TOSHIBA TPC8106-H

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

TPC8106-H

LITHIUM ION BATTERY APPLICATIONS

NOTE BOOK PC, PORTABLE EQUIPMENTS APPLICATIONS

HIGH SPEED AND HIGH EFFICIENCY DC-DC CONVERTERS

• High Speed Switching

• Small Gate Charge : $Q_g = 52 \text{ nC (Typ.)}$

• Low Drain-Source ON Resistance : $R_{DS(ON)} = 14 \,\mathrm{m}\Omega$ (Typ.)

• High Forward Transfer Admittance : $|Y_{fS}| = 16.6 \, S$ (Typ.)

• Low Leakage Current : $I_{DSS} = -10 \,\mu\text{A}$ (Max.) ($V_{DS} = -30 \,\text{V}$)

• Enhancement-Mode : $V_{th} = -0.8 \sim -2.0 \text{ V}$

 $(V_{DS} = -10 \text{ V}, I_{D} = -1 \text{ mA})$

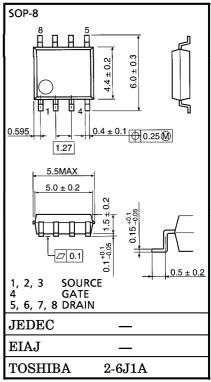
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERIS	SYMBOL	RATING	UNIT					
Drain-Source Voltage	$v_{ m DSS}$	-30	V					
Drain-Gate Voltage (RG	$v_{ m DGR}$	-30	V					
Gate-Source Voltage	v_{GSS}	±20	V					
Drain Current	DC	$I_{\mathbf{D}}$	-10	A				
Drain Current	Pulse	I_{DP}	-40	A				
Drain Power Dissipation (Ta = 25°C)	PD	2.4	w					
Single Pulse Avalanche	EAS	130	mJ					
Avalanche Current	I_{AR}	-10	Α					
Repetitive Avalanche En	E_{AR}	0.24	mJ					
Channel Temperature	$\mathrm{T_{ch}}$	150	$^{\circ}\mathrm{C}$					
Storage Temperature Ra	$\mathrm{T_{stg}}$	-55~150	°C					

THERMAL CHARACTERISTICS

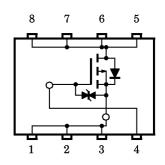
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient***	R _{th (ch-a)}	52.1	°C/W

INDUSTRIAL APPLICATIONS Unit in mm



Weight: 0.08 g

CIRCUIT CONFIGURATION



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 mH, $R_G = 25 \Omega$, $I_{AR} = -10 \text{ A}$
- *** Drive operation; Mount on glass epoxy board $[1 \operatorname{inch}^2 \times 0.8 t]$ (t = 10 s)

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

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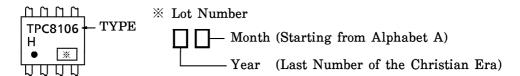
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

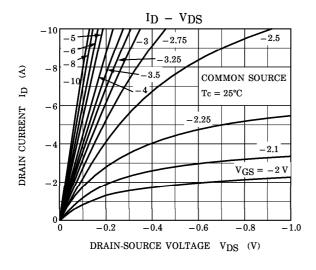
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CHARA	CTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakag	e Current	IGSS	$V_{GS} = \pm 16 V, V_{DS} = 0 V$	_	_	±10	μ A
Drain Cut-O	ff Current	$I_{ m DSS}$	$V_{DS} = -30 \text{ V}, V_{GS} = 0 \text{ V}$	_	_	-10	μ A
Drain-Source	Breakdown	V _(BR) DSS	$I_{D} = -10 \text{ mA}, V_{GS} = 0 \text{ V}$	-30	_	_	v
Voltage		V _(BR) DSX	$I_{D} = -10 \text{ mA}, \text{ V}_{GS} = 20 \text{ V}$	-15	_	_]
Gate Thresh	old Voltage	$V_{ m th}$	$V_{DS} = -10 \text{ V}, I_{D} = -1 \text{ mA}$	-0.8	_	-2.0	V
Drain-Source	ON Resistance	RDS (ON)	$V_{GS} = -4 \text{ V}, I_{D} = -5 \text{ A}$ $V_{GS} = -10 \text{ V}, I_{D} = -5 \text{ A}$	_	24 14	30 20	$\mathbf{m}\Omega$
Forward Tra	nsfor	R _{DS} (ON)	VGS = =10 V, 1D = =3 A	_	14	20	
Admittance	nsiei	$ Y_{fs} $	$V_{DS} = -10 V, I_{D} = -5 A$	8.3	16.6	_	S
Input Capaci	Input Capacitance			_	2160	_	
Reverse Transfer Capacitance		$egin{array}{ccc} C_{ ext{iss}} \ \end{array}$	$ m V_{DS} = -10 V, V_{GS} = 0 V, \ f = 1 MHz$	-	530	_	рF
Output Capacitance		Coss		_	720	_	
Switching Time	Rise Time	$t_{\mathbf{r}}$	V_{GS} 0 V $I_{D} = -5 \text{ A}$	_	12	_	
	Turn-On Time	ton	$V_{GS} = 0 \text{ V}$ -10 V $C \Rightarrow V_{OUT}$ $R_{L} = 3 \Omega$ $V_{DD} = -15 \text{ V}$	_	20	_	na
	Fall Time	tf	$\begin{array}{c c} & V_{DD} = -15 \mathrm{V} \\ \hline \end{array}$	_	100	_	ns
	Turn-Off Time	t _{off}	$egin{aligned} ext{VIN}: ext{t_r}, ext{t_f} &< 5 ext{ ns,} \ ext{Duty} &\leq 1\%, ext{t_W} &= 10 ext{} \mu ext{s} \end{aligned}$	-	250	_	
Total Gate Charge (Gate- Source Plus Gate-Drain)		$\mathbf{Q}_{\mathbf{g}}$	$V_{DD} = -24 \text{ V}, V_{GS} = -10 \text{ V},$	_	52	_	C
Gate-Source Charge		$Q_{ m gs}$	$I_{ m D}=-10~{ m A}$	_	38	_	nC
Gate-Drain ("Miller") Charge		$ m Q_{gd}$		_	14	_	

