

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

TPC8105-H

LITHIUM ION BATTERY APPLICATIONS

NOTE BOOK PC, PORTABLE EQUIPMENTS APPLICATIONS

HIGH SPEED AND HIGH EFFICIENCY DC-DC CONVERTERS

INDUSTRIAL APPLICATIONS

Unit in mm

- High Speed Switching
- Small Gate Charge : $Q_g = 32 \text{ nC}$ (Typ.)
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 20 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 12 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = -10 \mu\text{A}$ (Max.) ($V_{DS} = -30 \text{ V}$)
- 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	-7	A
	Pulse	I_{DP}	-28	A
Drain Power Dissipation*** ($T_a = 25^\circ\text{C}$)		P_D	2.4	W
Single Pulse Avalanche Energy**		E_{AS}	63.7	mJ
Avalanche Current		I_{AR}	-7	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	$^\circ\text{C/W}$

Note ;

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

** $V_{DD} = -24 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = -7 \text{ A}$ *** Drive operation ; Mount on glass epoxy board [$1 \text{ inch}^2 \times 0.8 \text{ t}$] ($t = 10 \text{ s}$)

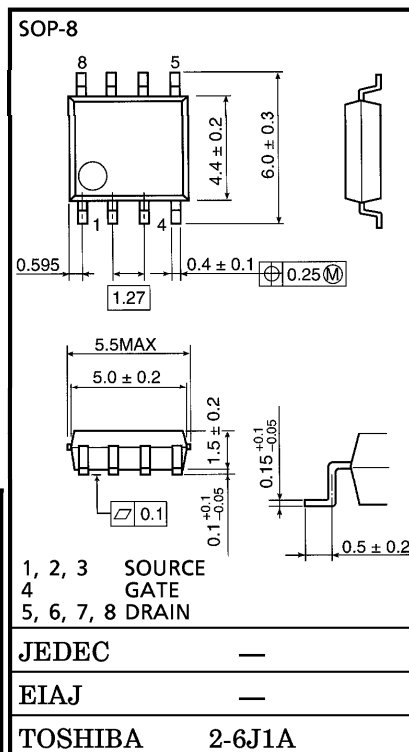
This transistor is an electrostatic sensitive device. Please handle with caution.

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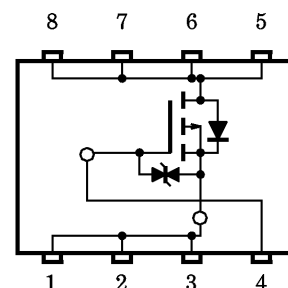
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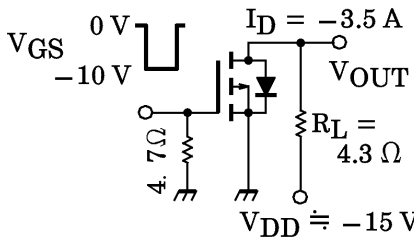


Weight : 0.08 g

CIRCUIT CONFIGURATION



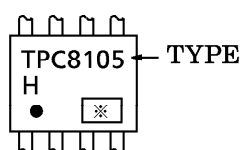
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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	—	—	
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 = −3.5 A	—	34	60	mΩ
		R _{DS (ON)}	V _{GS} = −10 V, I _D = −3.5 A	—	20	40	
Forward Transfer Admittance		Y _{fs}	V _{DS} = −10 V, I _D = −3.5 A	5.9	12	—	S
Input Capacitance		C _{iss}	V _{DS} = −10 V, V _{GS} = 0 V, f = 1 MHz	—	1440	—	pF
Reverse Transfer Capacitance		C _{rss}		—	330	—	
Output Capacitance		C _{oss}		—	485	—	
Switching Time	Rise Time	t _r		—	10	—	ns
	Turn-On Time	t _{on}		—	18	—	
	Fall Time	t _f		—	50	—	
	Turn-Off Time	t _{off}		—	140	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q _g	V _{DD} ≐ −24 V, V _{GS} = −10 V, I _D = −7 A	—	32	—	nC
Gate-Source Charge		Q _{gs}		—	23	—	
Gate-Drain (“Miller”) Charge		Q _{gd}		—	8	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I _{DR}	—	—	—	-7	A
Pulse Drain Reverse Current	I _{DRP}	—	—	—	-28	A
Diode Forward Voltage	V _{DSF}	I _{DR} = -7 A, V _{GS} = 0 V	—	—	1.2	V

