

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

TPC8305

LITHIUM ION BATTERY

NOTE BOOK PC

PORTABLE MACHINES AND TOOLS

- Compact and thin package allows smaller mounting area.
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 24 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 12 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = -10 \mu\text{A}$ (Max.) ($V_{DS} = -20 \text{ V}$)
- Enhancement-Mode : $V_{th} = -0.5 \sim -1.2 \text{ V}$
($V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$)

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	-20	V
Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	-20	V
Gate-Source Voltage		V_{GSS}	± 12	V
Drain Current	DC	I_D	-5	A
	Pulse	I_{DP}	-20	A
Drain Power Dissipation*** ($T_a = 25^\circ\text{C}$)		P_D	2.0	W
Single Pulse Avalanche Energy**		E_{AS}	32.5	mJ
Avalanche Current		I_{AR}	-5	A
Repetitive Avalanche Energy*		E_{AR}	0.2	mJ
Channel Temperature		T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient***	$R_{th(ch-a)}$	62.5	$^\circ\text{C/W}$

Note ;

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

** $V_{DD} = -16 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = -5 \text{ A}$

*** Drive operation ; Mount on glass epoxy board [$1\text{inch}^2 \times 0.8 \text{ t}$] in the two devices driving ($t = 10 \text{ s}$)

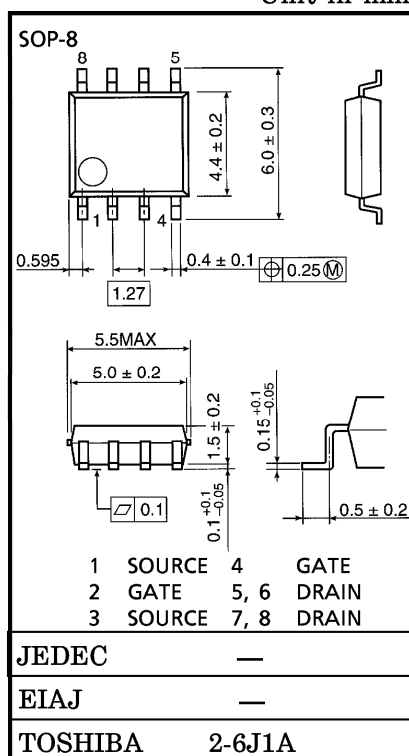
This transistor is an electrostatic sensitive device. Please handle with caution.

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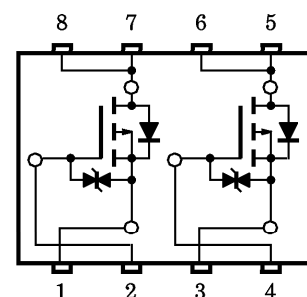
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INDUSTRIAL APPLICATIONS

