

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	$^\circ\text{C}/\text{W}$

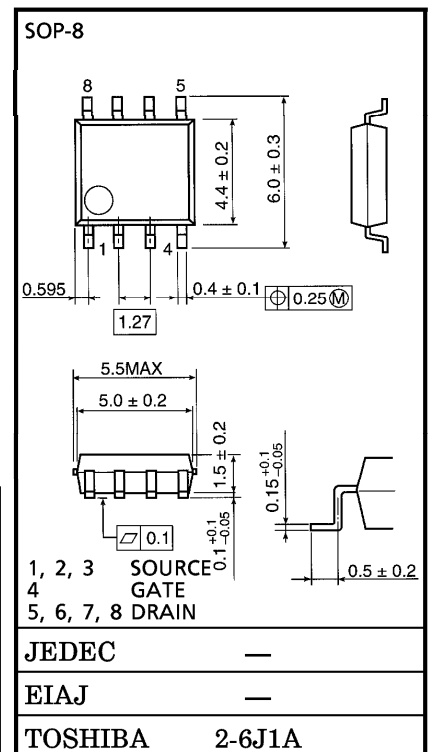
Note ;

- * 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.

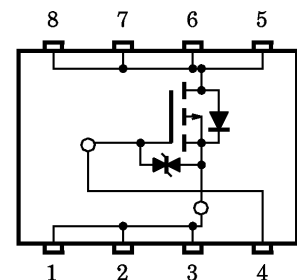
INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 0.08 g (Typ.)

CIRCUIT CONFIGURATION



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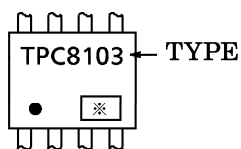
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±16 V, VDS = 0 V	—	—	±10	μA
Drain Cut-Off Current		IDSS	VDS = -30 V, VGS = 0 V	—	—	-10	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = -10 mA, VGS = 0 V	-30	—	—	V
		V(BR)DSX	ID = -10 mA, VGS = 20 V	-15	—	—	V
Gate Threshold Voltage		Vth	VDS = -10 V, ID = -1 mA	-0.8	—	-2.0	V
Drain-Source ON Resistance		RDS(ON)	VGS = -4 V, ID = -5.5 A	—	18.5	23	mΩ
		RDS(ON)	VGS = -10 V, ID = -5.5 A	—	9.5	13	mΩ
Forward Transfer Admittance		Yfs	VDS = -10 V, ID = -5.5 A	10	20	—	S
Input Capacitance		Ciss	VDS = -10 V, VGS = 0 V, f = 1 MHz	—	2700	—	pF
Reverse Transfer Capacitance		Crss		—	600	—	
Output Capacitance		Coss		—	1000	—	
Switching Time	Rise Time	tr	<p> $V_{GS} = 0\text{ V}$ to -10 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	ton		—	60	—	
	Fall Time	tf		—	220	—	
	Turn-Off Time	toff		—	480	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD = -24 V, VGS = -11 V ID = -11 A	—	60	—	nC
Gate-Source Charge		Qgs		—	40	—	
Gate-Drain ("Miller") Charge		Qgd		—	20	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	-11	A
Pulse Drain Reverse Current	IDRP	—	—	—	-44	A
Diode Forward Voltage	VDSF	IDR = -11 A, VGS = 0 V	—	—	1.2	V

