

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
: $I_{DSS} = -10\text{ }\mu\text{A}$ (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 (Ta = 25°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*** (Ta = 25°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	°C
Storage Temperature Range		T_{stg}	-55~150	°C

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient***	$R_{th(ch-a)}$	52.1	°C/W

Note ;

* Repetitive rating ; Pulse Width Limited by Max. Junction temperature.

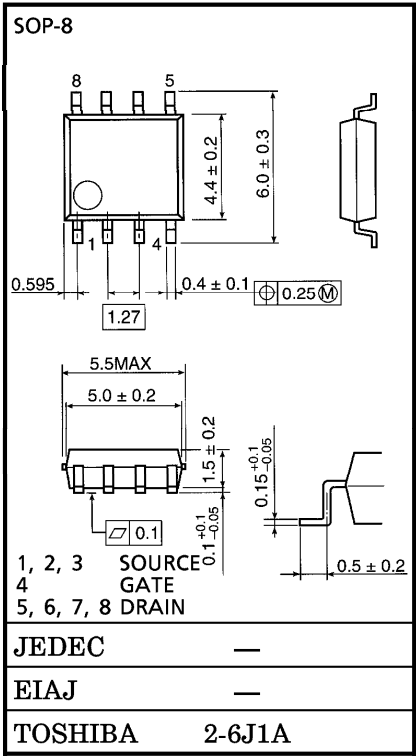
** $V_{DD} = -24\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0\text{ mH}$, $R_G = 25\text{ }\Omega$, $I_{AR} = -11\text{ A}$

*** 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.

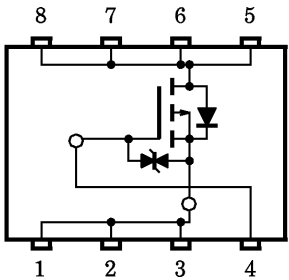
INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 0.08 g (Typ.)

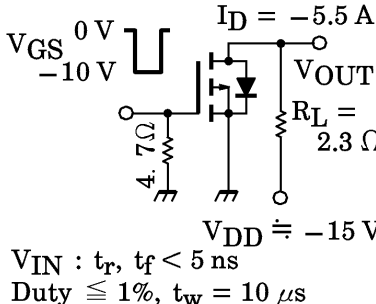
CIRCUIT CONFIGURATION



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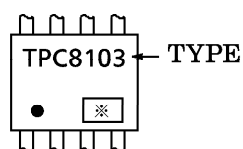
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I _{GSS}	V _{GS} = ±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	—	—	V
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 = −5.5 A	—	18.5	23	mΩ
		R _{DS (ON)}	V _{GS} = −10 V, I _D = −5.5 A	—	9.5	13	mΩ
Forward Transfer Admittance		Y _{fs}	V _{DS} = −10 V, I _D = −5.5 A	10	20	—	S
Input Capacitance		C _{iss}	V _{DS} = −10 V, V _{GS} = 0 V, f = 1 MHz	—	2700	—	pF
Reverse Transfer Capacitance		C _{rss}		—	600	—	
Output Capacitance		C _{oss}		—	1000	—	
Switching Time	Rise Time	t _r		—	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 V, V _{GS} = −11 V I _D = −11 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