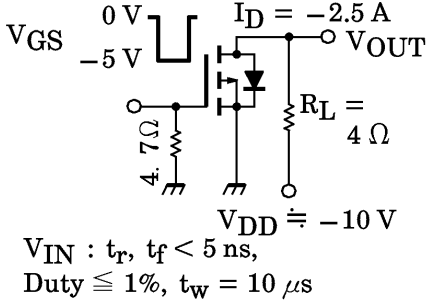
Unit in mm



CIRCUIT CONFIGURATION



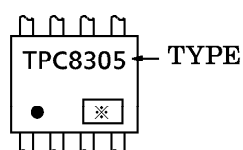
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 10 \text{ V}$, $V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain Cut-Off Current	I_{DSS}	$V_{DS} = -20 \text{ V}$, $V_{GS} = 0 \text{ V}$	—	—	-10	μA
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -10 \text{ mA}$, $V_{GS} = 0 \text{ V}$	-20	—	—	V
		$I_D = -10 \text{ mA}$, $V_{GS} = 12 \text{ V}$	-8	—	—	
Gate Threshold Voltage	V_{th}	$V_{DS} = -10 \text{ V}$, $I_D = -200 \mu\text{A}$	-0.5	—	-1.2	V
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = -2.0 \text{ V}$, $I_D = -2.5 \text{ A}$	—	56	80	$\text{m}\Omega$
	$R_{DS(ON)}$	$V_{GS} = -2.5 \text{ V}$, $I_D = -2.5 \text{ A}$	—	38	50	$\text{m}\Omega$
	$R_{DS(ON)}$	$V_{GS} = -4.5 \text{ V}$, $I_D = -2.5 \text{ A}$	—	24	30	$\text{m}\Omega$
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = -10 \text{ V}$, $I_D = -2.5 \text{ A}$	6	12	—	S
Input Capacitance	C_{iss}	$V_{DS} = -10 \text{ V}$, $V_{GS} = 0 \text{ V}$ $f = 1 \text{ MHz}$	—	2030	—	pF
