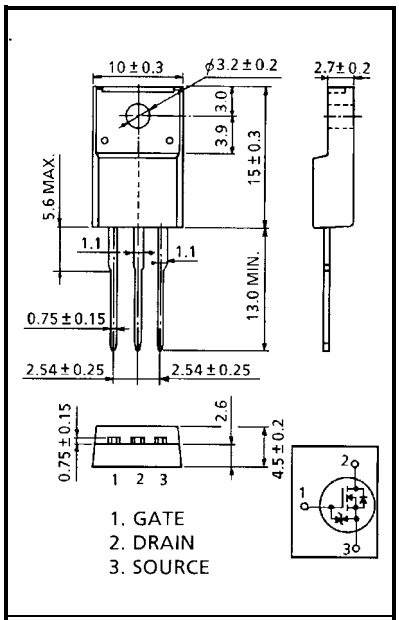
2SK3543

Switching Regulator and DC-DC Converter Applications
Motor Drive Applications

Unit: mm



JEDEC	—
JEITA	SC-67
TOSHIBA	2-10R1B

Weight: 1.9 g (typ.)

- Low drain-source ON resistance: $R_{DS\ (ON)}$ = 1.9 Ω (typ.)
- High forward transfer admittance: $|Y_{fs}|$ = 1.3 S (typ.)
- Low leakage current: I_{DSS} = 100 μA (max) (V_{DS} = 450 V)
- Enhancement-model: V_{th} = 2.0 to 4.0 V (V_{DS} = 10 V, I_D = 1 mA)

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	450	V
Drain-gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	450	V
Gate-source voltage		V_{GSS}	±30	V
Drain current	DC (Note 1)	I_D	2	A
	Pulse (Note 1)	I_{DP}	5	
Drain power dissipation (Tc = 25°C)		P_D	30	W
Single pulse avalanche energy (Note 2)		E_{AS}	103	mJ
Avalanche current		I_{AR}	2	A
Repetitive avalanche energy (Note 3)		E_{AR}	3	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55 to150	°C

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th\ (ch-c)}$	4.17	°C/W
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	62.5	°C/W

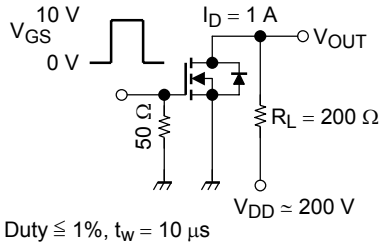
Note 1: Please use devices on condition that the channel temperature is below 150°C.

Note 2: V_{DD} = 90 V, T_{ch} = 25°C (initial), L = 42.8 mH, R_G = 25 Ω, I_{AR} = 2 A

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

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

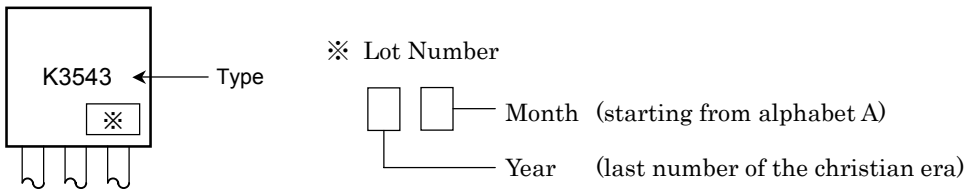
Electrical Characteristics (Ta = 25°C)

