

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

SSM6K07FU

DC-DC Converters
High Speed Switching Applications

- Small package
- Low on resistance: $R_{on} = 130 \text{ m}\Omega \text{ max (@}V_{GS} = 10 \text{ V)}$
: $R_{on} = 220 \text{ m}\Omega \text{ max (@}V_{GS} = 4 \text{ V)}$
- Low input capacitance: $C_{iss} = 102 \text{ pF typ.}$
: $C_{rss} = 22 \text{ pF typ.}$

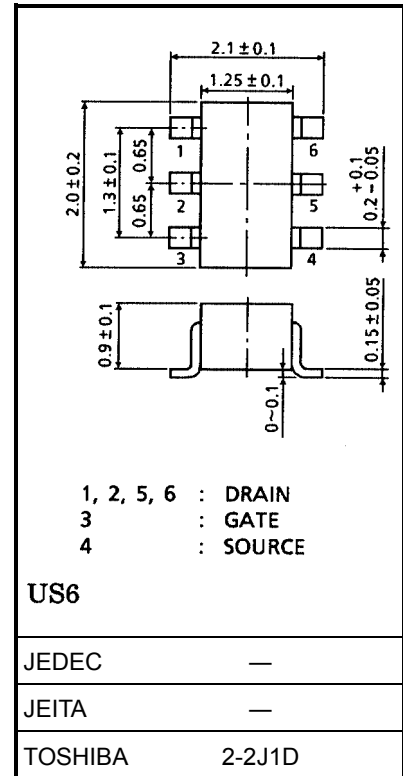
Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DS}	30	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC	I_D	1.5	A
	Pulse	I_{DP}	3.0	
Drain power dissipation		P_D (Note 1)	300	mW
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	-55~150	°C

Note 1: Mounted on FR4 board.

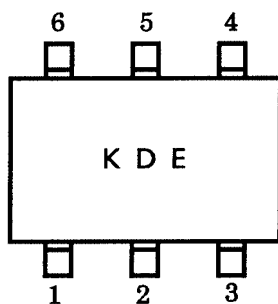
(25.4 mm × 25.4 mm × 1.6 t, Cu pad: 0.32 mm² × 6)

Unit: mm

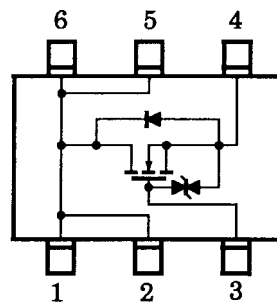


Weight: 6.8 mg (typ.)

Marking



Equivalent Circuit (top view)



Handling Precaution

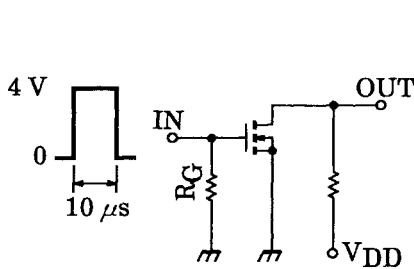
When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static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

Electrical Characteristics (Ta = 25°C)

