

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (U-MOS II)

TPC8003

LITHIUM ION BATTERY

NOTE BOOK PC

PORTABLE MACHINES AND TOOLS

INDUSTRIAL APPLICATIONS

Unit in mm

- Supplied in Compact and Thin Package Requires Only a Small Mounting Area.
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 5.4m\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 21S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 10\mu A$ (Max.) ($V_{DS} = 30V$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.5V$ ($V_{DS} = 10V$, $I_D = 1mA$)

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

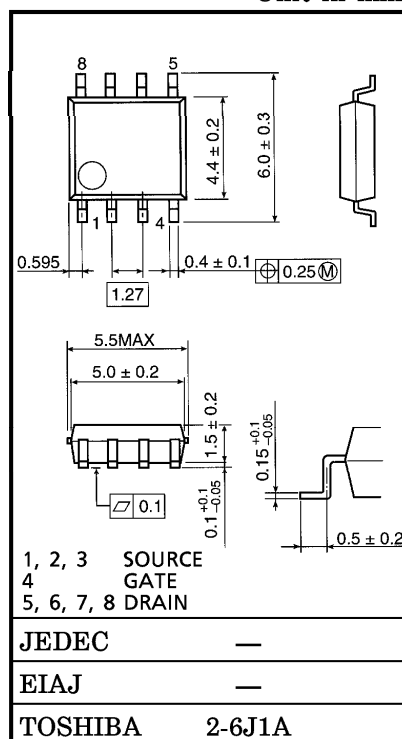
CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)		V_{DGR}	30	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	13	A
	Pulse	I_{DP}	52	A
Drain Power Dissipation ($T_a = 25^\circ C$)		P_D^{***}	2.4	W
Single Pulse Avalanche Energy**		E_{AS}	220	mJ
Avalanche Current		I_{AR}	13	A
Repetitive Avalanche Energy*		E_{AR}	0.24	mJ
Channel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ C$

THERMAL CHARACTERISTICS

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

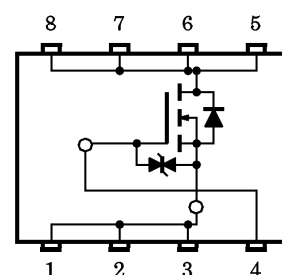
Note ;

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

** $V_{DD} = 24V$, Starting $T_{ch} = 25^\circ C$, $L = 1.0mH$, $R_G = 25\Omega$, $I_{AR} = 13A$ *** Drive operation : Mount on glass epoxy board [$1inch^2 \times 0.8t$]**This transistor is an electrostatic sensitive device. Please handle with caution.**

Weight : 0.08g (Typ.)

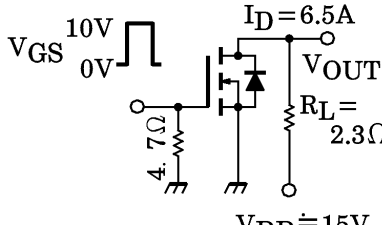
CIRCUIT CONFIGURATION



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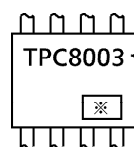
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I _{GSS}	V _{GS} = ±16V, V _{DS} = 0V	—	—	±10	μA
Drain Cut-Off Current		I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	—	—	10	μA
Drain-Source Breakdown Voltage	V (BR) DSS	I _D = 10mA, V _{GS} = 0V	30	—	—	V	
	V (BR) DSX	I _D = 10mA, V _{GS} = −20V	15	—	—	V	
Gate Threshold Voltage		V _{th}	V _{DS} = 10V, I _D = 1mA	0.8	—	2.5	V
Drain-Source ON Resistance	R _{DS (ON)}	V _{GS} = 4V, I _D = 6.5A	—	8.3	13	mΩ	
	R _{DS (ON)}	V _{GS} = 10V, I _D = 6.5A	—	5.4	7	mΩ	
Forward Transfer Admittance		Y _{fs}	V _{DS} = 10V, I _D = 6.5A	10	21	—	S
Input Capacitance		C _{iss}	V _{DS} = 10V, V _{GS} = 0V, f = 1MHz	—	4380	—	pF
Reverse Transfer Capacitance		C _{rss}		—	500	—	
Output Capacitance		C _{oss}		—	890	—	
Switching Time	Rise Time	t _r	 V_{GS} 10V 0V I_D = 6.5A V_{OUT} R_L = 2.3Ω V_{DD} ≐ 15V V_{IN} : t_r, t_f < 5ns Duty ≤ 1%, t_w = 10 μs	—	14	—	ns
	Turn-On Time	t _{on}		—	27	—	
	Fall Time	t _f		—	72	—	
	Turn-Off Time	t _{off}		—	235	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q _g	V _{DD} ≐ 24V, V _{GS} = 10V I _D = 13A	—	90	—	nC
Gate-Source Charge		Q _{gs}		—	60	—	
Gate-Drain (“Miller”) Charge		Q _{gd}		—	30	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	13	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	52	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 13A, V_{GS} = 0V$	—	—	-1.2	V

