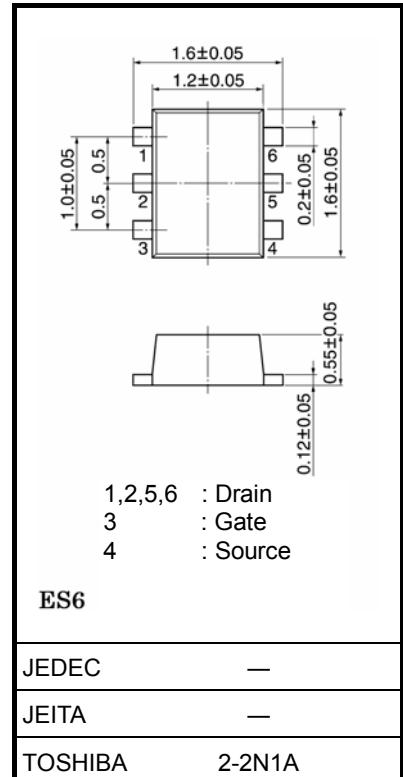


TOSHIBA Field Effect Transistor Silicon P Channel MOS Type (Π -MOSVII)**SSM6K30FE**

- High speed switching
- DC-DC Converter

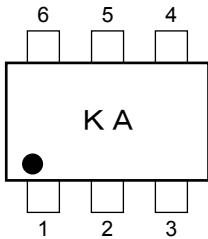
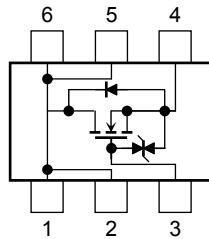
- Small package
- Low RDS (ON) : $R_{on} = 210 \text{ m}\Omega$ (max) (@ $V_{GS} = 10 \text{ V}$)
: $R_{on} = 420 \text{ m}\Omega$ (max) (@ $V_{GS} = 4 \text{ V}$)
- High speed switching : $t_{on} = 19 \text{ ns}$ (typ)
: $t_{off} = 10 \text{ ns}$ (typ)

Unit: mm

**Maximum Ratings (Ta = 25°C) MOSFET**

Characteristics	Symbol	Rating	Unit
Drain-Source voltage	V_{DS}	20	V
Gate-Source voltage	V_{GSS}	± 20	V
Drain current	DC	I_D	A
	Pulse	I_{DP}	
Drain power dissipation	P_D (Note 1)	500	mW
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55~150	°C

Note 1: Mounted on FR4 board
(25.4 mm × 25.4 mm × 1.6 t, Cu pad: 645 mm²)

Marking**Equivalent Circuit (top view)****Handling Precaution**

When handling individual devices (which are not yet mounted on a circuit board), ensure that the environment is protected against static electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

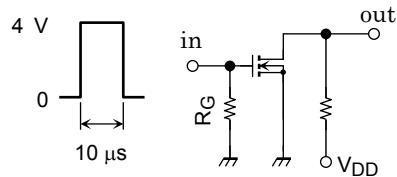
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0$	—	—	± 1	μA
Drain-Source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 1\text{ mA}$, $V_{GS} = 0$	20	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 20\text{ V}$, $V_{GS} = 0$	—	—	1	μA
Gate threshold voltage	V_{th}	$V_{DS} = 5\text{ V}$, $I_D = 0.1\text{ mA}$	1.1	—	2.3	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 5\text{ V}$, $I_D = 0.6\text{ A}$ (Note 2)	0.68	—	—	S
Drain-Source on-resistance	$R_{DS(\text{ON})}$	$I_D = 0.6\text{ A}$, $V_{GS} = 10\text{ V}$ (Note 2)	—	145	210	$\text{m}\Omega$
		$I_D = 0.6\text{ A}$, $V_{GS} = 4\text{ V}$ (Note 2)	—	260	420	
Input capacitance	C_{iss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	—	60	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	—	17	—	pF
Output capacitance	C_{oss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0$, $f = 1\text{ MHz}$	—	47	—	pF
Switching time	Turn-on time	t_{on}	$V_{DD} = 10\text{ V}$, $I_D = 0.6\text{ A}$, $V_{GS} = 0\text{~}4\text{ V}$, $R_G = 10\Omega$	—	19	ns
	Turn-off time	t_{off}		—	10	

