

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

TPC8103

LITHIUM ION BATTERY

PORTABLE MACHINES AND TOOLS

NOTE BOOK PC

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 9.5 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 20 \text{ S}$ (Typ.)
- Low Leakage Current
: $I_{DSS} = -10 \mu\text{A}$ (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	-11	A
	Pulse	I_{DP}	-44	A
Drain Power Dissipation*** ($T_a = 25^\circ\text{C}$)		P_D	2.4	W
Single Pulse Avalanche Energy**		E_{AS}	157	mJ
Avalanche Current		I_{AR}	-11	A
Repetitive Avalanche Energy*		E_{AR}	0.24	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***	$R_{th(ch-a)}$	52.1	$^\circ\text{C}/\text{W}$

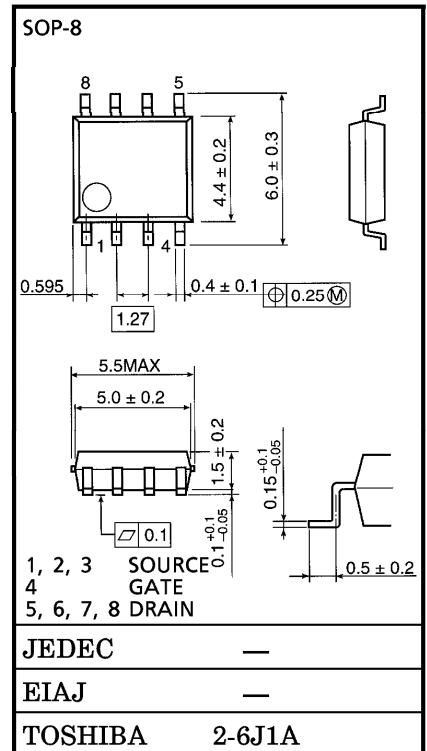
Note ;

- * Repetitive rating ; Pulse Width Limited by Max. Junction temperature.
- ** $V_{DD} = -24 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = -11 \text{ A}$
- *** Drive operation ; Mount on glass epoxy board [$1 \text{ inch}^2 \times 0.8 \text{ t}$] ($t = 10 \text{ s}$)

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

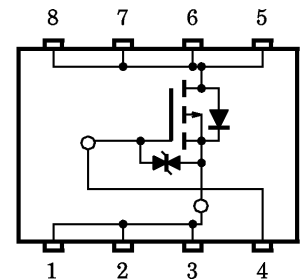
INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 0.08 g (Typ.)

CIRCUIT CONFIGURATION



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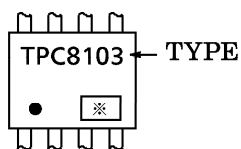
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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
		$V_{(BR)DSX}$	$I_D = -10\text{ mA}, V_{GS} = 20\text{ V}$	-15	—	—	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		$R_{DS(ON)}$	$V_{GS} = -4\text{ V}, I_D = -5.5\text{ A}$	—	18.5	23	$\text{m}\Omega$
		$R_{DS(ON)}$	$V_{GS} = -10\text{ V}, I_D = -5.5\text{ A}$	—	9.5	13	$\text{m}\Omega$
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -5.5\text{ A}$	10	20	—	S
Input Capacitance		C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	—	2700	—	pF
Reverse Transfer Capacitance		C_{rss}		—	600	—	
Output Capacitance		C_{oss}		—	1000	—	
Switching Time	Rise Time	t_r	<p>$V_{GS} = 0\text{ V}, -10\text{ V}$ $I_D = -5.5\text{ A}$ $R_L = 2.3\ \Omega$ $V_{DD} = -15\text{ V}$ $V_{IN} : t_r, t_f < 5\text{ ns}$ $\text{Duty} \leq 1\%, t_w = 10\ \mu\text{s}$</p>	—	50	—	ns
	Turn-On Time	t_{on}		—	60	—	
	Fall Time	t_f		—	220	—	
	Turn-Off Time	t_{off}		—	480	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD} = -24\text{ V}, V_{GS} = -11\text{ V}$ $I_D = -11\text{ A}$	—	60	—	nC
Gate-Source Charge		Q_{gs}		—	40	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	20	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	-11	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	-44	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = -11\text{ A}, V_{GS} = 0\text{ V}$	—	—	1.2	V