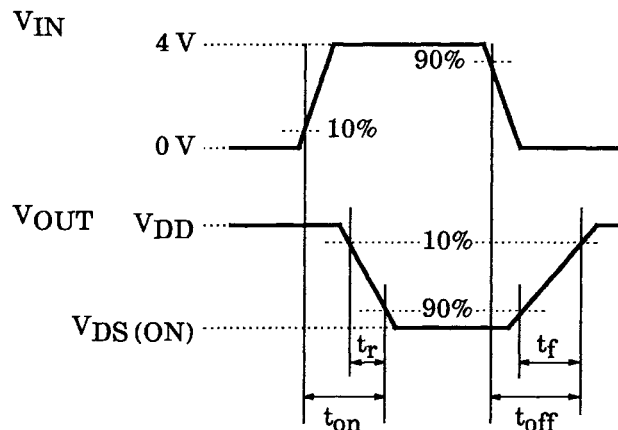
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0$	—	—	± 1	μA
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 1\text{ mA}, V_{GS} = 0$	30	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0$	—	—	1	μA
Gate threshold voltage	V_{th}	$V_{DS} = 5\text{ V}, I_D = 0.1\text{ mA}$	1.1	—	1.8	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 5\text{ V}, I_D = 0.75\text{ A}$ (Note 2)	1.0	—	—	S
Drain-source ON resistance	$R_{DS(ON)}$	$I_D = 0.75\text{ A}, V_{GS} = 10\text{ V}$ (Note 2)	—	105	130	m Ω
	$R_{DS(ON)}$	$I_D = 0.75\text{ A}, V_{GS} = 4\text{ V}$ (Note 2)	—	170	220	
	$R_{DS(ON)}$	$I_D = 0.75\text{ A}, V_{GS} = 3.3\text{ V}$ (Note 2)	—	230	500	
Input capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	102	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DS} = 15\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	22	—	pF
Output capacitance	C_{oss}	$V_{DS} = 15\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	57	—	pF
Switching time	Turn-on time	$V_{DD} = 15\text{ V}, I_D = 0.75\text{ A}, V_{GS} = 0\sim 4\text{ V}, R_G = 10\ \Omega$	—	46	—	ns
	Turn-off time		—	65	—	

Note 2: Pulse test

Switching Time Test Circuit



$V_{DD} = 15\text{ V}$
 $R_G = 10\ \Omega$
 D.U. $\leq 1\%$
 $V_{IN} : t_r, t_f < 5\text{ ns}$
COMMON SOURCE
 $T_a = 25^\circ\text{C}$