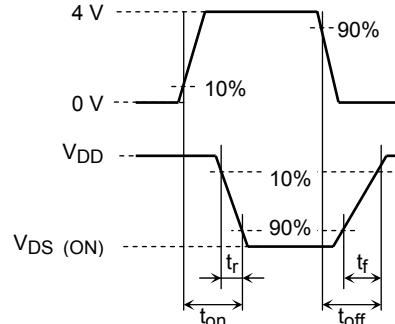
Note 2:Pulse measurement

Switching Time Test Circuit

(a) Test circuit



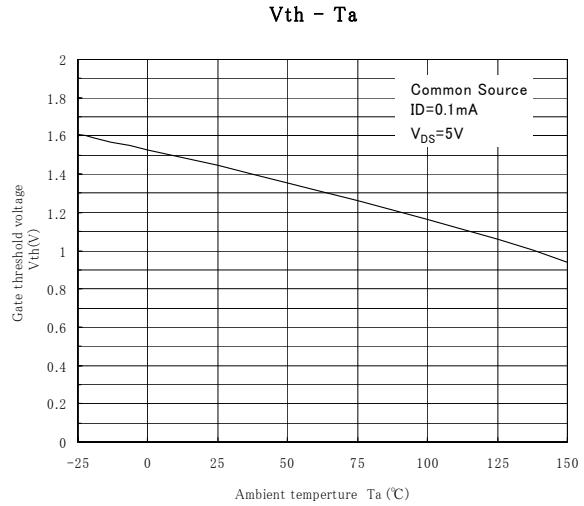
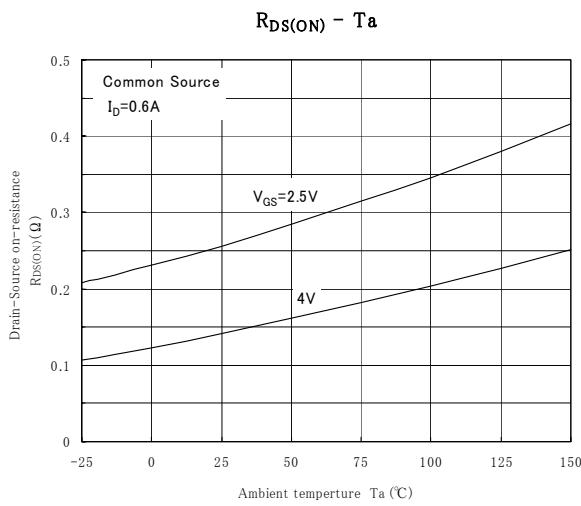
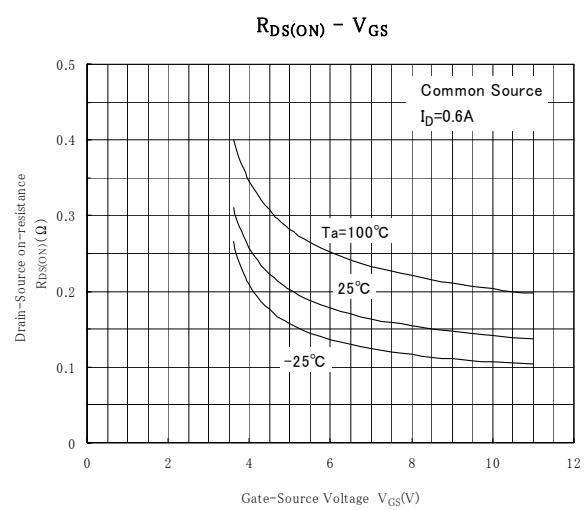
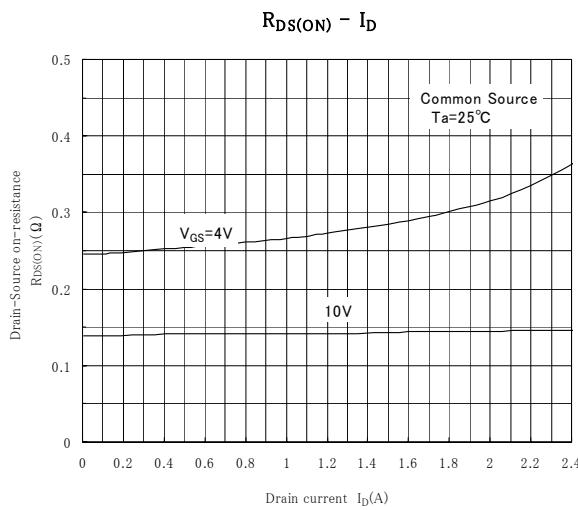
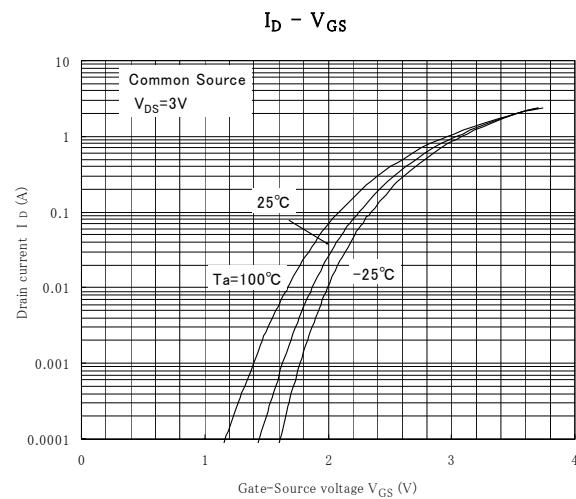
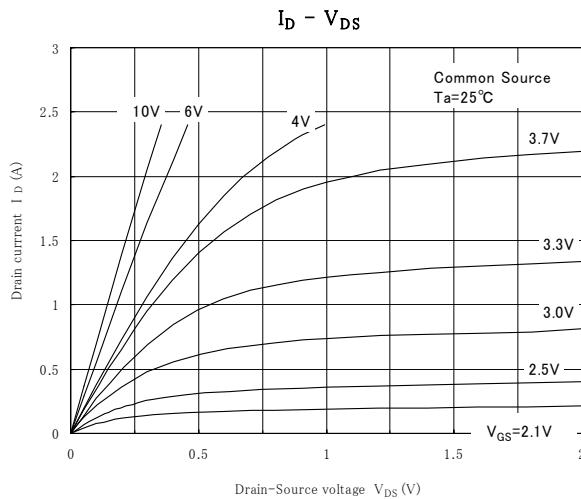
$V_{DD} = 10\text{ V}$
 $R_G = 10\Omega$
 $\text{Duty} \leq 1\%$
 V_{IN} : $t_r, t_f < 5\text{ ns}$
 Common source
 $T_a = 25^\circ\text{C}$