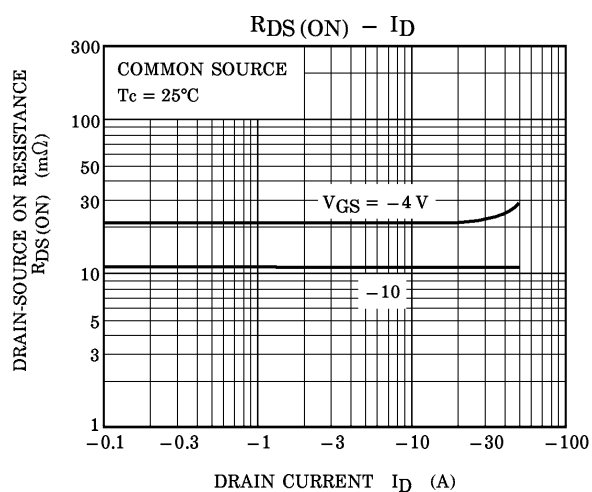
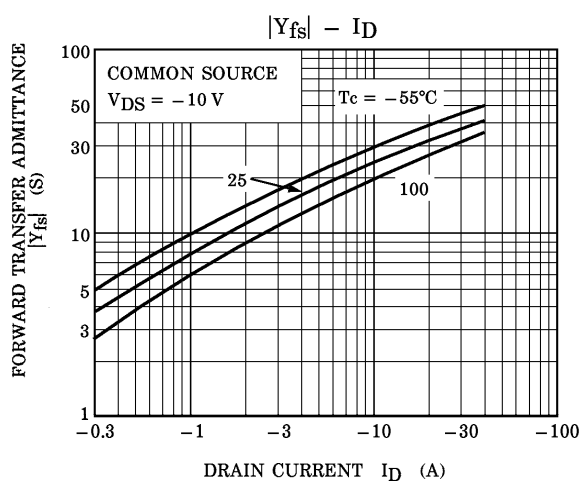
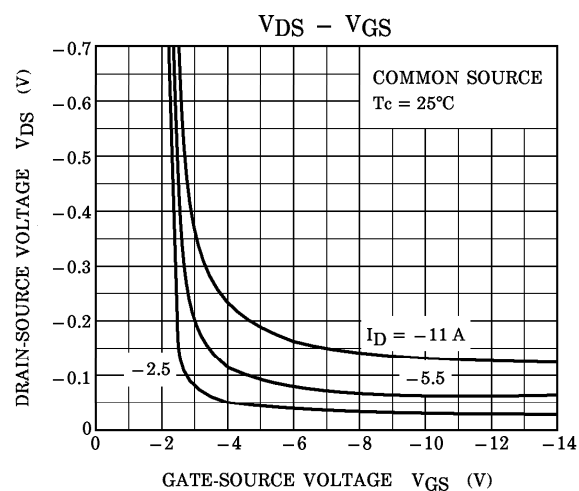
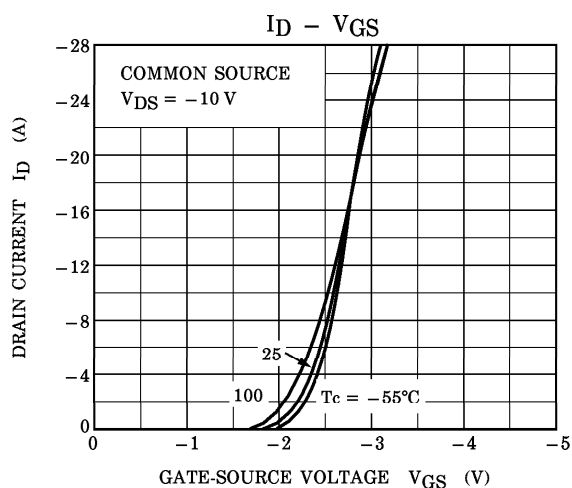
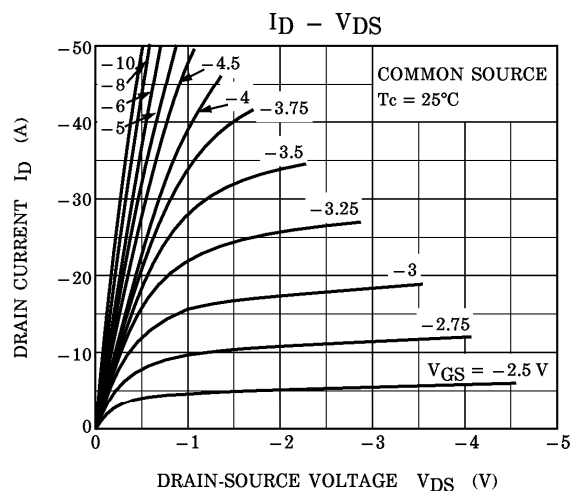
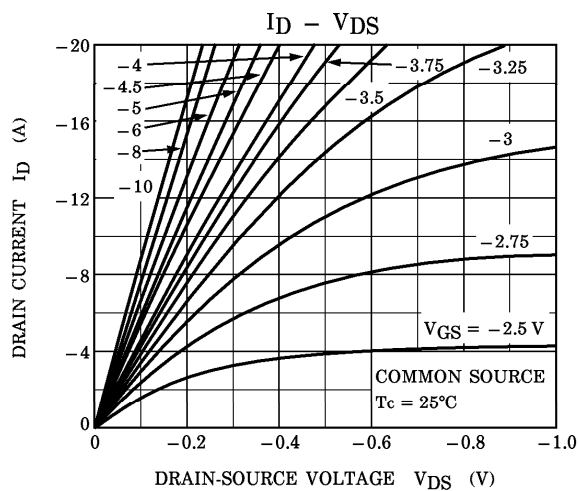
MARKING