MARKING

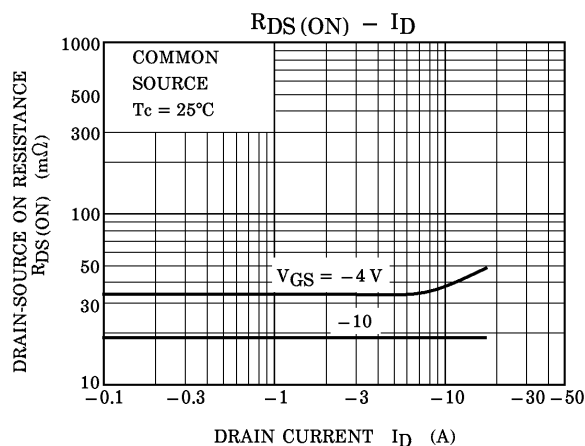
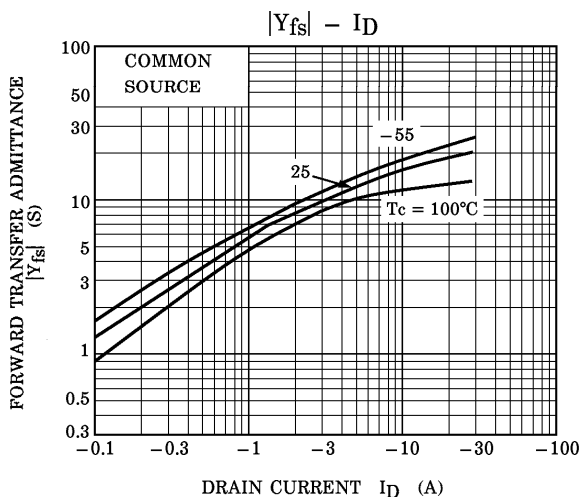
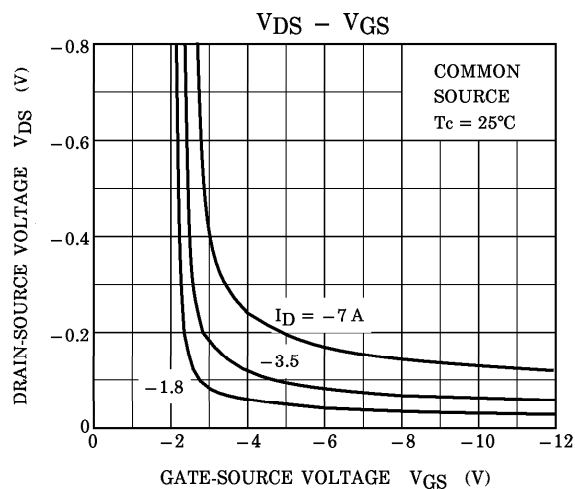
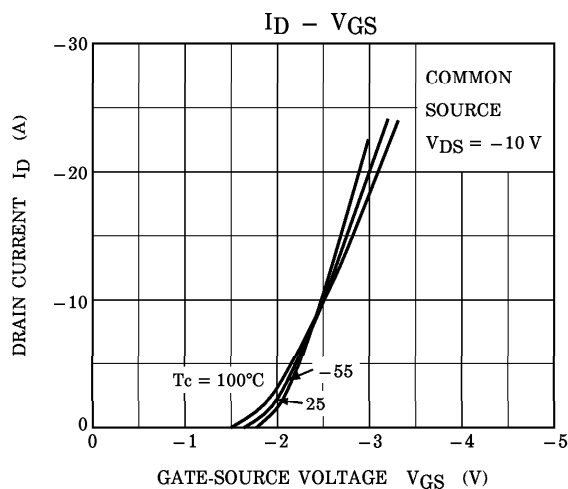
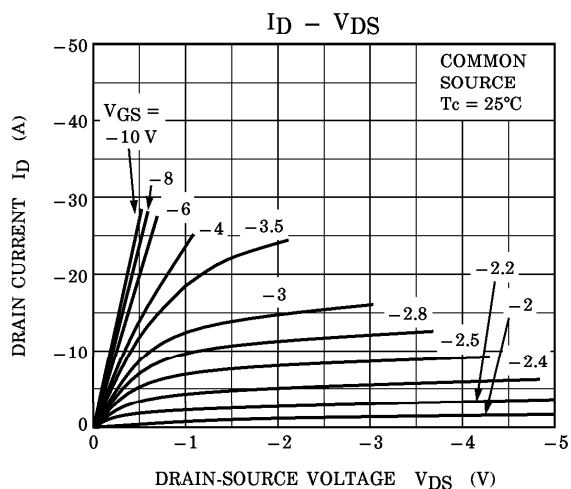
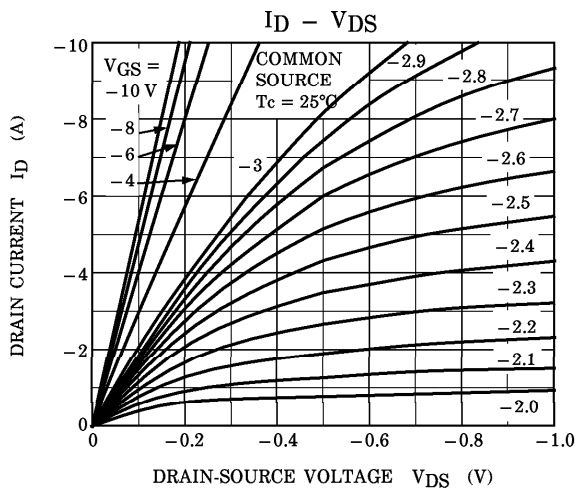


