

TOSHIBA Field Effect Transistor Silicon N-Channel MOS Type (U-MOSIII)

2SK3843

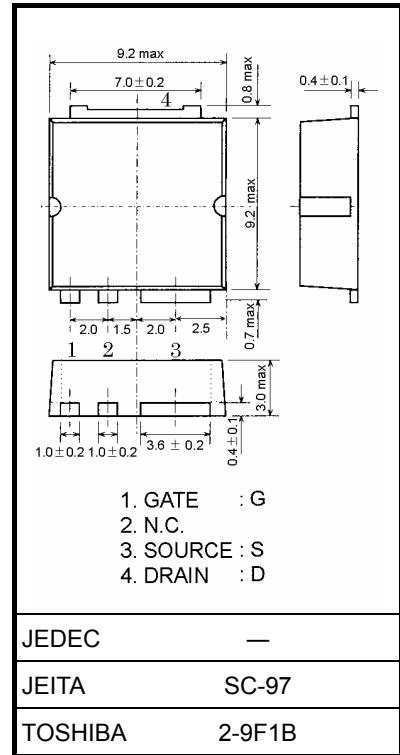
Switching Regulator, DC/DC Converter and Motor Drive Applications

Unit: mm

- Low drain-source ON resistance : $R_{DS\ (ON)} = 2.7\ m\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 120\ S$ (typ.)
- Low leakage current : $Id_{SS} = 10\ \mu A$ (max) ($V_{DS} = 40\ V$)
- Enhancement mode : $V_{th} = 1.5\sim3.0\ V$ ($V_{DS} = 10\ V$, $Id = 1\ mA$)

Maximum Ratings ($T_a = 25^\circ C$)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	40	V
Drain-gate voltage ($R_{GS} = 20\ k\Omega$)	V_{DGR}	40	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	A
Drain power dissipation ($T_c = 25^\circ C$)	P_D	125	W
Single-pulse avalanche energy (Note 2)	E_{AS}	542	mJ
Avalanche current	I_{AR}	75	A
Repetitive avalanche energy (Note 3)	E_{AR}	12.5	mJ
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature range	T_{stg}	-55~150	$^\circ C$



Weight: 0.74 g (typ.)

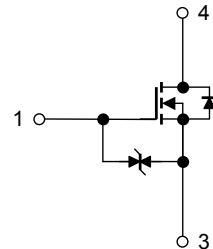
Thermal Characteristics

Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th\ (ch-c)}$	1.0	$^\circ C/W$

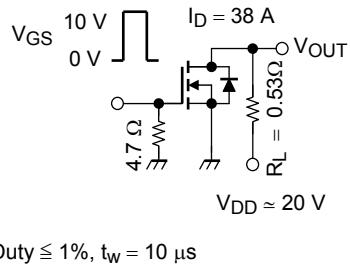
Note 1: Ensure that the channel temperature does not exceed $150^\circ C$.Note 2: $V_{DD} = 25\ V$, $T_{ch} = 25^\circ C$ (initial), $L = 100\ \mu H$, $I_{AR} = 75\ A$, $R_G = 25\ \Omega$

Note 3: Repetitive rating: pulse width limited by maximum channel temperature.

This transistor is an electrostatic-sensitive device. Handle with care.



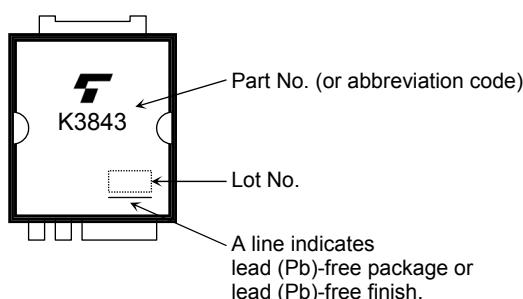
Electrical Characteristics (Ta = 25°C)