MARKING



TYPE

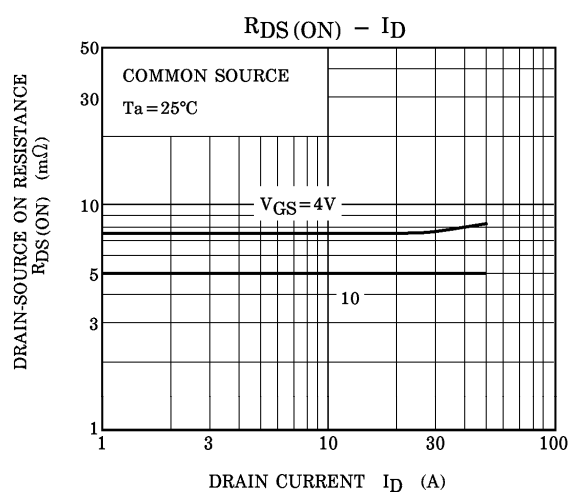
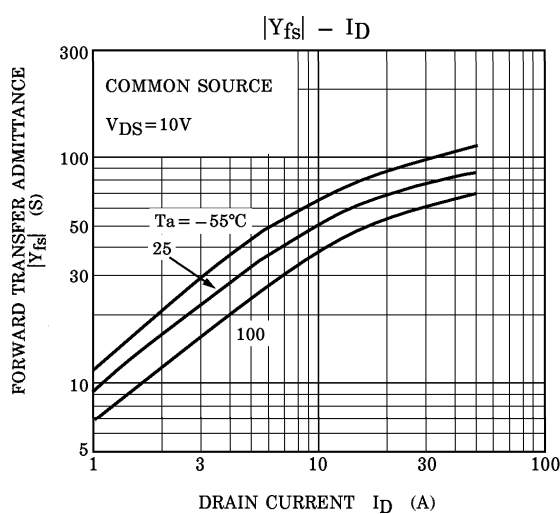
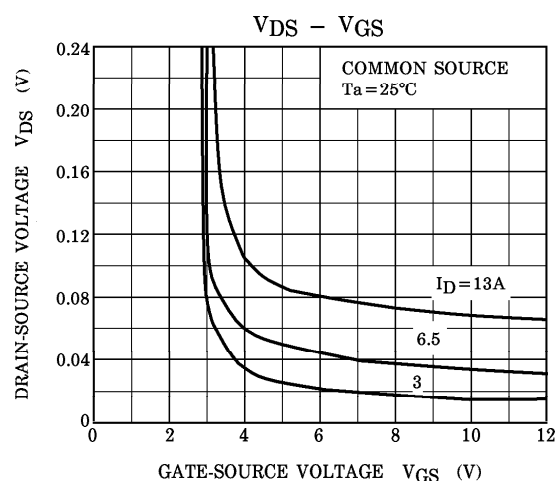
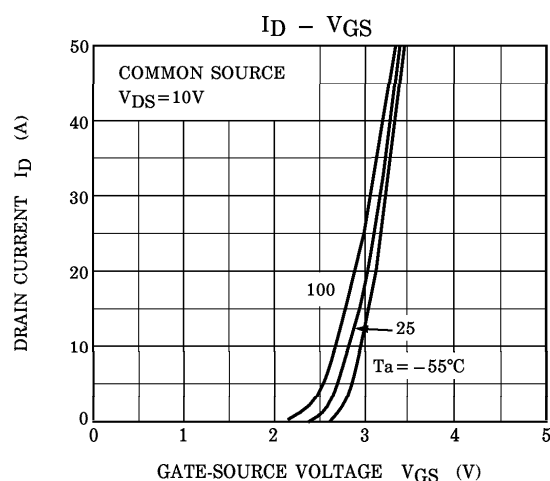