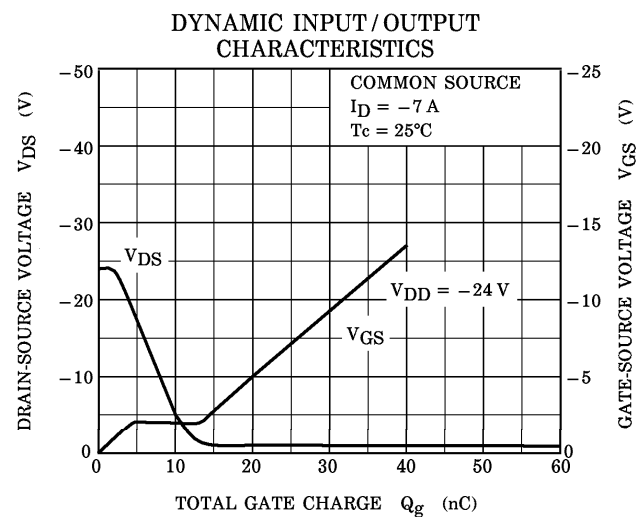
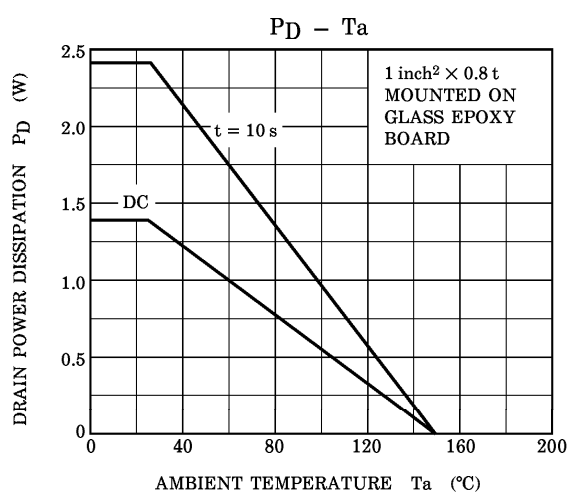
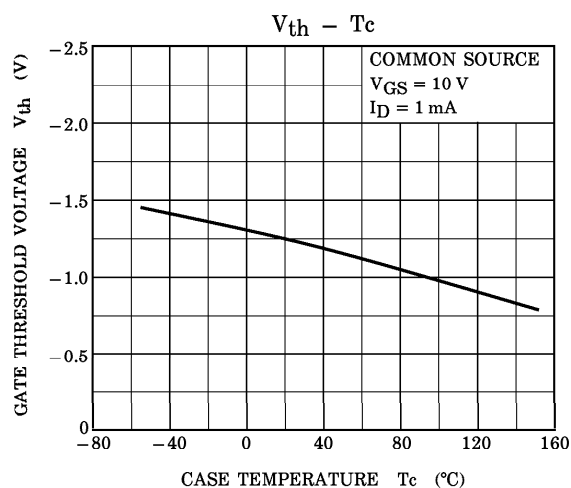