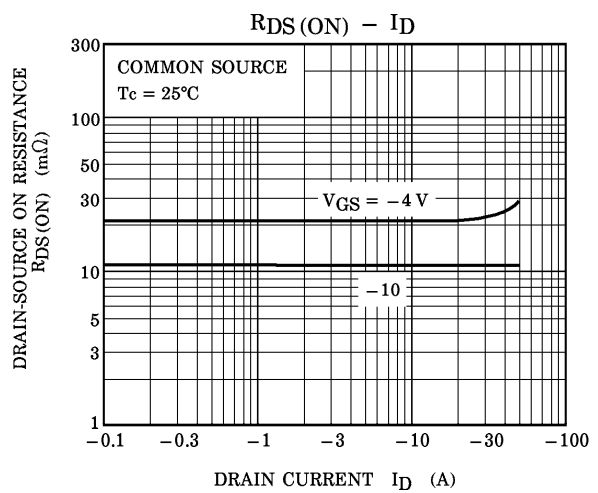
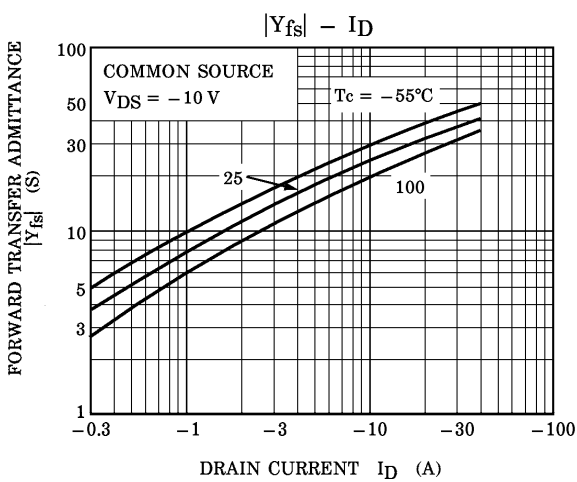
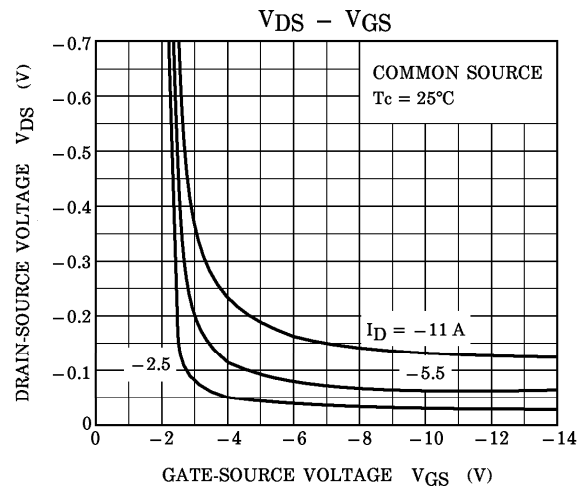
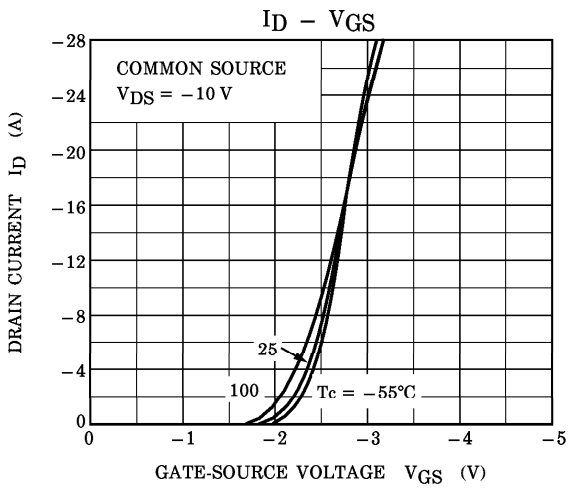
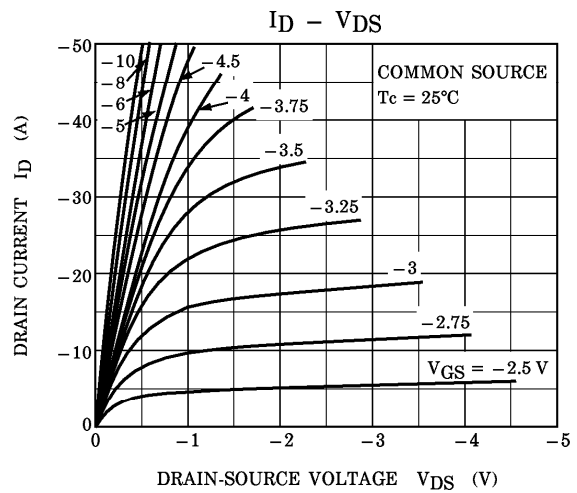
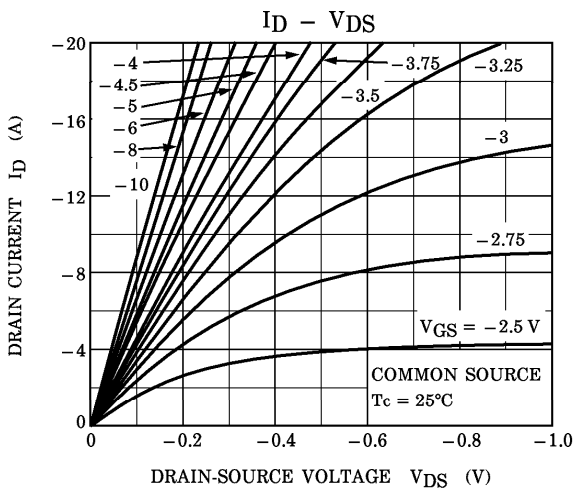
MARKING

