

TK19H50C

Switching Regulator Applications

- Low drain-source ON resistance : $R_{DS(ON)} = 0.25\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 14\text{ S}$ (typ.)
- Low leakage current : $I_{DSS} = 100\ \mu\text{A}$ (max) ($V_{DS} = 500\text{ V}$)
- Enhancement mode : $V_{th} = 2.0\sim 4.0\text{ V}$ ($V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$)

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	500	V
Drain-gate voltage ($R_{GS} = 20\text{ k}\Omega$)		V_{DGR}	500	V
Gate-source voltage		V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	19	A
	Pulse (Note 1)	I_{DP}	76	A
Drain power dissipation ($T_c = 25^\circ\text{C}$)		P_D	150	W
Single-pulse avalanche energy (Note 2)		E_{AS}	968	mJ
Avalanche current		I_{AR}	19	A
Repetitive avalanche energy (Note 3)		E_{AR}	15	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 case	$R_{th(ch-c)}$	0.833	$^\circ\text{C} / \text{W}$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	50	$^\circ\text{C} / \text{W}$

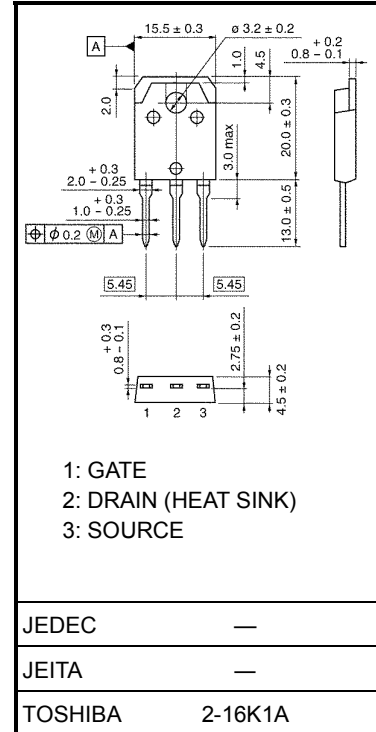
Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: $V_{DD} = 90\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 4.56\text{ mH}$, $R_G = 25\ \Omega$, $I_{AR} = 19\text{ A}$

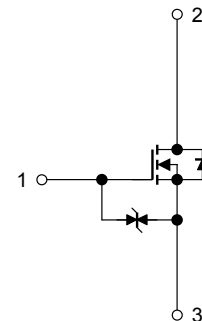
Note 3: Repetitive rating: pulse width limited by maximum channel temperature

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

Unit: mm



Weight: 3.8 g (typ.)



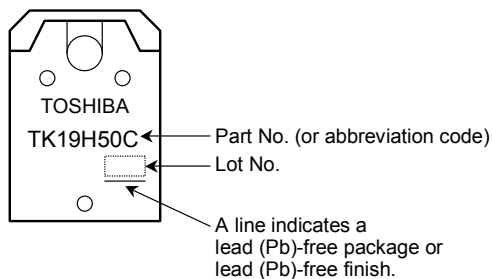
Electrical Characteristics (Ta = 25°C)