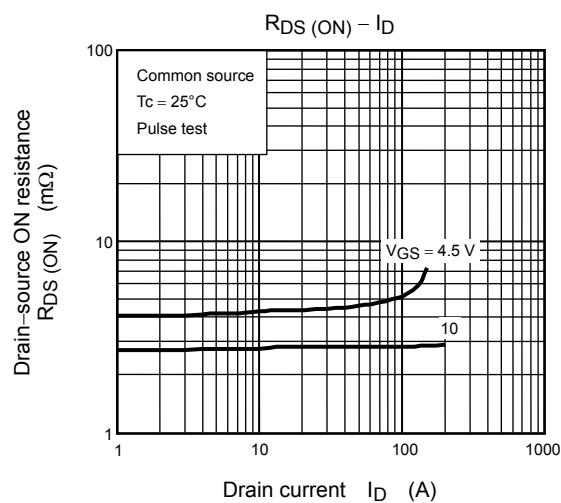
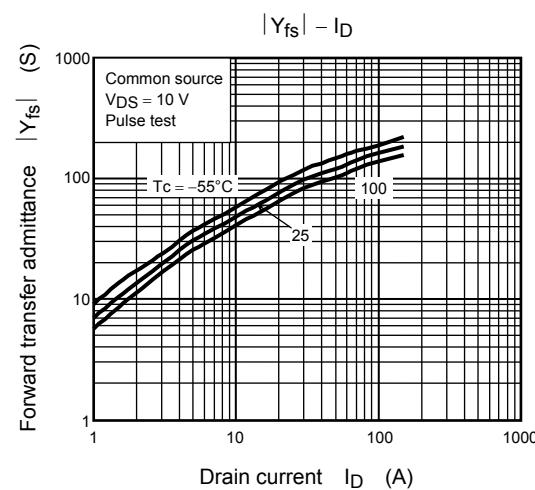
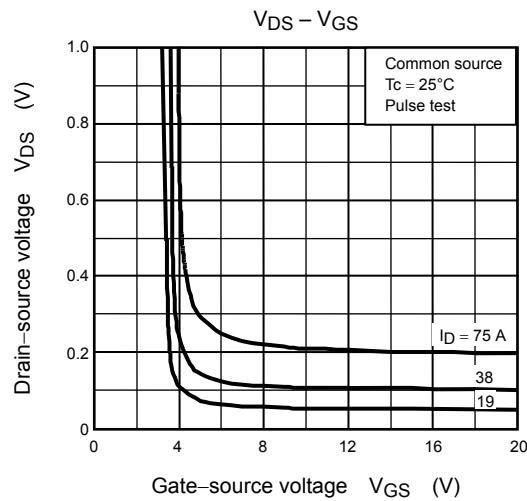
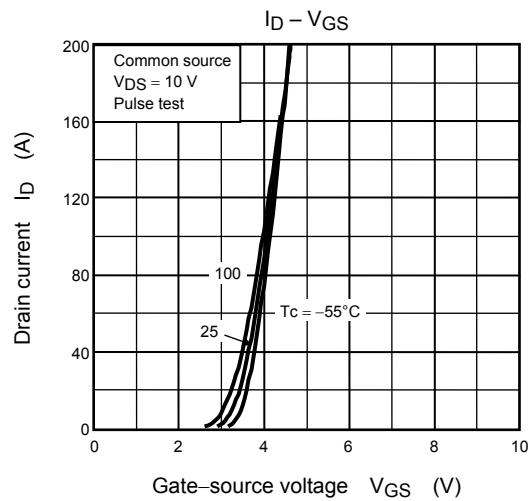
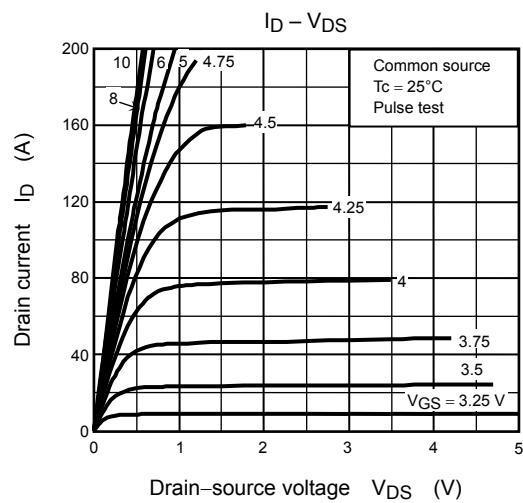
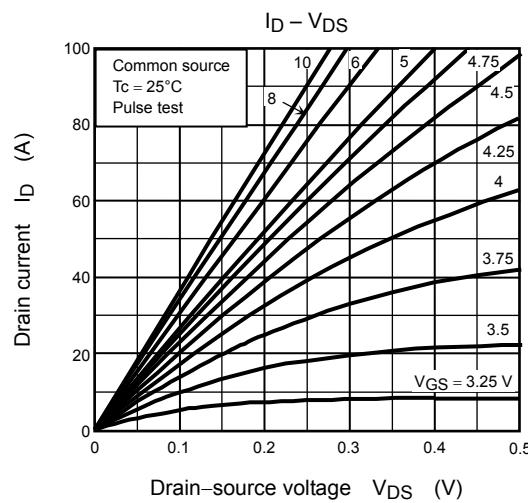
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	—	—	±10	µA
Drain cutoff current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V	—	—	10	µA
Drain–source breakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	40	—	—	V
	V (BR) DSX	I _D = 10 mA, V _{GS} = -20 V	15	—	—	
Gate threshold voltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.5	—	3.0	V
Drain–source ON resistance	R _{D5} (ON)	V _{GS} = 4.5 V, I _D = 38 A	—	4.3	8.0	mΩ
		V _{GS} = 10 V, I _D = 38 A	—	2.7	3.5	
Forward transfer admittance	Y _{fs}	V _{DS} = 10 V, I _D = 38 A	60	120	—	S
Input capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	11200	—	pF
Reverse transfer capacitance	C _{rss}		—	800	—	
Output capacitance	C _{oss}		—	1350	—	
Switching time	Rise time	t _r		—	12	ns
	Turn-on time	t _{on}		—	40	
	Fall time	t _f		—	65	
	Turn-off time	t _{off}		—	260	
Total gate charge (gate–source plus gate–drain)	Q _g	V _{DD} ≈ 32 V, V _{GS} = 10 V, I _D = 75 A	—	210	—	nC
Gate–source charge	Q _{gs}		—	150	—	
Gate–drain (“Miller”) Charge	Q _{gd}		—	60	—	