Reverse Transfer Capacitance	C_{rss}		—	400	—	
Output Capacitance	C_{oss}		—	580	—	
Switching Time	Rise Time	 V_{GS} 0 V, -5 V, $I_D = -2.5 \text{ A}$, $R_L = 4 \Omega$, $V_{DD} = -10 \text{ V}$ $V_{IN} : t_r, t_f < 5 \text{ ns}$, Duty $\leq 1\%$, $t_w = 10 \mu\text{s}$	—	25	—	ns
	Turn-On Time		—	35	—	
	Fall Time		—	95	—	
	Turn-Off Time		—	200	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q_g	$V_{DD} = -16 \text{ V}$, $V_{GS} = -5 \text{ V}$ $I_D = -5 \text{ A}$	—	24	—	nC
Gate-Source Charge	Q_{gs}		—	17	—	
Gate-Drain ("Miller") Charge	Q_{gd}		—	7	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	-5	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	-20	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = -5 \text{ A}$, $V_{GS} = 0 \text{ V}$	—	—	1.2	V

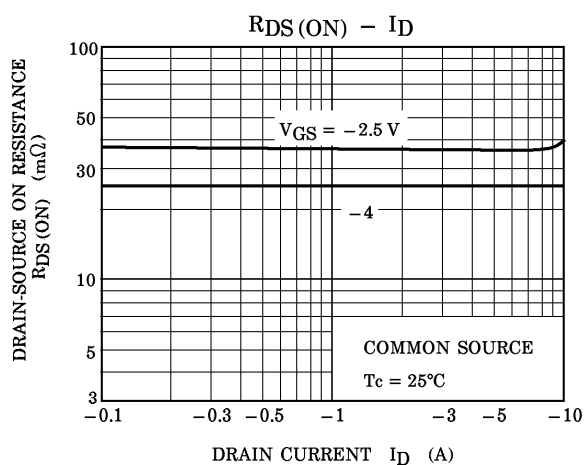
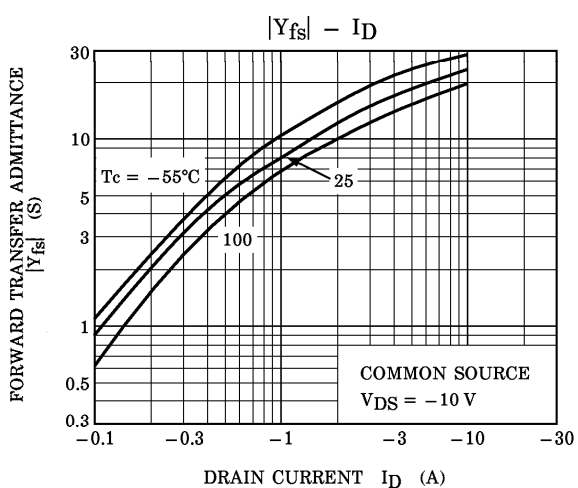
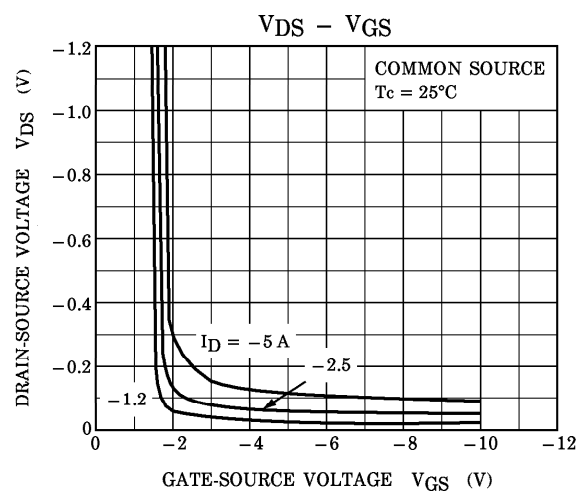
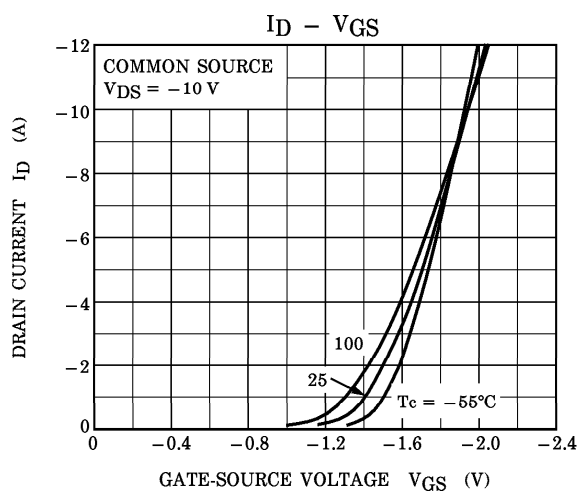
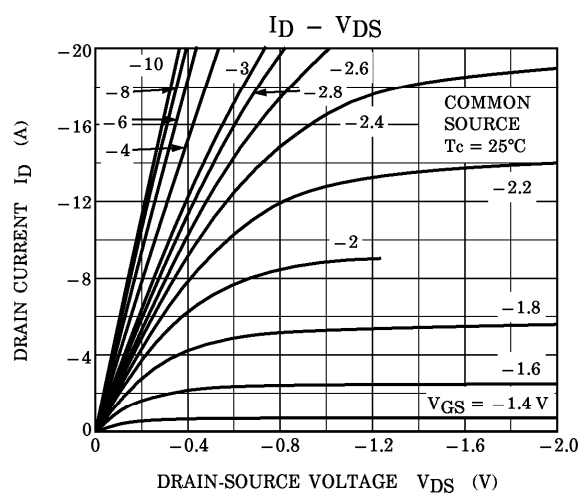
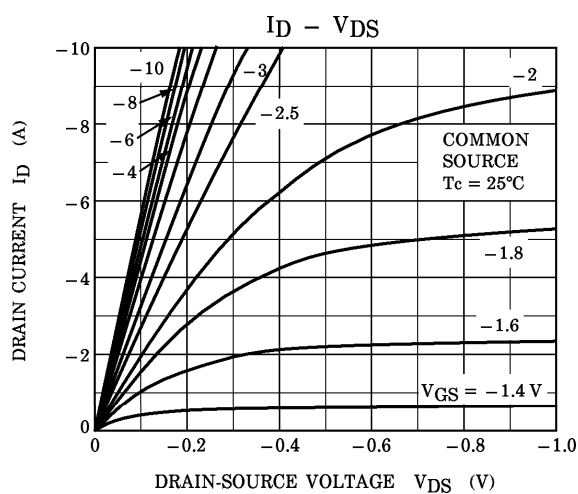
MARKING