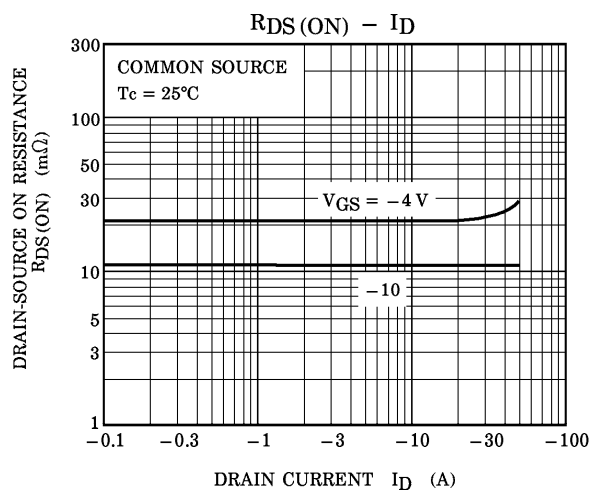
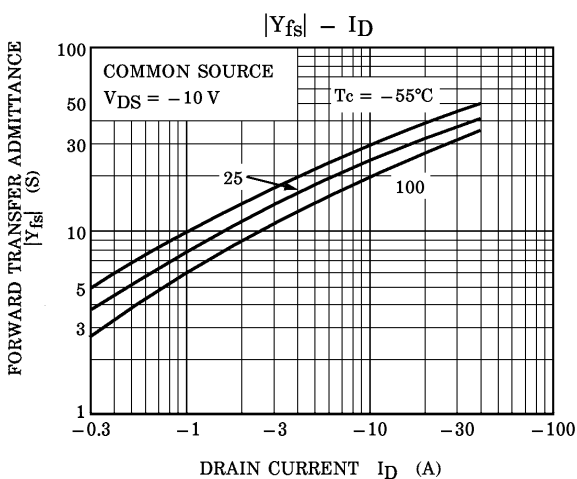
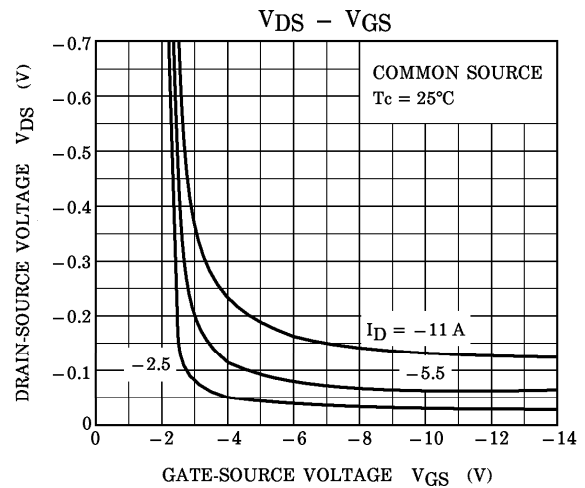
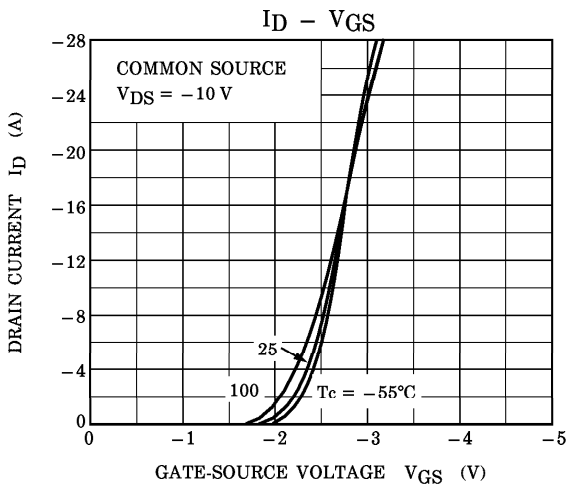
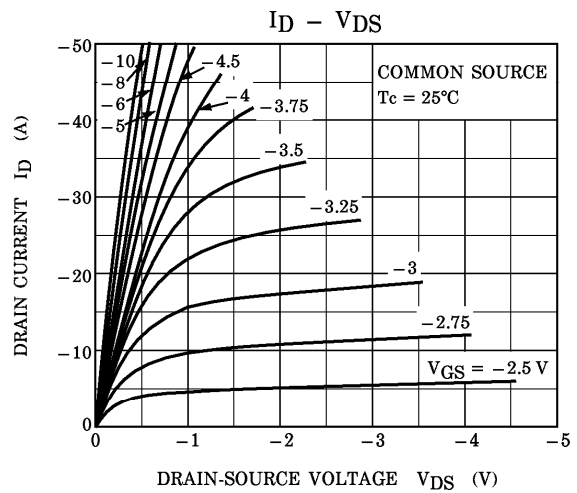
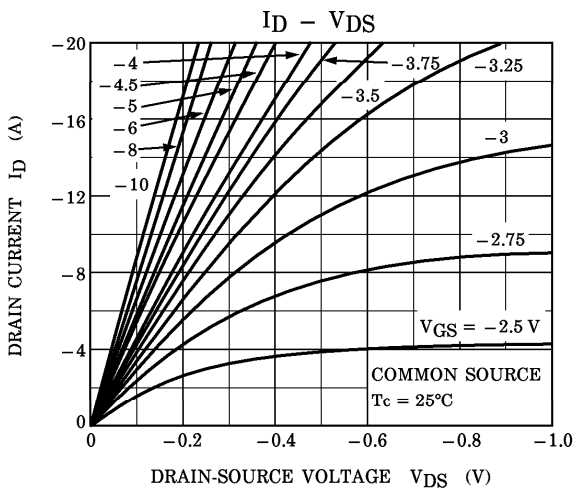
MARKING