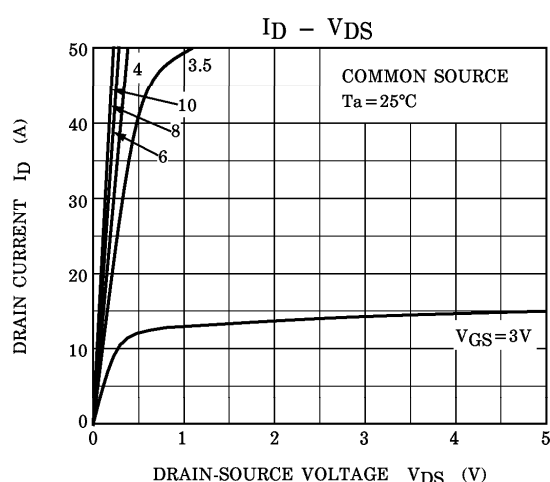
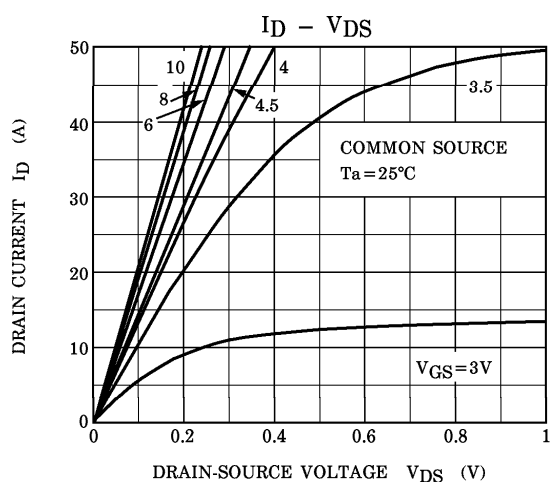
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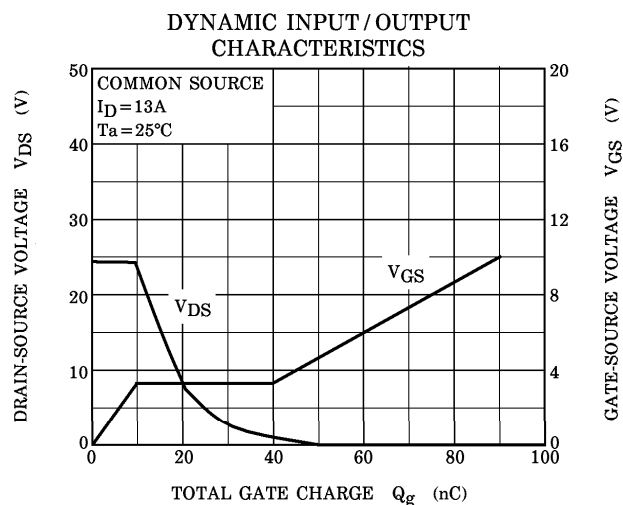