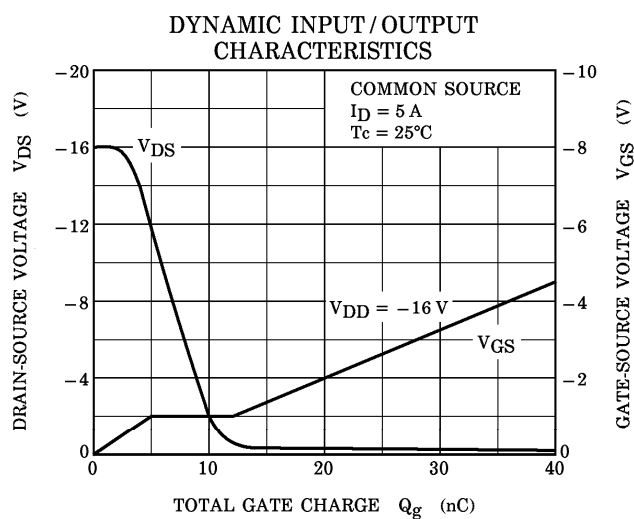
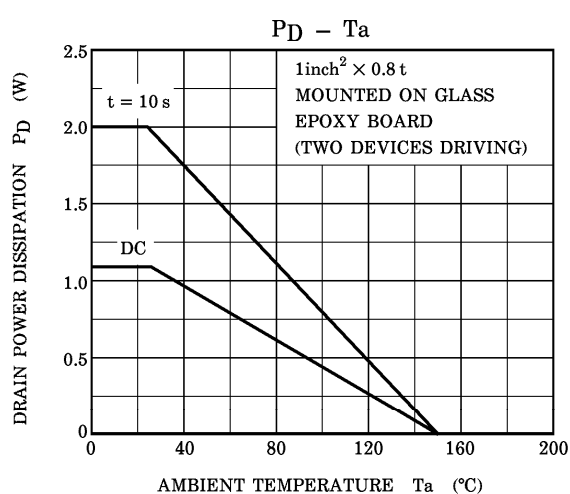
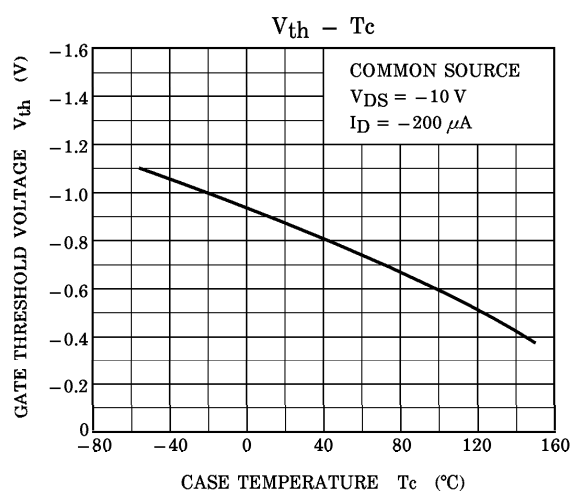
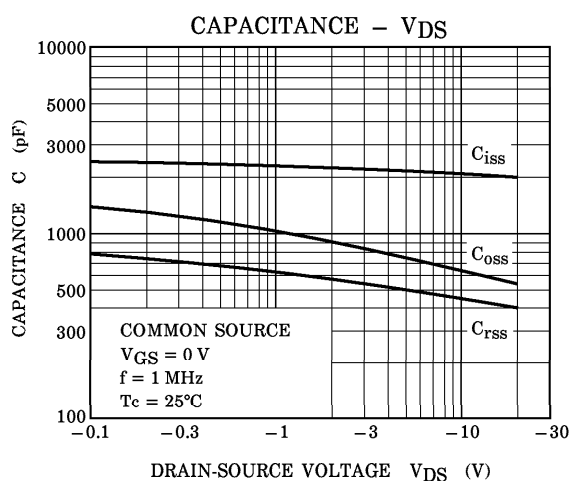
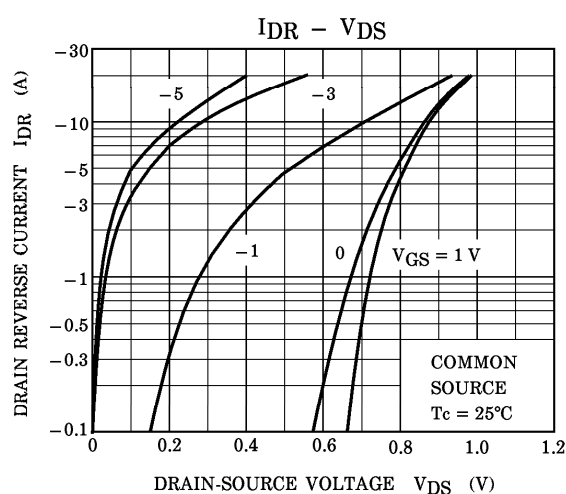
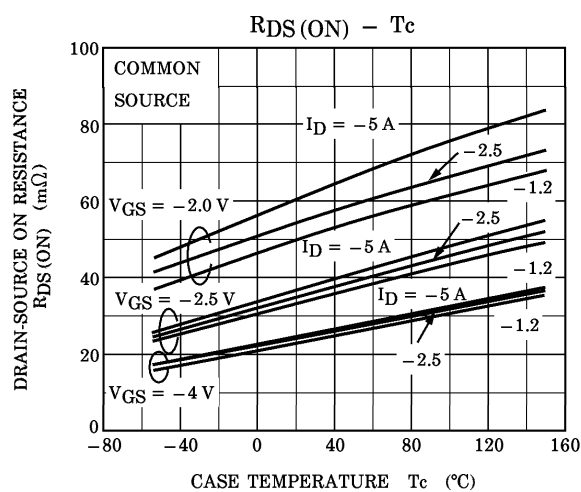