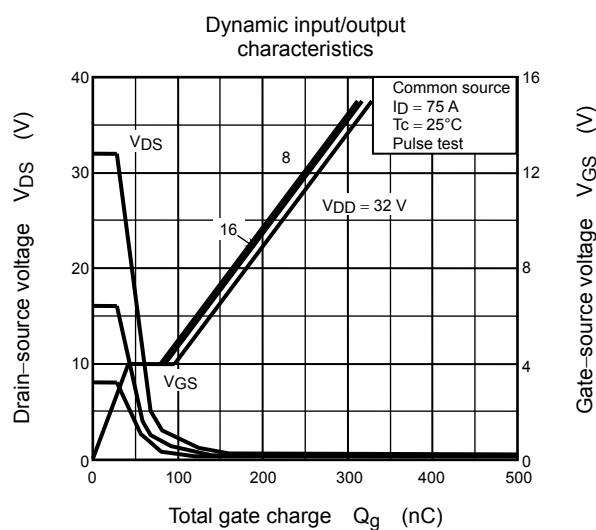
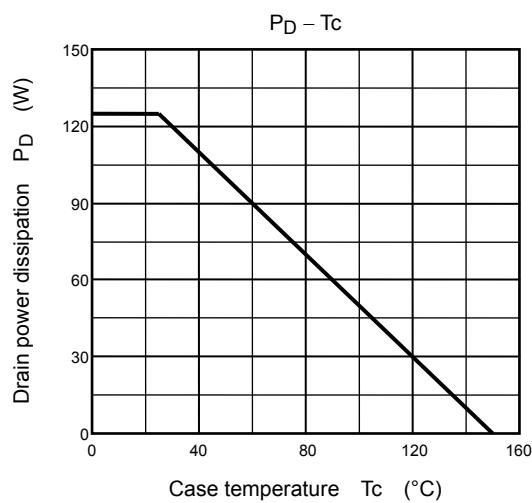
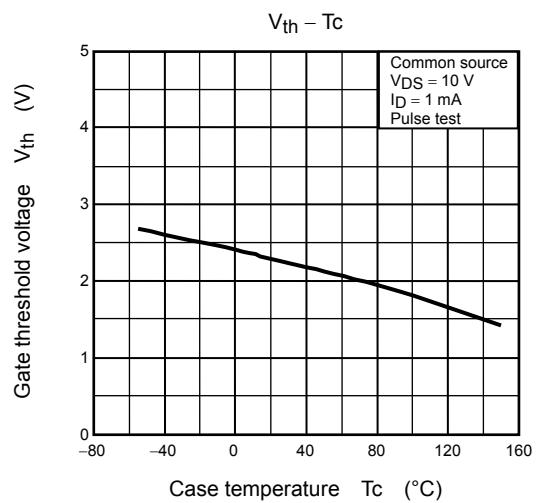
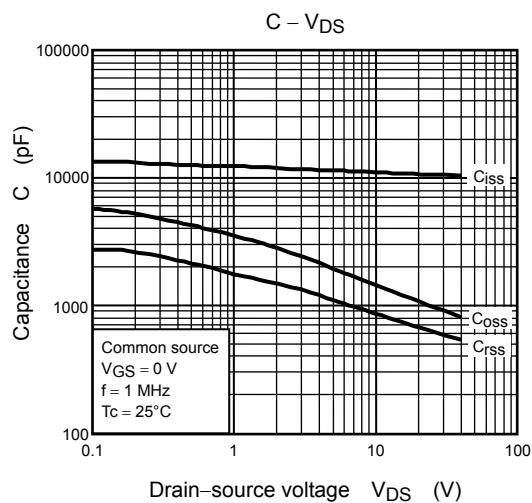
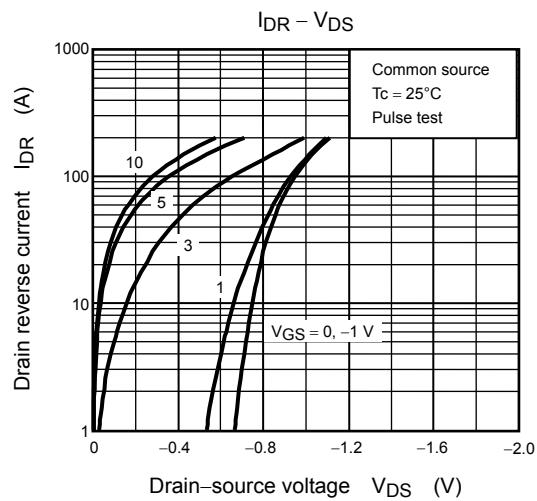
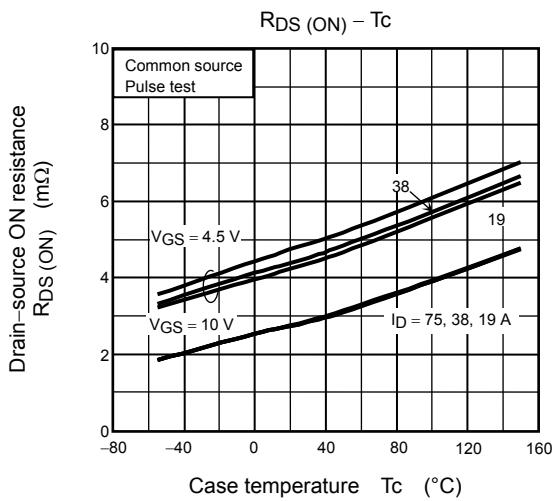
Source–Drain Ratings and Characteristics (Ta = 25°C)