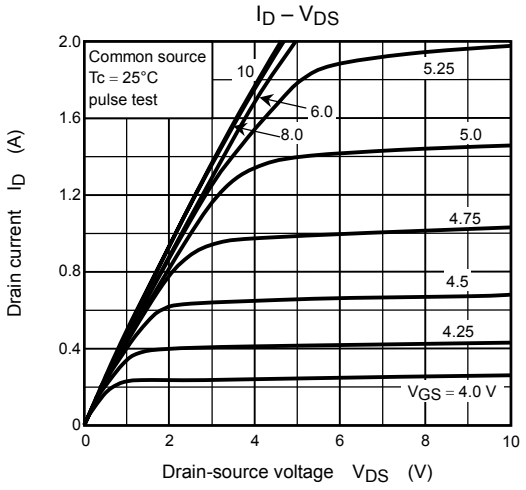
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±25 V, V_{DS} = 0 V	—	—	±10	μA
Drain-source breakdown voltage		$V_{(BR)\ GSS}$	I_G = ±10 μA, V_{DS} = 0 V	±30	—	—	V
Drain cut-OFF current		I_{DSS}	V_{DS} = 450 V, V_{GS} = 0 V	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 10 mA, V_{GS} = 0 V	450	—	—	V
Gate threshold voltage		V_{th}	V_{DS} = 10 V, I_D = 1 mA	2.0	—	4.0	V
Drain-source ON resistance		$R_{DS\ (ON)}$	V_{GS} = 10 V, I_D = 1 A	—	1.9	2.45	Ω
Forward transfer admittance		$\lvert Y_{fs} \rvert$	V_{DS} = 10 V, I_D = 1 A	0.6	1.3	—	S
Input capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	—	380	—	pF
Reverse transfer capacitance		C_{rss}		—	40	—	
Output capacitance		C_{oss}		—	120	—	
Switching time	Rise time	t_r	 Duty ≦ 1%, t_w = 10 μs	—	15	—	ns
	Turn-ON time	t_{on}		—	25	—	
	Fall time	t_f		—	20	—	
	Turn-OFF time	t_{off}		—	80	—	
Total gate charge (gate-source plus gate-drain)		Q_g	V_{DD} ≃ 360 V, V_{GS} = 10 V, I_D = 2 A	—	9	—	nC
Gate-source charge		Q_{gs}		—	5	—	
Gate-drain ("miller") charge		Q_{gd}		—	4	—	

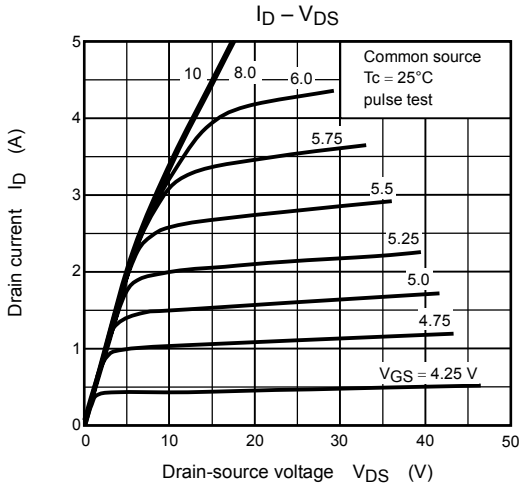
Source-Drain Ratings and Characteristics (Ta = 25°C)

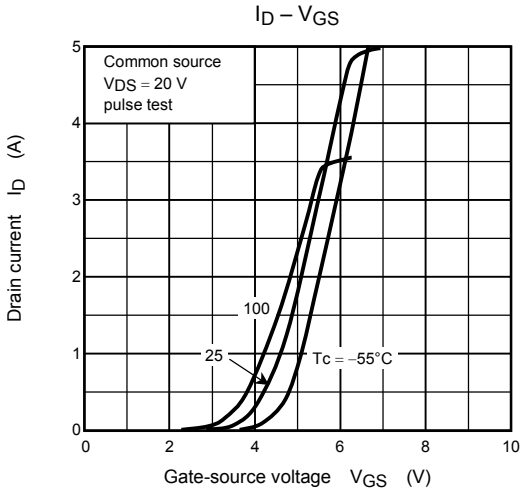
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	2	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	5	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 2 A, V_{GS} = 0 V	—	—	−1.5	V
Reverse recovery time	t_{rr}	I_{DR} = 2 A, V_{GS} = 0 V, dI_{DR}/dt = 100 A/μs	—	1000	—	ns
Reverse recovery charge	Q_{rr}		—	3.5	—	μC