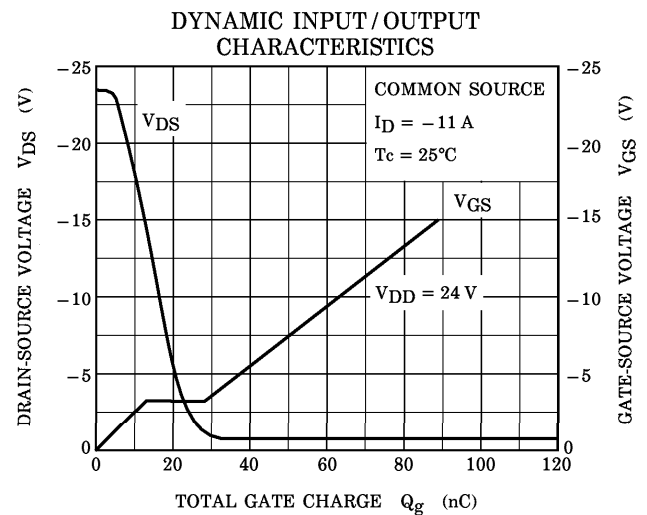
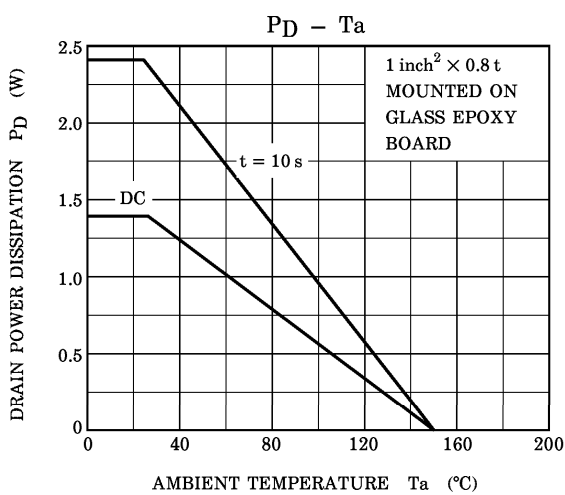
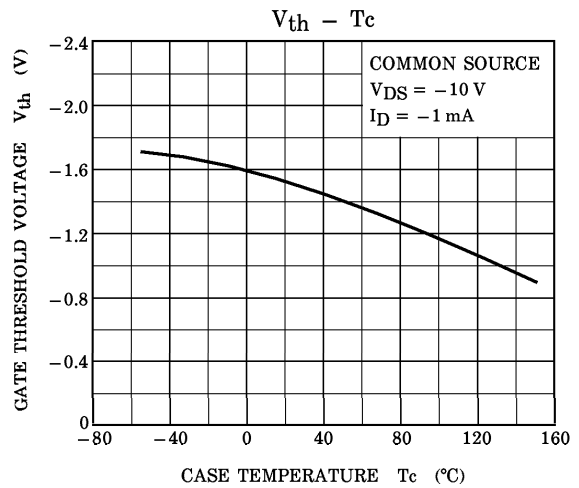