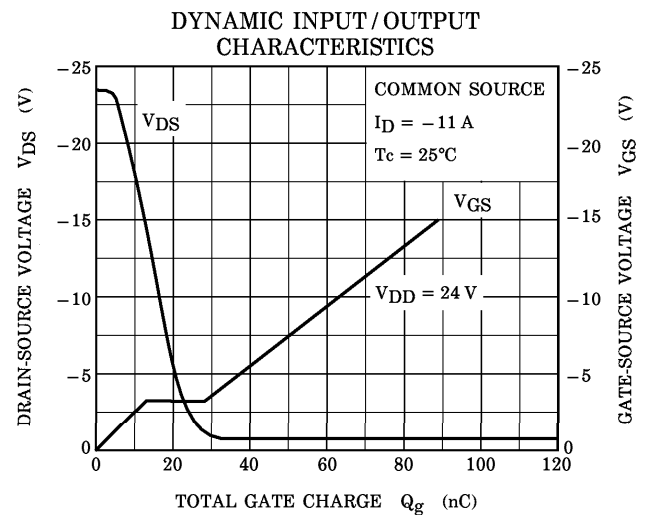
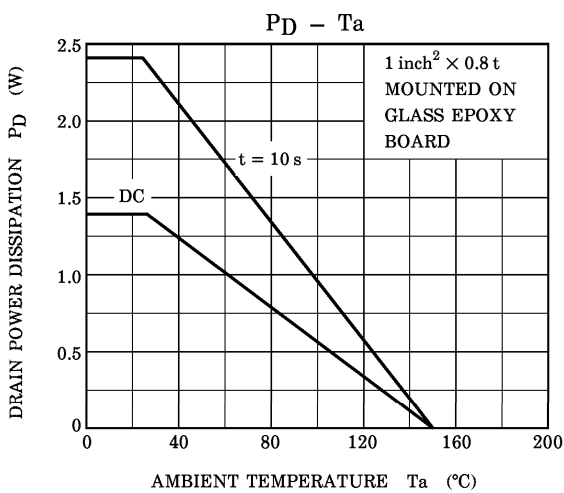
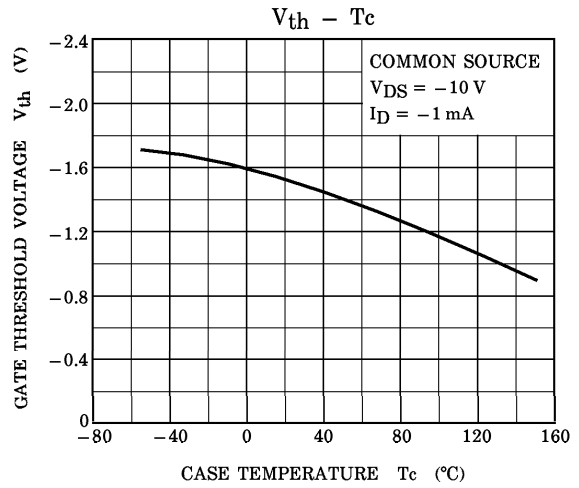
