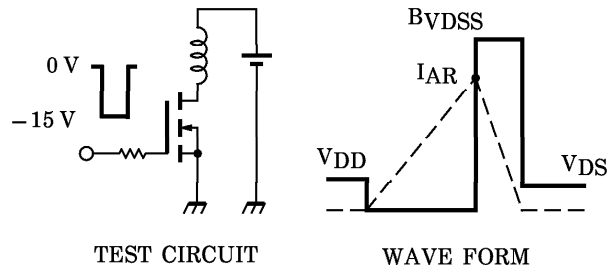
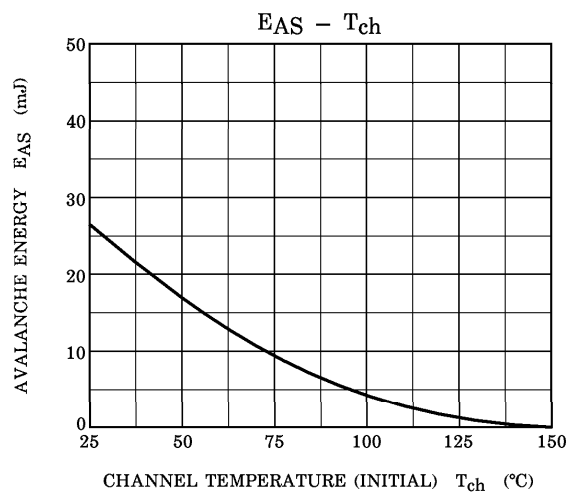
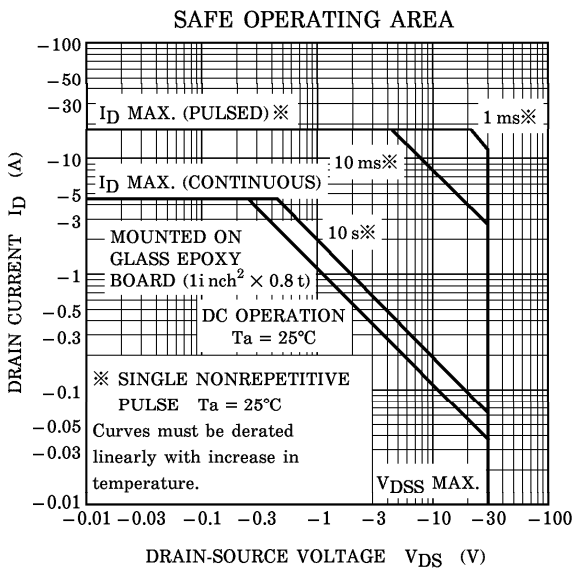
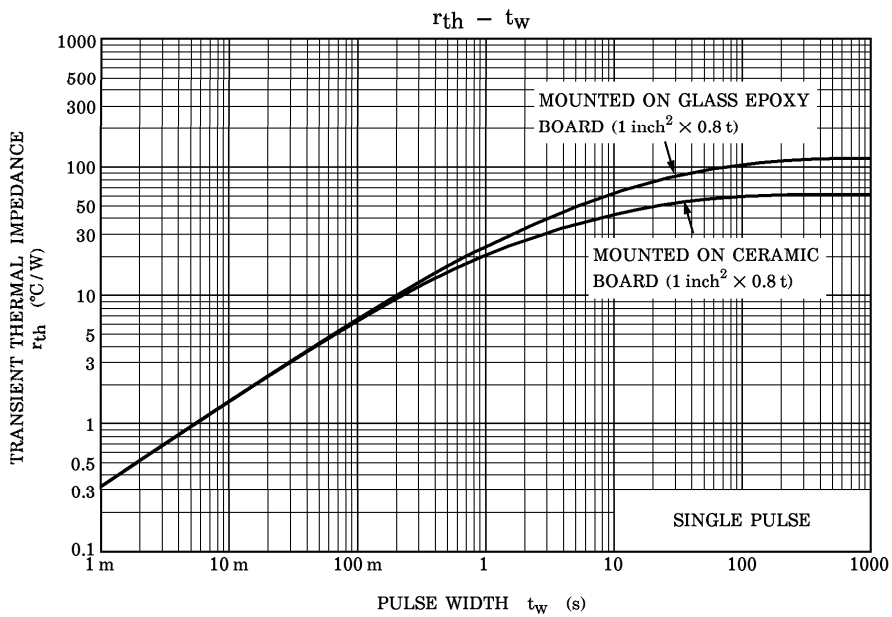
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







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