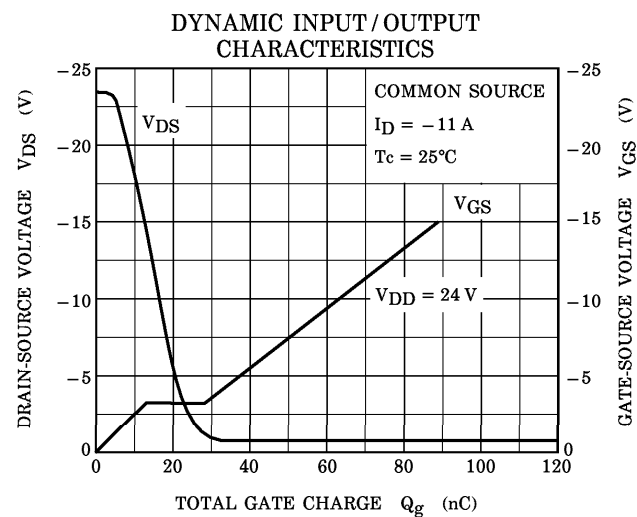
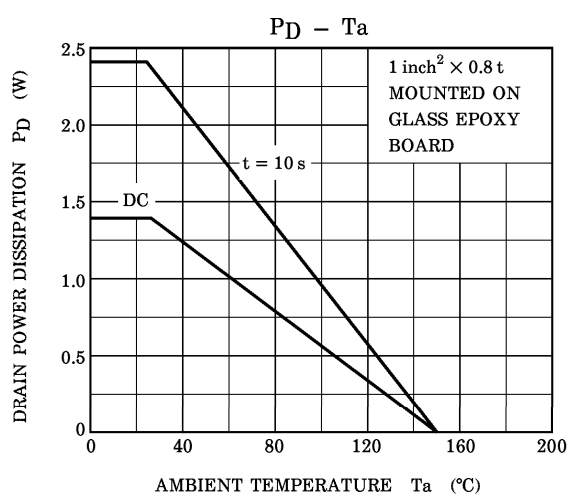
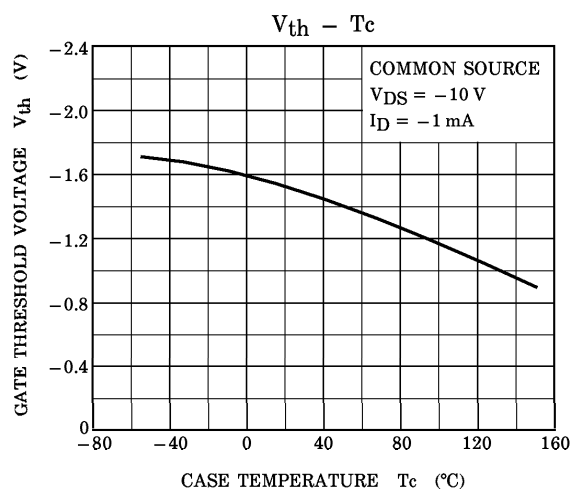