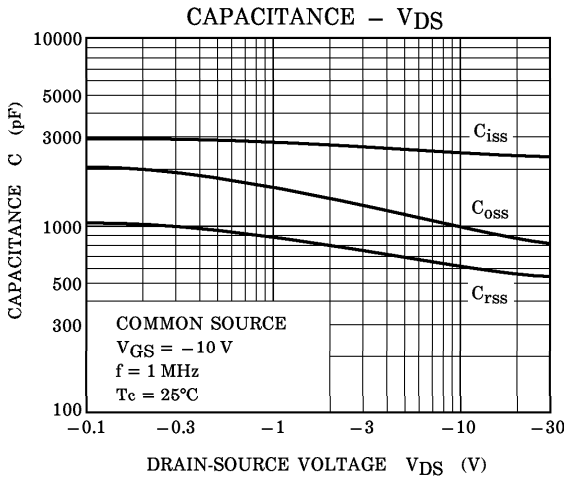
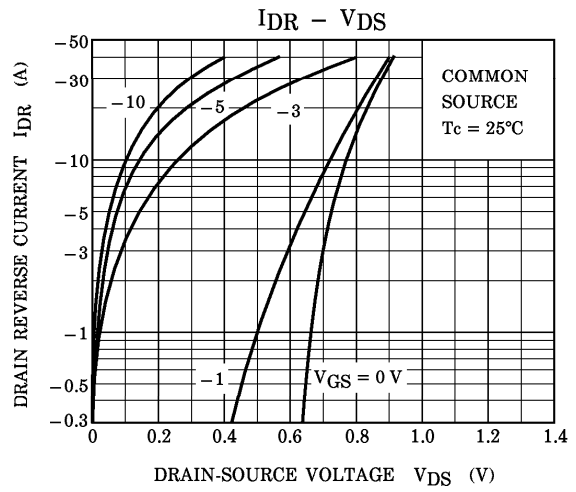
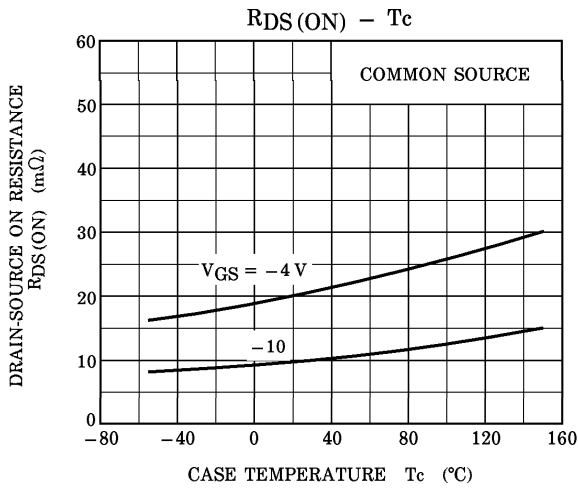