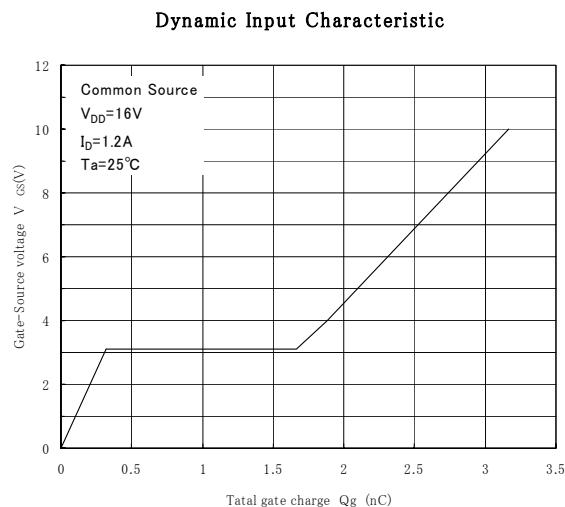
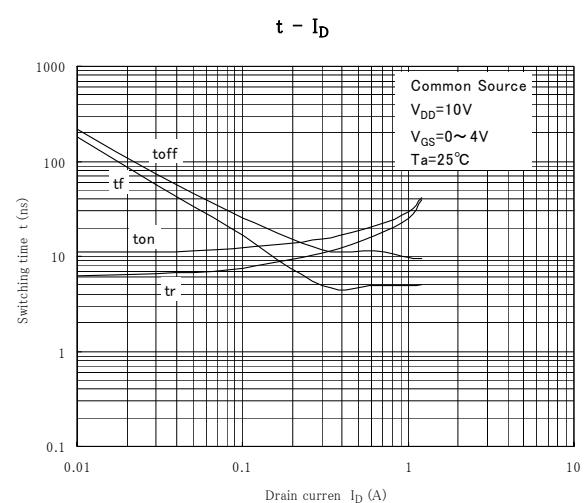
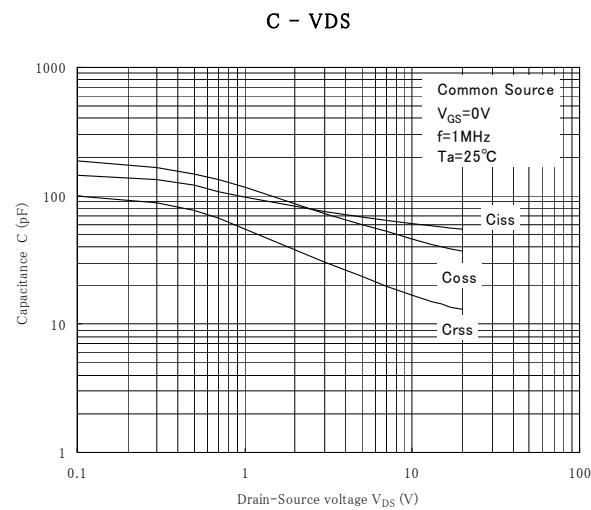
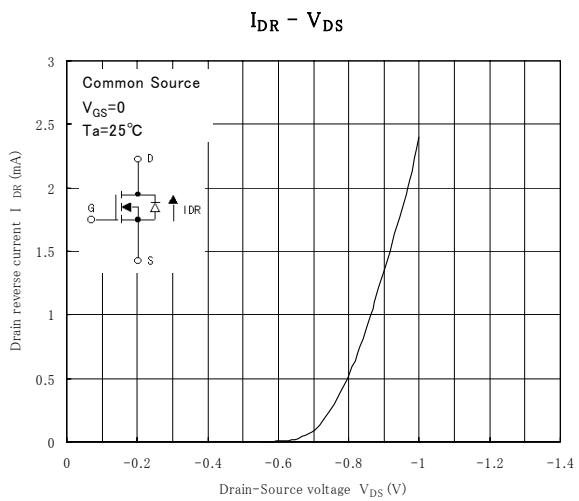
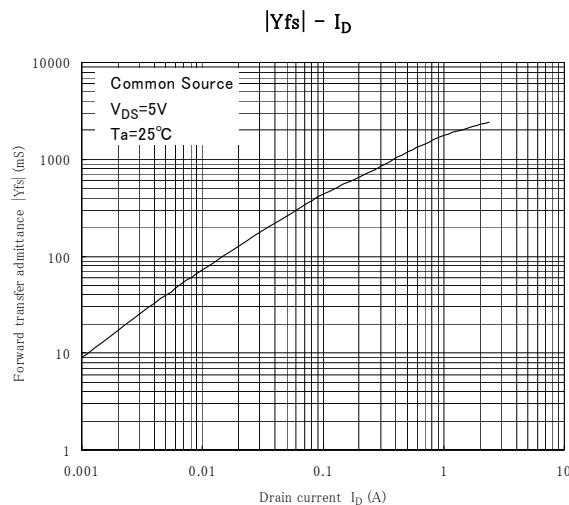
(b) V_{IN} (c) V_{OUT} 