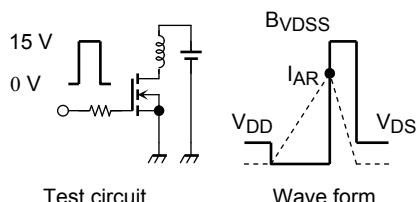
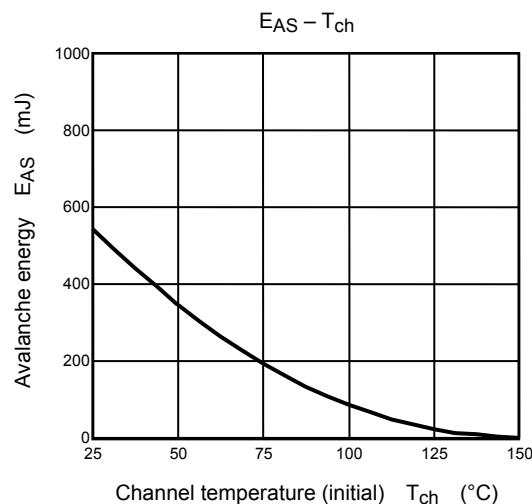
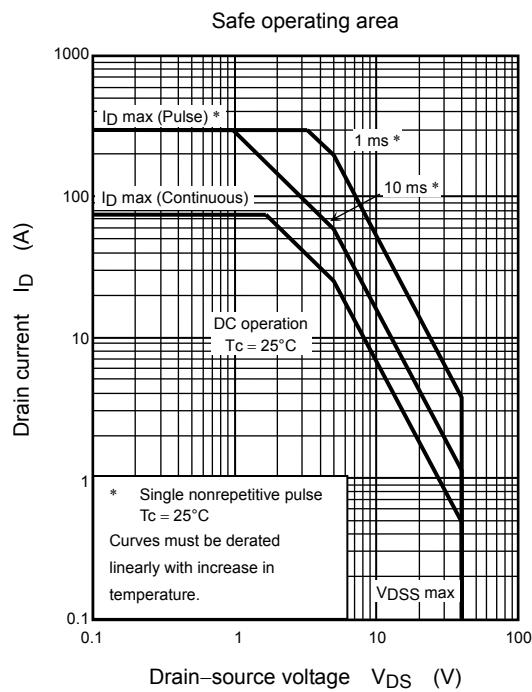
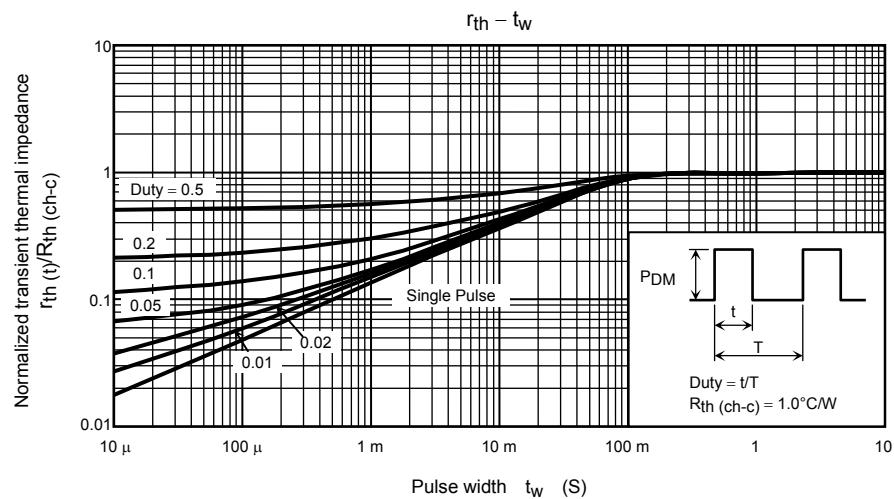
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	—	—	—	75	A
Pulse drain reverse current (Note 1)	I _{DRP}	—	—	—	300	A
Forward voltage (diode)	V _{DSF}	I _{DR1} = 75 A, V _{GS} = 0 V	—	—	-1.5	V
Reverse recovery time	t _{rr}	I _{DR} = 75 A, V _{GS} = 0 V	—	100	—	ns
Reverse recovery charge	Q _{rr}		—	120	—	nC

Marking









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