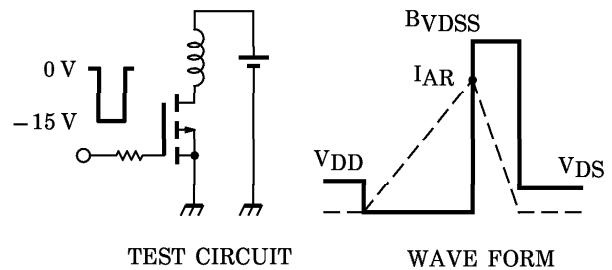
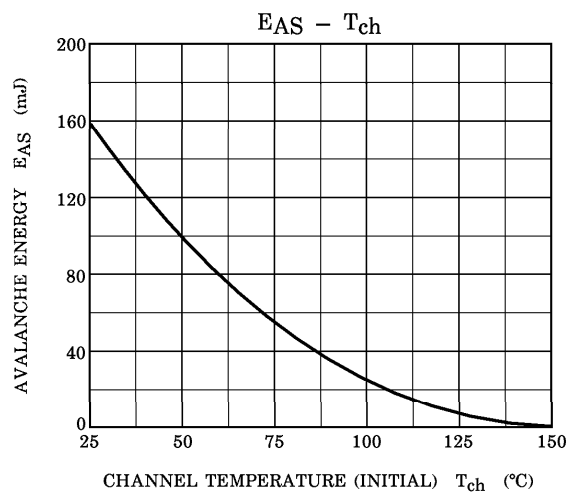
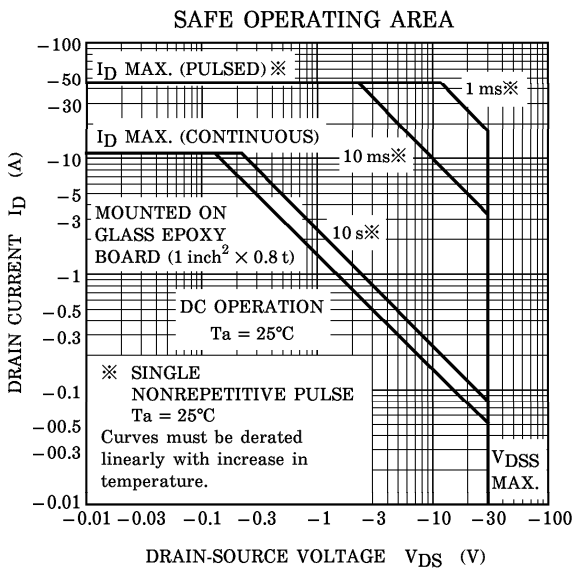
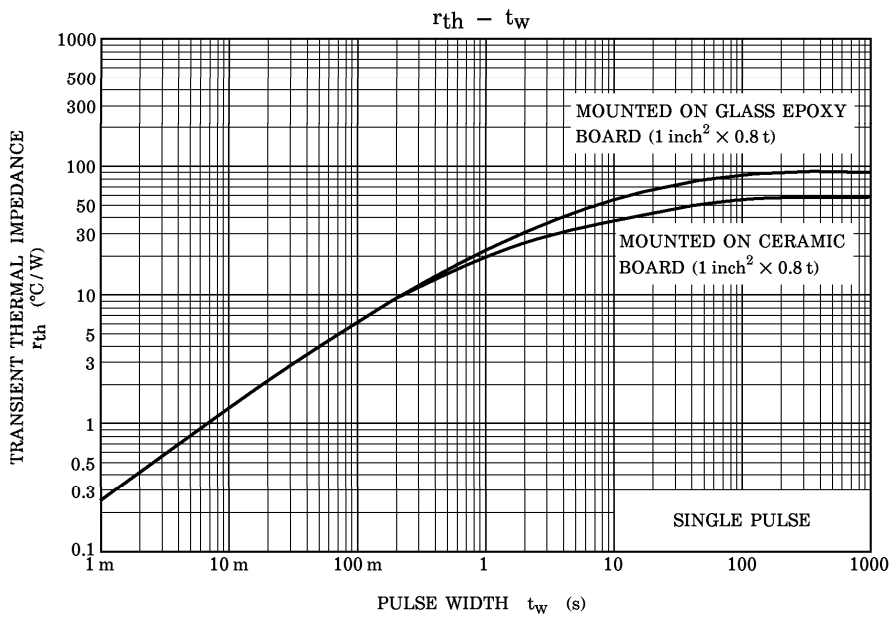
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR} = -11 \text{ A}$, $R_G = 25 \Omega$, $V_{DD} = -24 \text{ V}$, $L = 1.0 \text{ mH}$

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