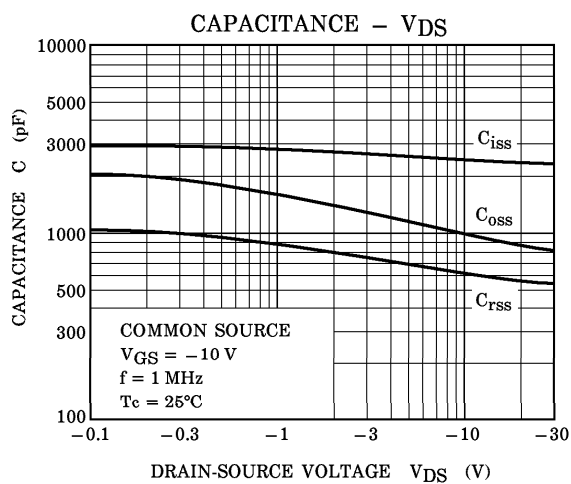
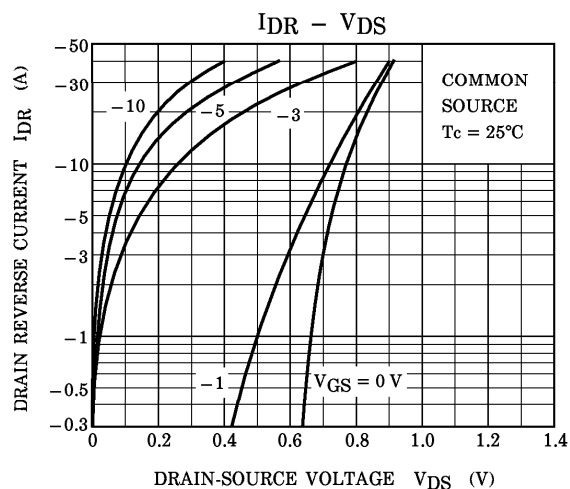
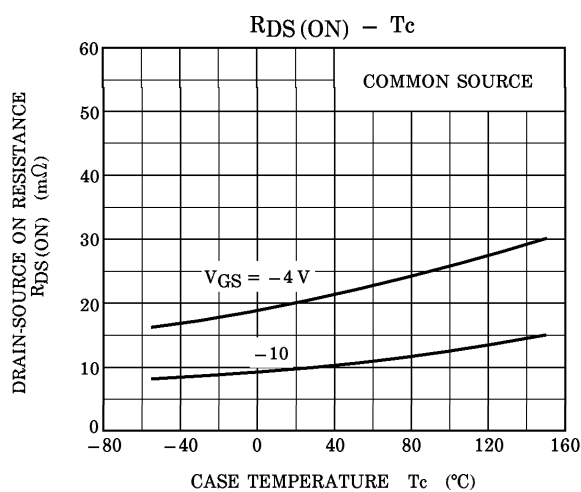