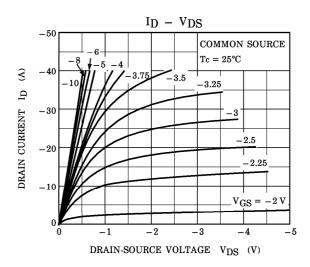
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

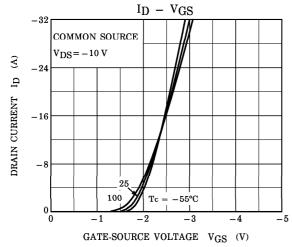
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{ m DR}$	1			-10	A
Pulse Drain Reverse Current	$I_{ m DRP}$		_	_	-40	Α
Diode Forward Voltage	$v_{ m DSF}$	$I_{DR} = -10 \text{ A}, V_{GS} = 0 \text{ V}$	ı		1.2	V

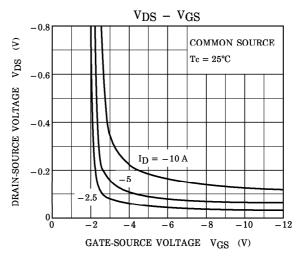
MARKING

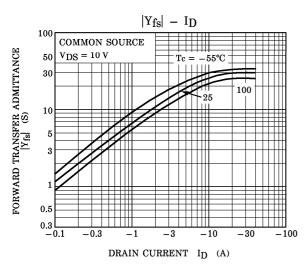


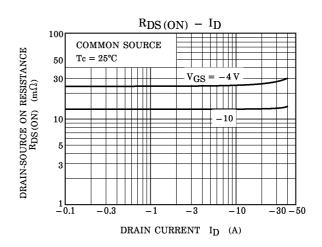


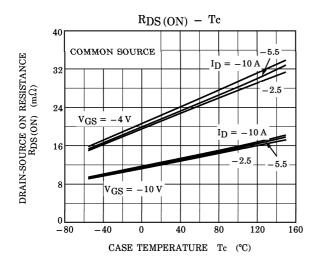


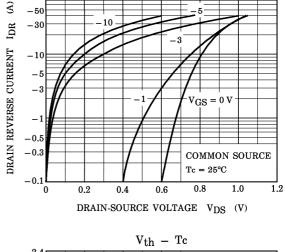






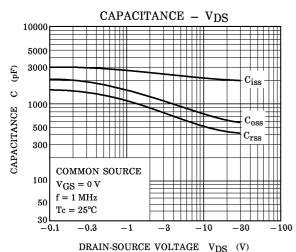


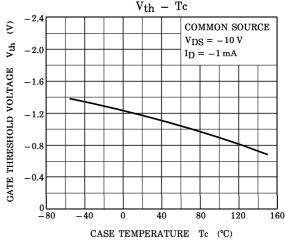


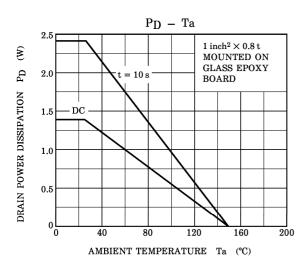


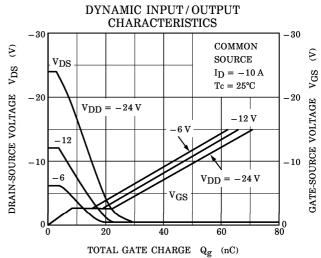
 $I_{DR} - V_{DS}$

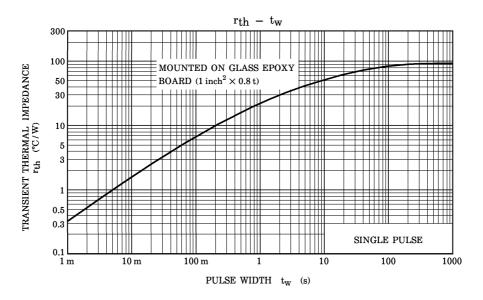
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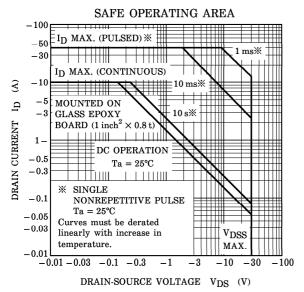


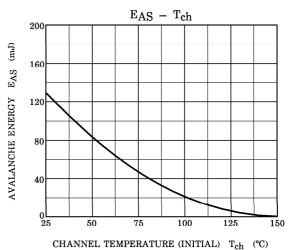


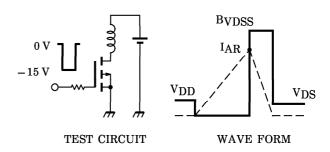












$$\begin{array}{l} Peak~I_{AR} = -10~A,~R_G = 25~\Omega \\ V_{DD} = -24~V,~L = 1.0~mH \end{array} \\ E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right) \\ \end{array}$$