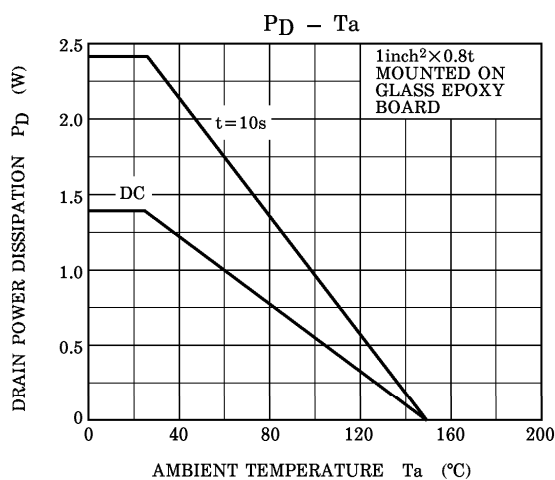
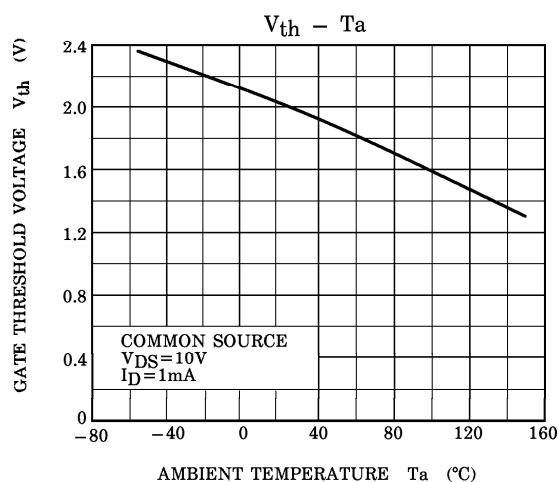
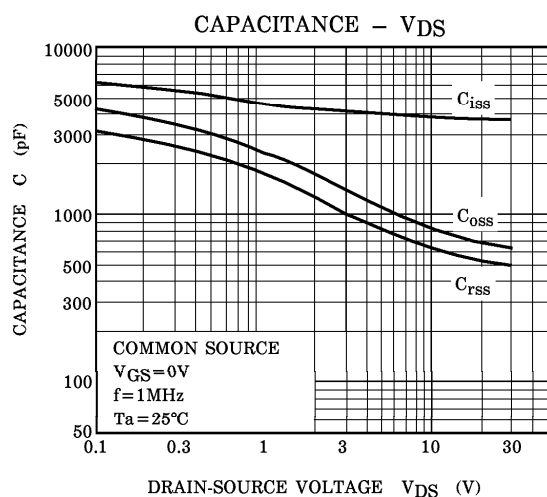
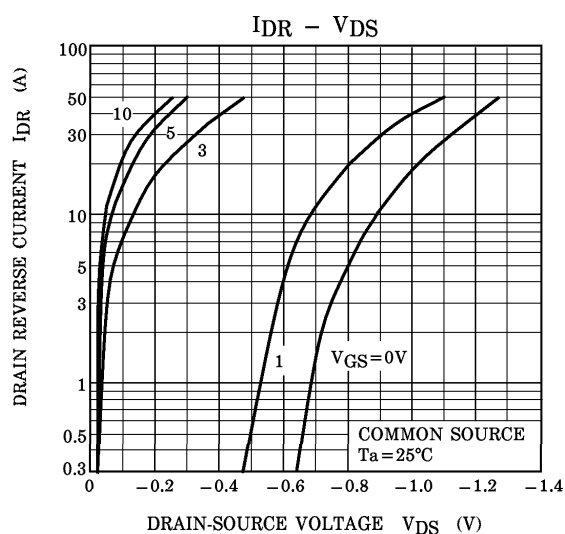
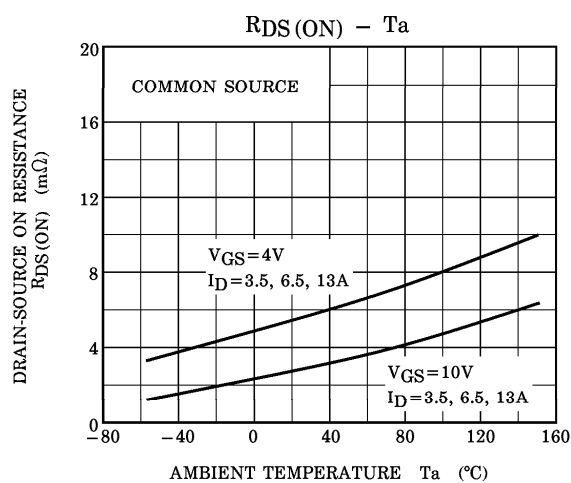