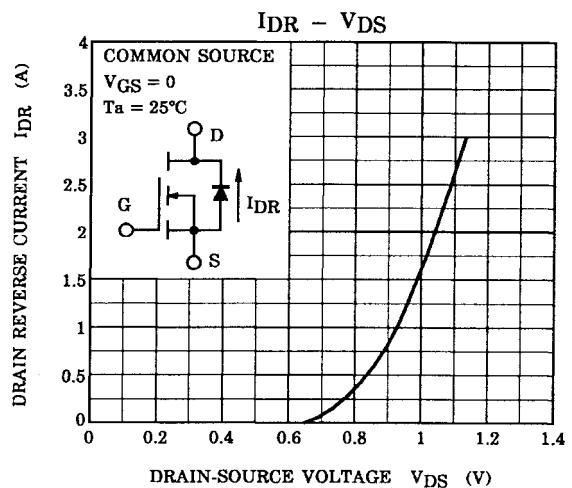
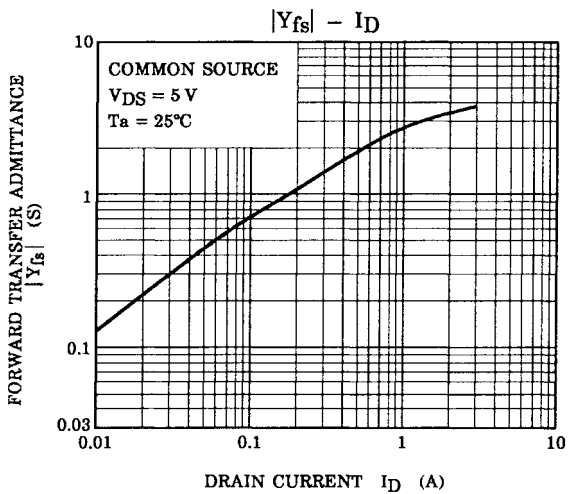
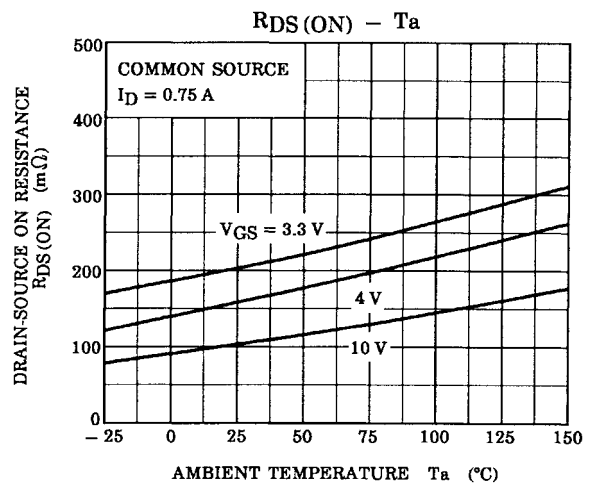
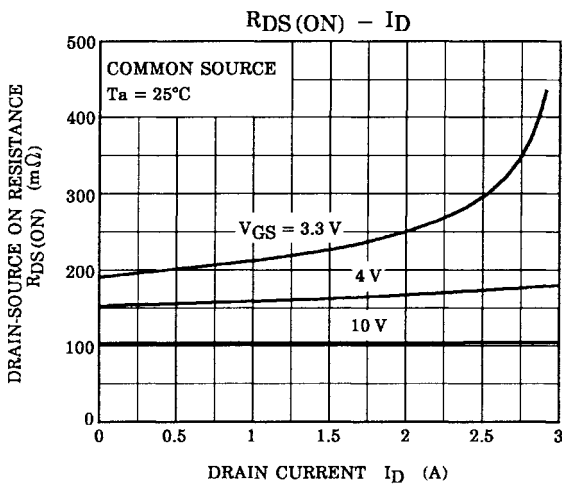
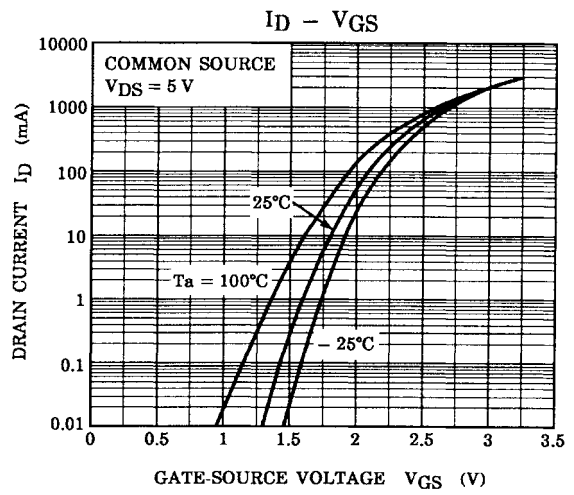
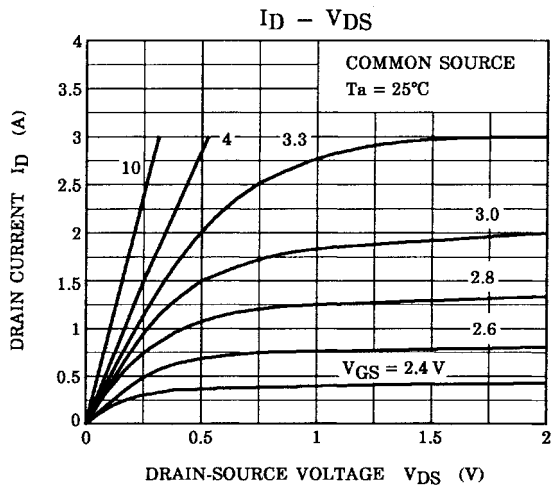
Precaution