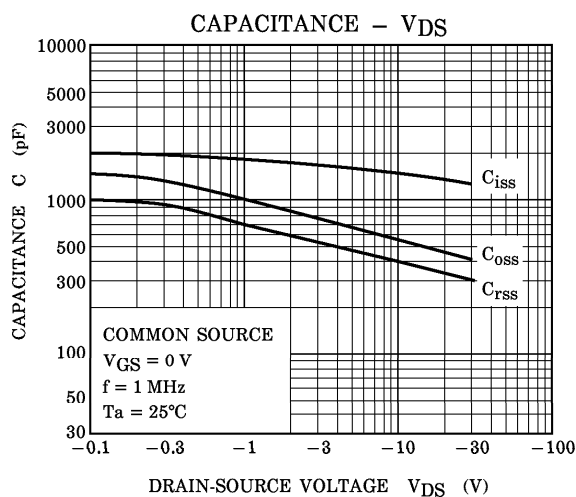
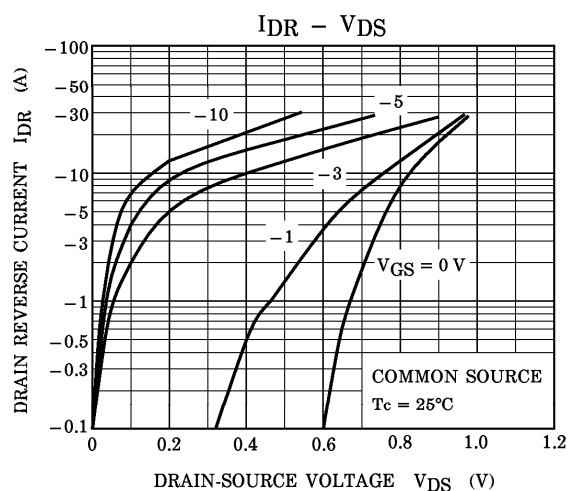
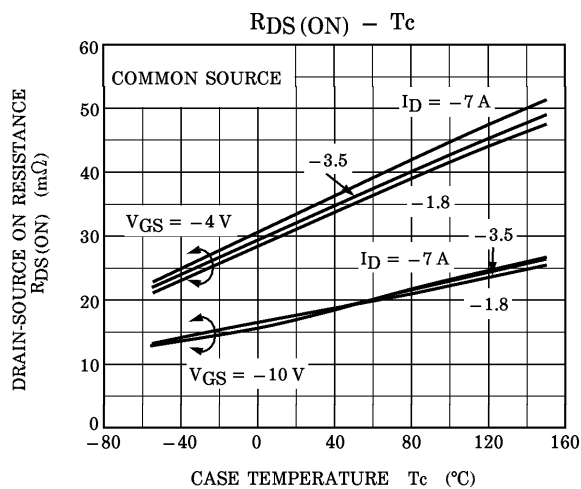
※ Lot Number