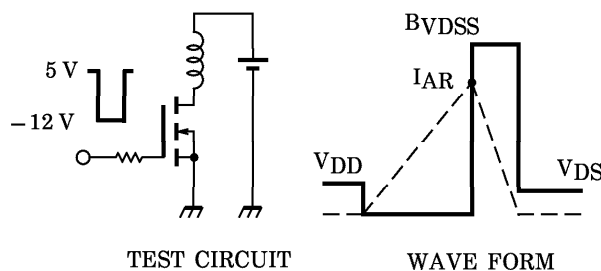
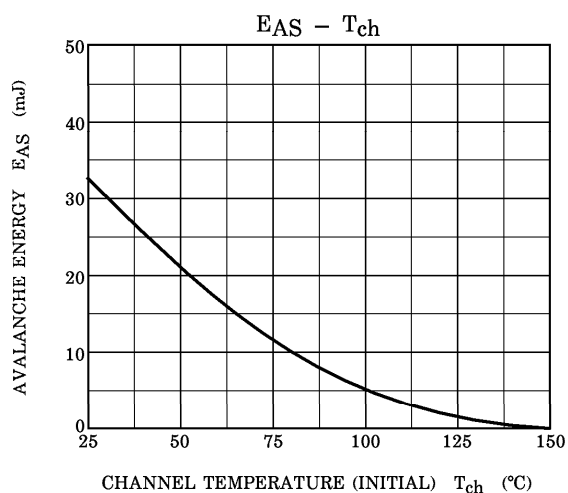
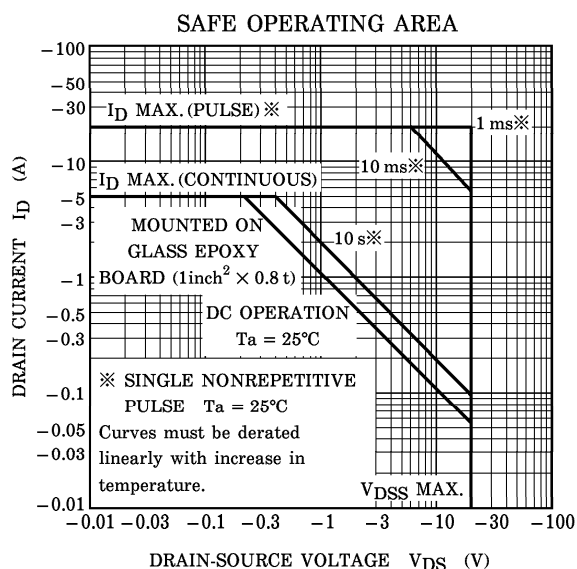
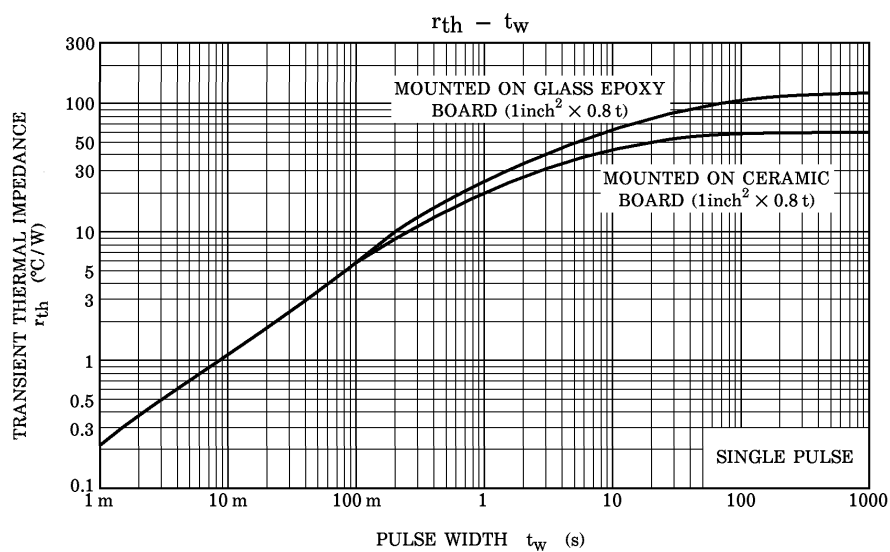
※ Lot Number

 — Month (Starting from Alphabet A)

 — Year (Last Number of the Christian Era)







Peak $I_{AR} = -5 \text{ A}$, $R_G = 25 \Omega$, $V_{DD} = -16 \text{ V}$, $L = 1.0 \text{ mH}$

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