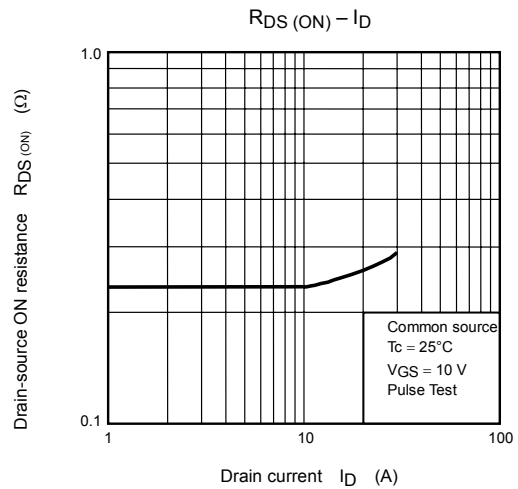
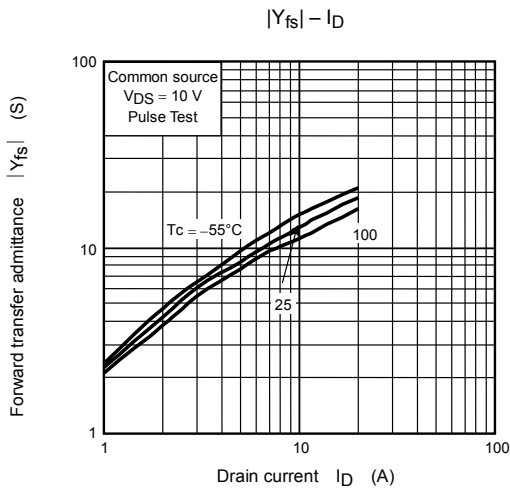
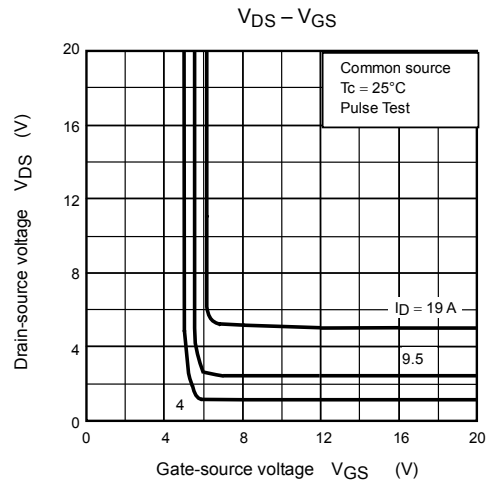
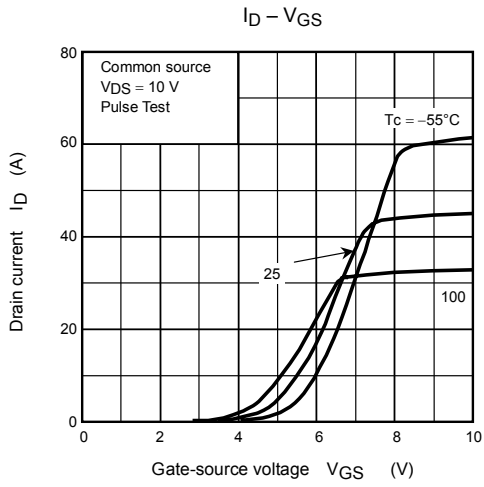
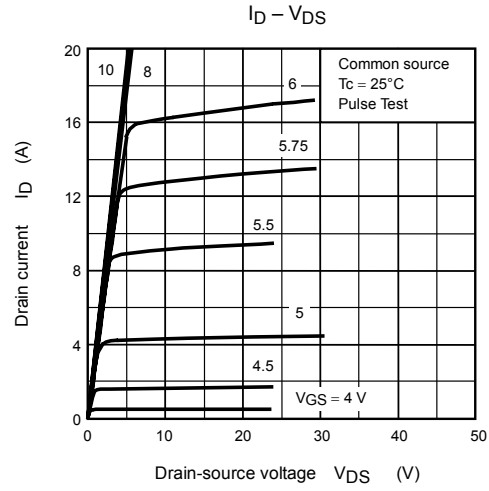
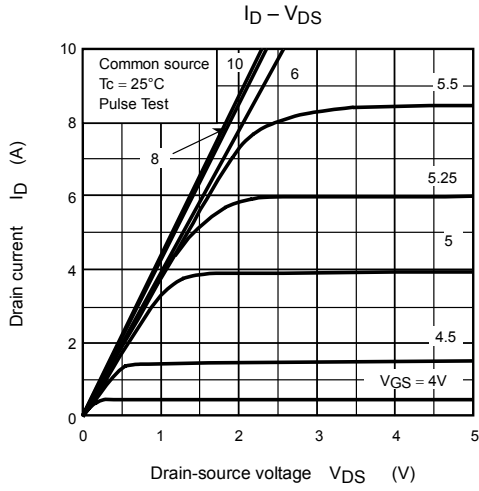
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA	
Gate-source breakdown voltage	$V_{(BR)GSS}$	$I_G = \pm 10 \mu\text{A}, V_{DS} = 0 \text{ V}$	± 30	—	—	V	
Drain cutoff current	I_{DSS}	$V_{DS} = 500 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	μA	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	500	—	—	V	
Gate threshold voltage	V_{th}	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$	2.0	—	4.0	V	
Drain-source ON resistance	$R_{DS(ON)}$	$V_{GS} = 10 \text{ V}, I_D = 9.5 \text{ A}$	—	0.25	0.30	Ω	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 9.5 \text{ A}$	4.0	14	—	S	
Input capacitance	C_{iss}	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	3100	—	pF	
Reverse transfer capacitance	C_{rss}		—	20	—		
Output capacitance	C_{oss}		—	270	—		
Switching time	Rise time	t_r		—	70	—	ns
	Turn on time	t_{on}		—	130	—	
	Fall time	t_f		—	70	—	
	Turn off time	t_{off}		—	280	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 400 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 19 \text{ A}$	—	62	—	nC	
Gate-source charge	Q_{gs}		—	40	—		
Gate-drain ("Miller") charge	Q_{gd}		—	22	—		