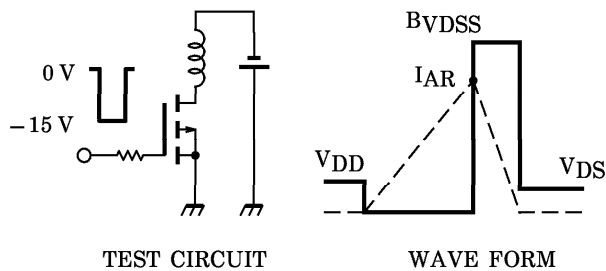
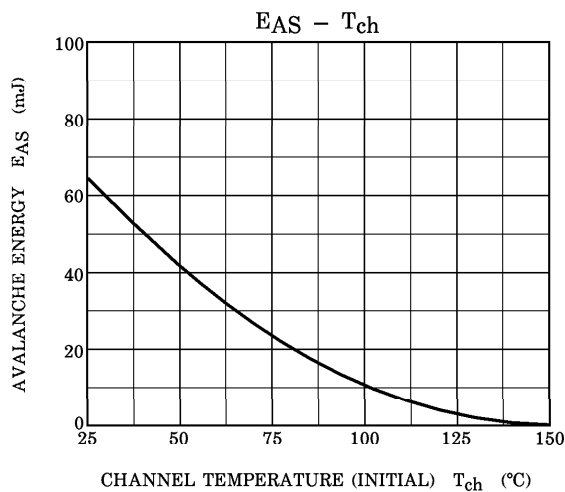
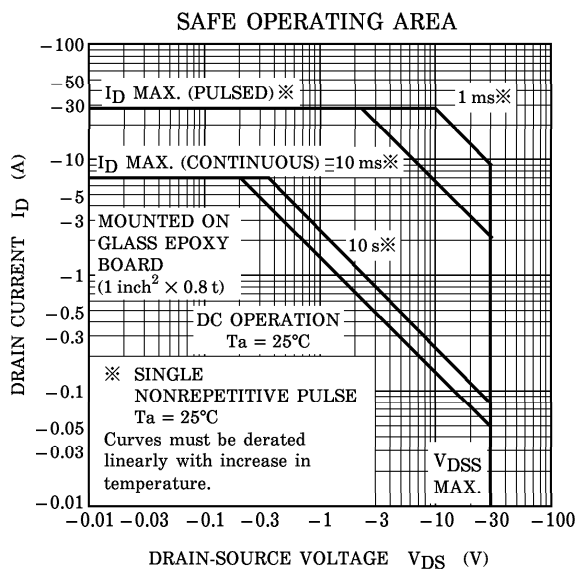
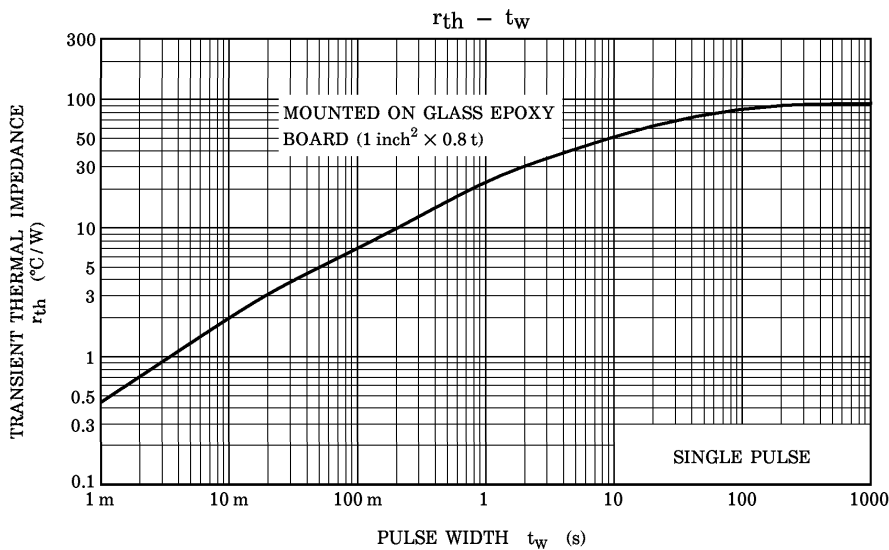


 Month (Starting from Alphabet A)


 Year (Last Number of the Christian Era)







Peak $I_{AR} = -7\text{ A}$, $R_G = 25\ \Omega$, $V_{DD} = -24\text{ V}$, $L = 1.0\text{ mH}$

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