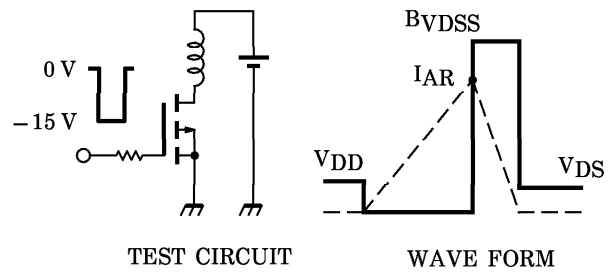
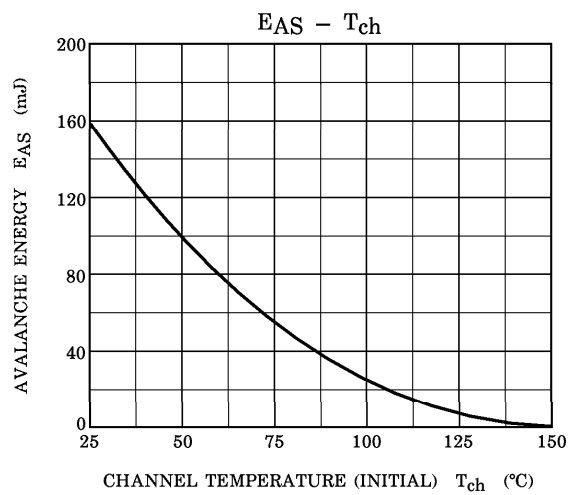
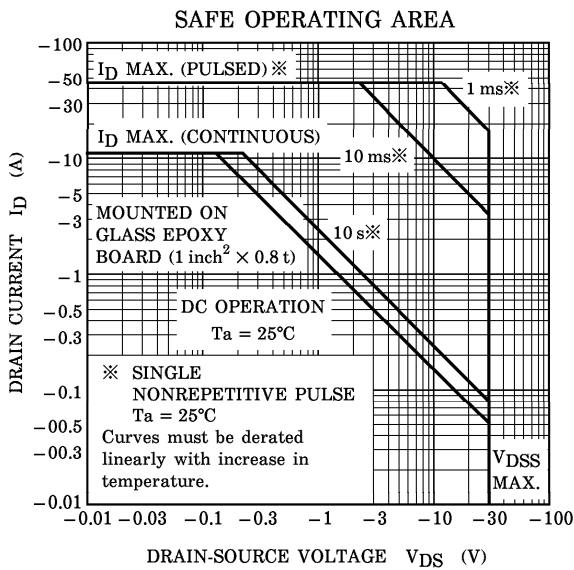
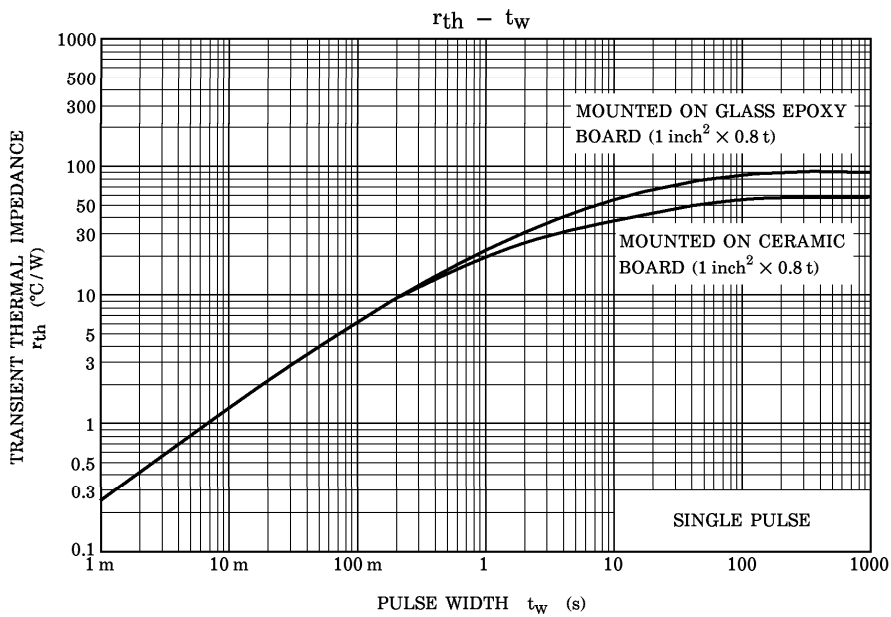
※ Lot Number


 Month (Starting from Alphabet A)


 Year (Last Number of the Christian Era)







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

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