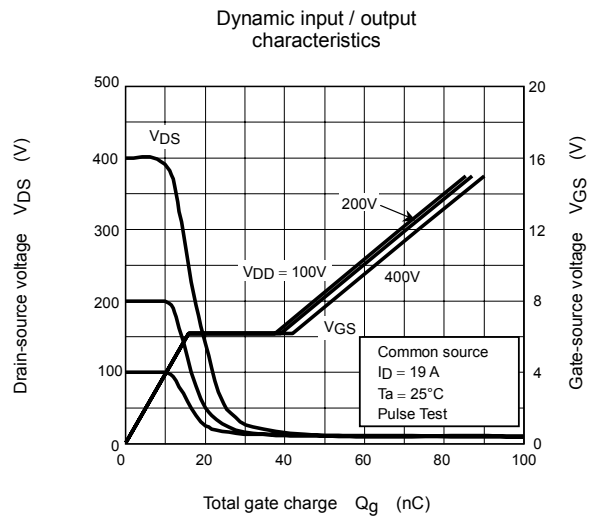
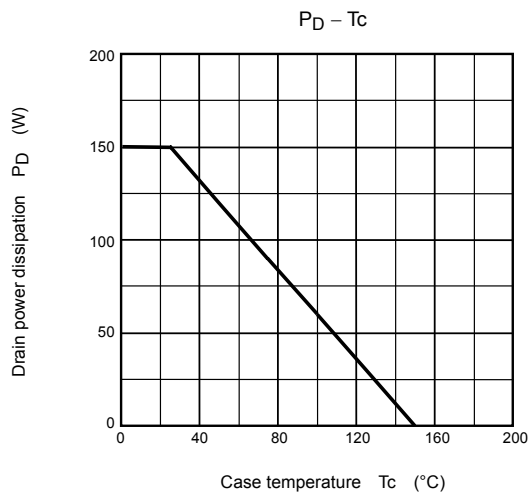
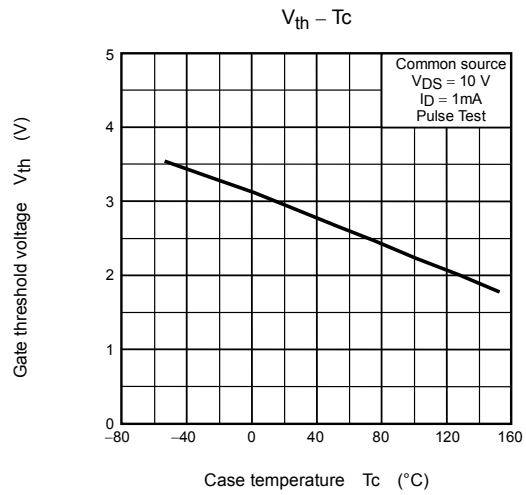
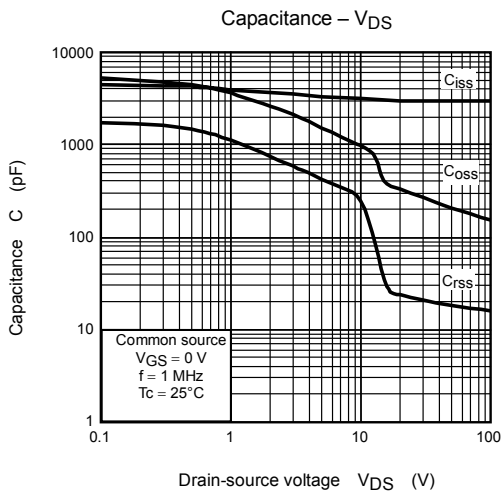
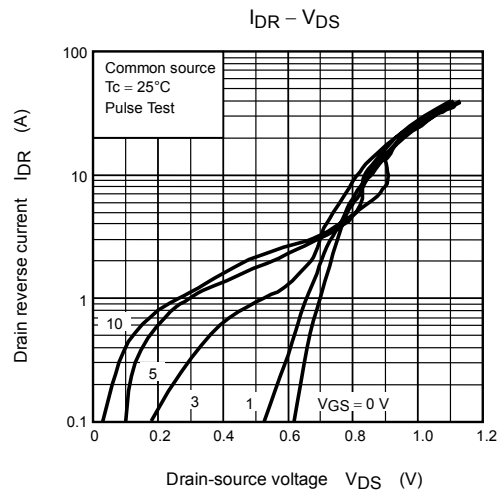
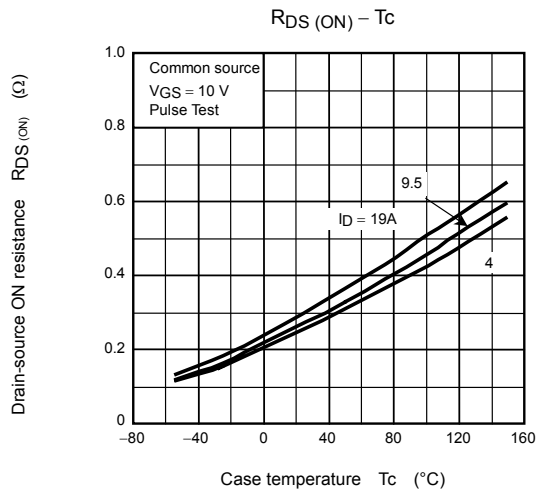
Source-Drain Ratings and Characteristics (Ta = 25°C)