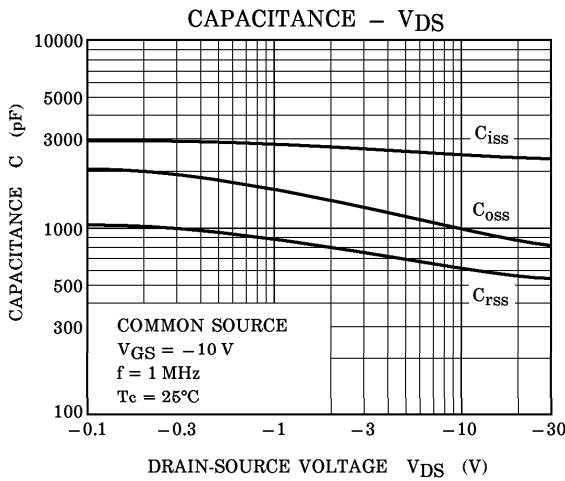
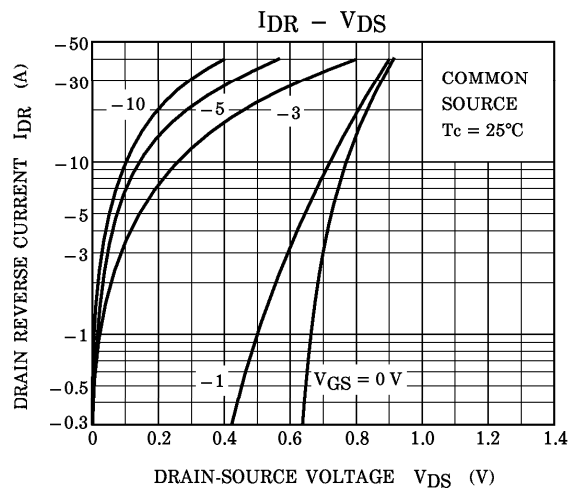
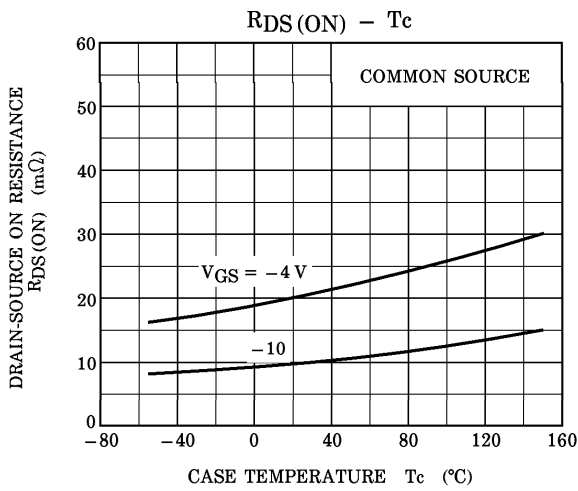