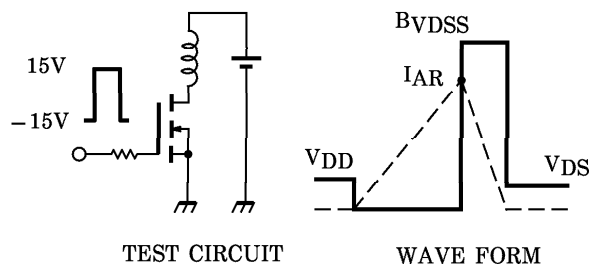
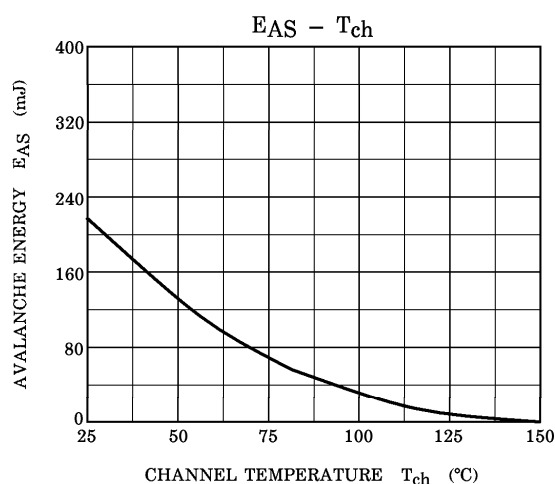
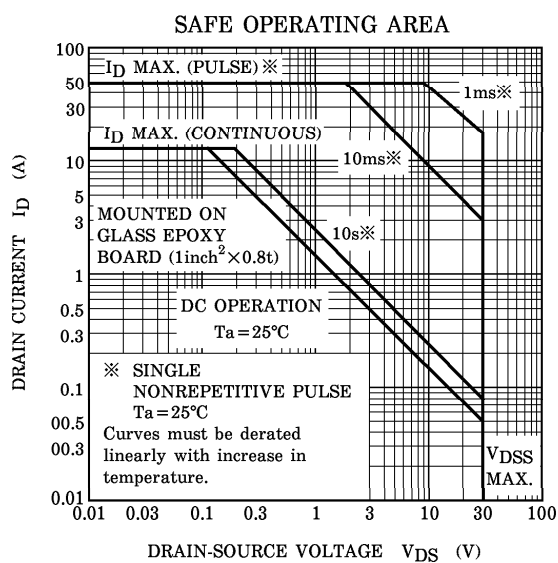
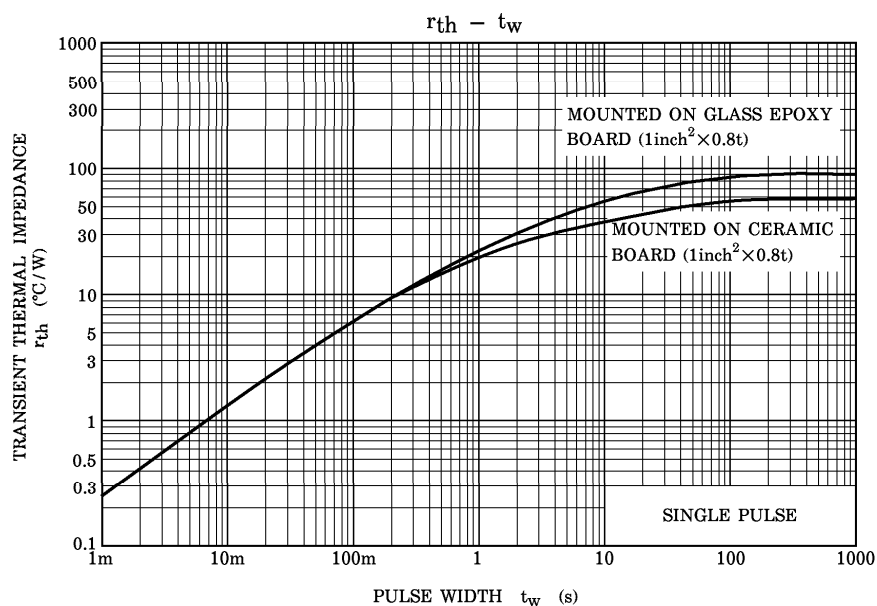
Month (Starting from Alphabet A)



Year (Last Number of the Christian Era)







Peak $I_{AR} = 13A$, $R_G = 25\Omega$
 $V_{DD} = 24V$, $L = 1.0mH$

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