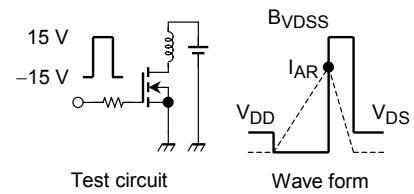
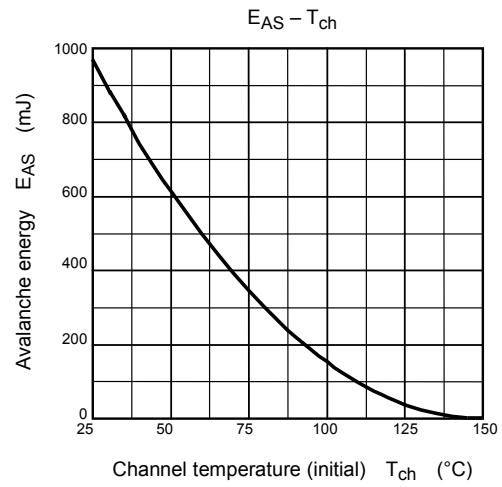
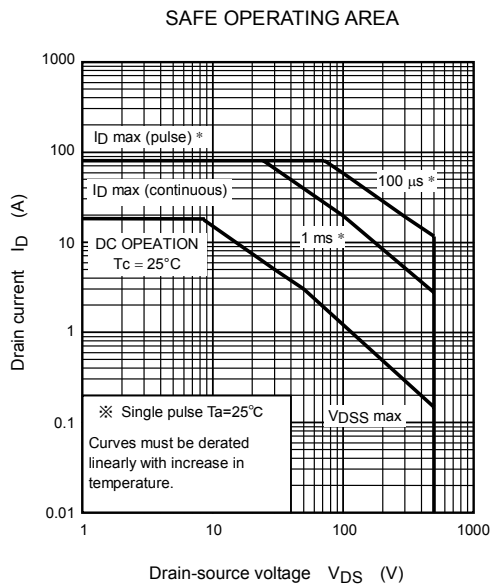
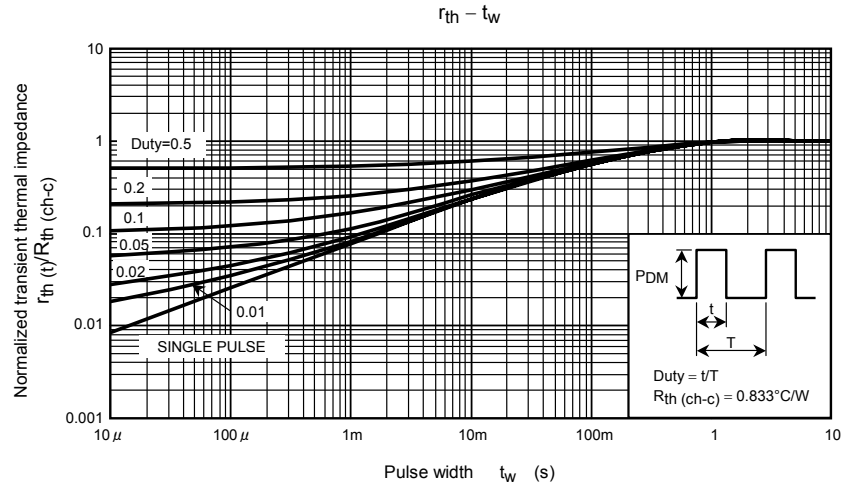
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	19	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	76	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 19 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 19 \text{ A}, V_{GS} = 0 \text{ V}$	—	1200	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR} / dt = 100 \text{ A} / \mu\text{s}$	—	18	—	μC

Marking









$R_G = 25 \Omega$
 $V_{DD} = 90 \text{ V}, L = 4.56 \text{ mH}$

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

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