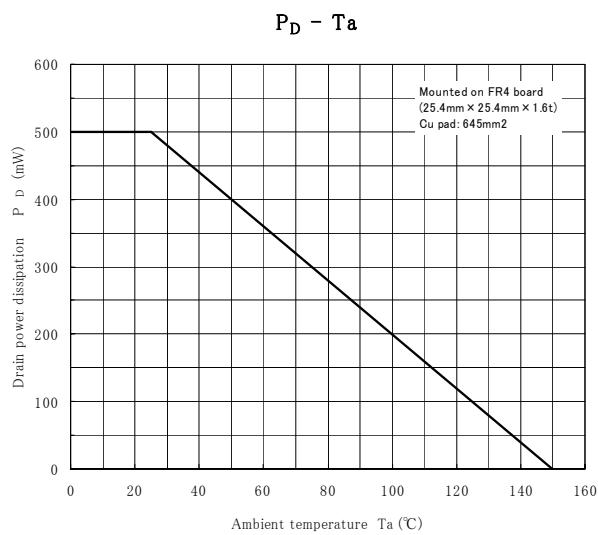
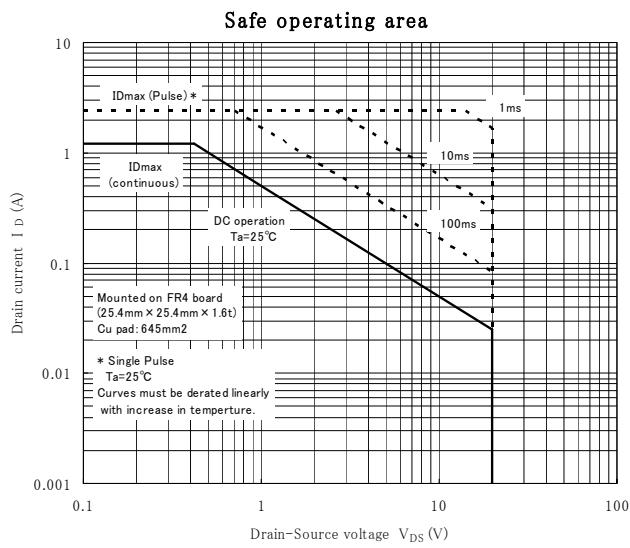
Precaution

V_{th} can be expressed as the voltage between the gate and source when the low operating current value is $I_D = 0.1\text{ mA}$ for this product. For normal switching operation, V_{GS} (on) requires a higher voltage than V_{th} and V_{GS} (off) requires a lower voltage than V_{th} . (The relationship can be established as follows: V_{GS} (off) < V_{th} < V_{GS} (on).)

Be sure to take this into consideration when using the device. The V_{GS} recommended voltage for turning on this product is 4V or higher.







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