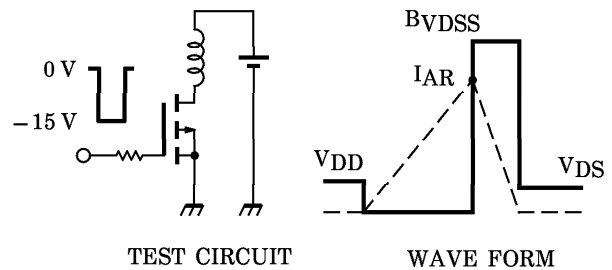
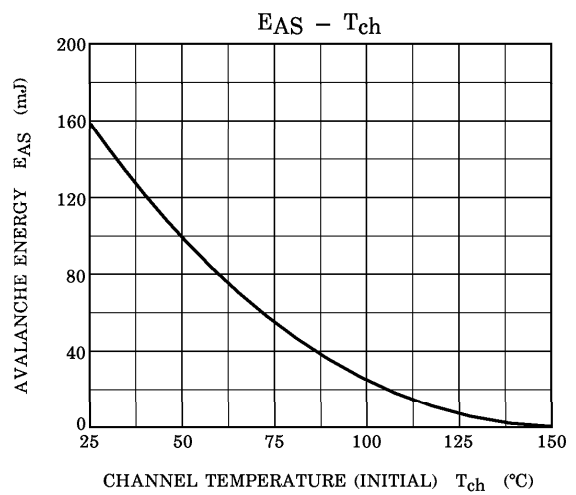
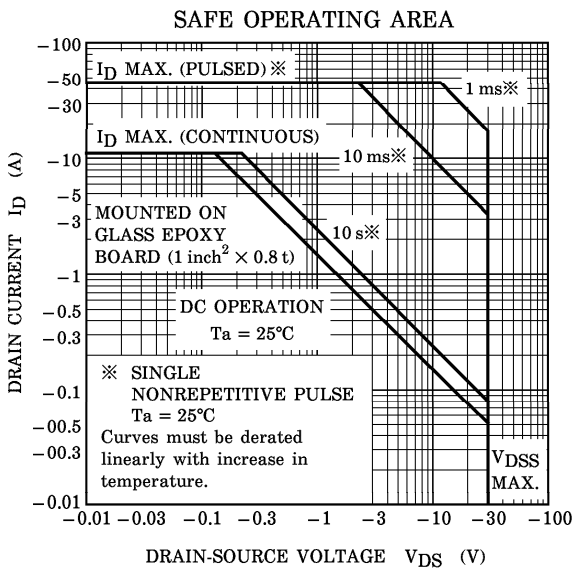
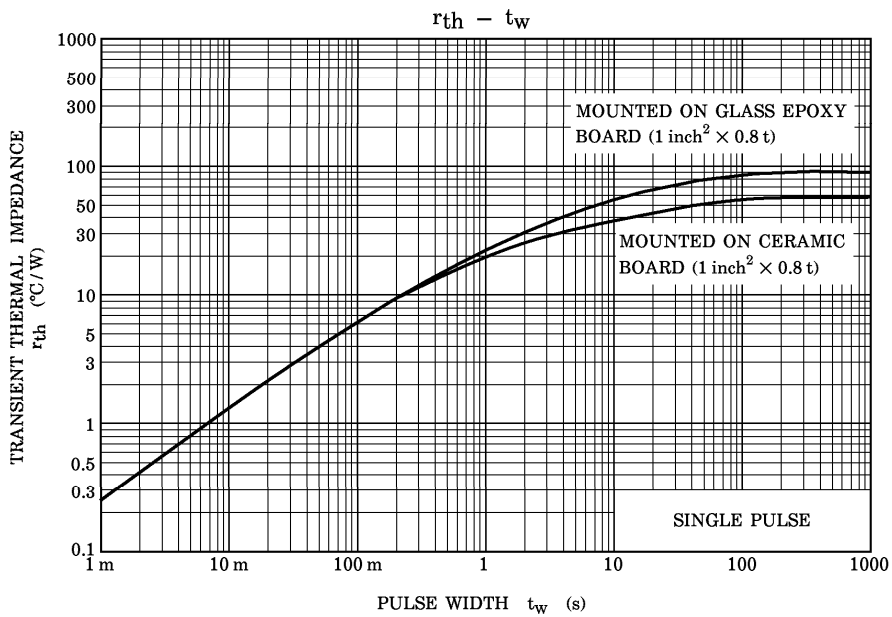
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$$\text{Peak } I_{AR} = -11 \text{ A, } R_G = 25 \Omega$$

$$V_{DD} = -24 \text{ V, } L = 1.0 \text{ mH}$$

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