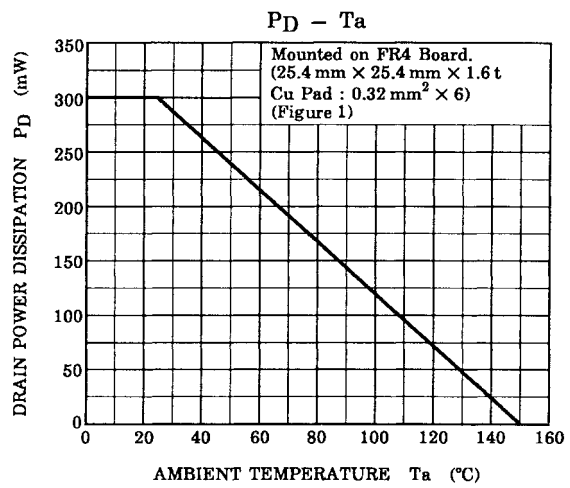
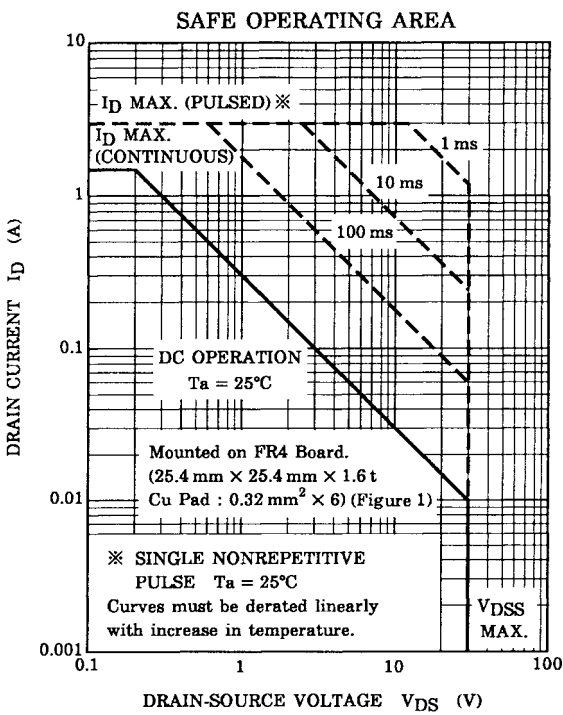
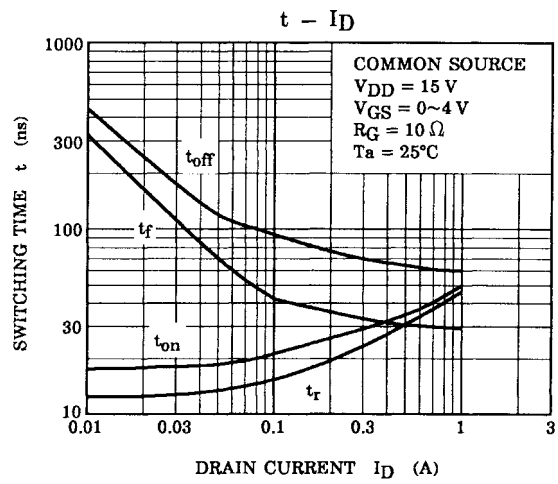
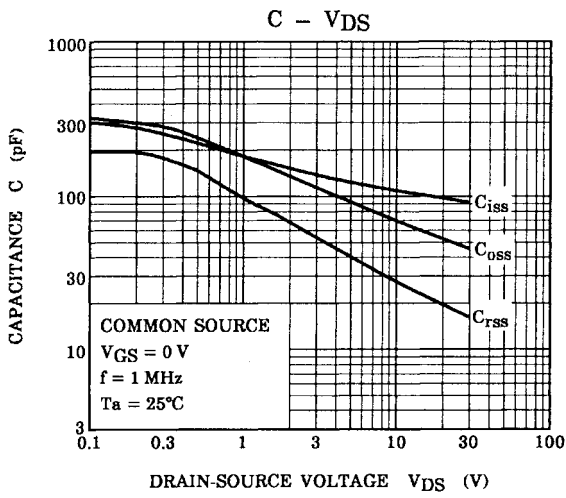
V_{th} can be expressed as voltage between gate and source when low operating current value is $I_D = 100\ \mu\text{A}$ for this product. For normal switching operation, $V_{GS(on)}$ requires higher voltage than V_{th} and $V_{GS(off)}$ requires lower voltage than V_{th} .

(Relationship can be established as follows: $V_{GS(off)} < V_{th} < V_{GS(on)}$)

Please take this into consideration for using the device.

V_{GS} recommended voltage of 4 V or higher to turn on this product.





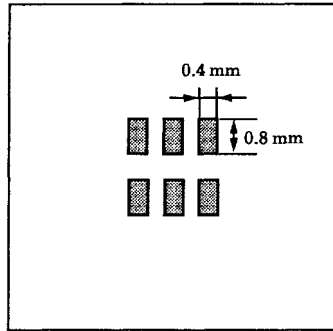


Figure 1 25.4 mm × 25.4 mm × 1.6 t, Cu Pad: 0.32 mm² × 6

RESTRICTIONS ON PRODUCT USE

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