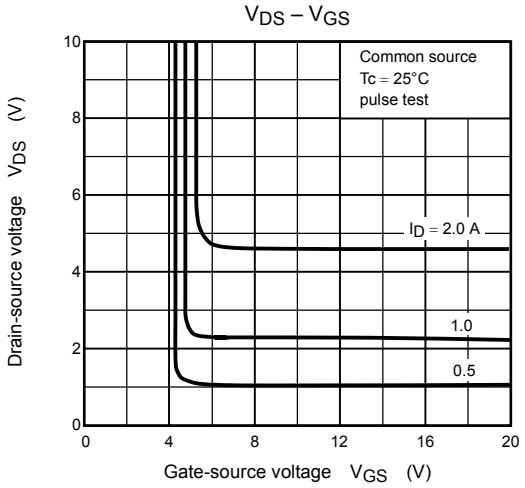
Marking

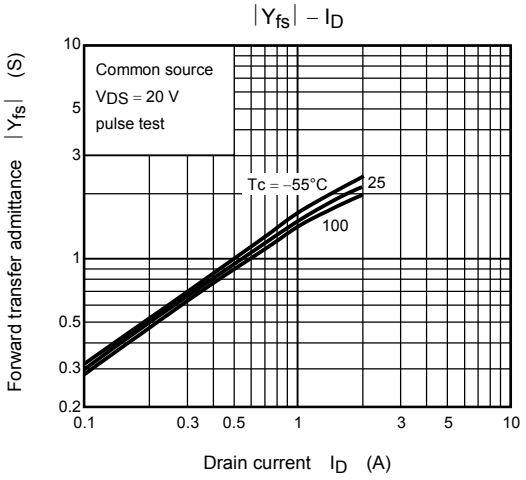


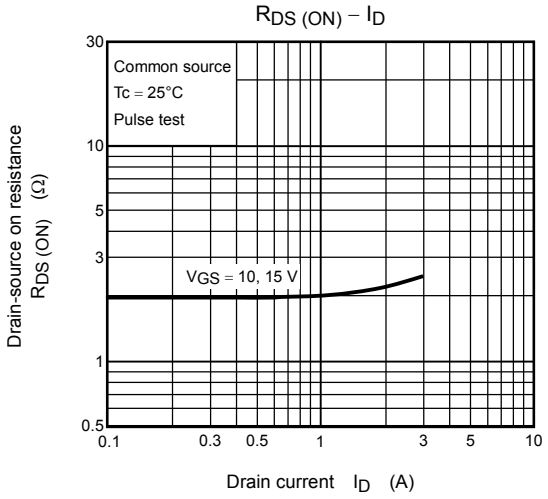

ID – VDS
Common source
Tc = 25°C
pulse test
10
6.0
8.0
5.25
5.0
4.75
4.5
4.25
VGS = 4.0 V
Drain current ID (A)
Drain-source voltage VDS (V)


ID – VDS
Common source
Tc = 25°C
pulse test
10
8.0
6.0
5.75
5.5
5.25
5.0
4.75
VGS = 4.25 V
Drain current ID (A)
Drain-source voltage VDS (V)


ID – VGS
Common source
VDS = 20 V
pulse test
100
25
Tc = –55°C
Drain current ID (A)
Gate-source voltage VGS (V)


VDS – VGS
Common source
Tc = 25°C
pulse test
ID = 2.0 A
1.0
0.5
Drain-source voltage VDS (V)
Gate-source voltage VGS (V)


|Yfs| – ID
Common source
VDS = 20 V
pulse test
Tc = –55°C
25
100
Forward transfer admittance |Yfs| (S)
Drain current ID (A)


RDS (ON) – ID
Common source
Tc = 25°C
Pulse test
VGS = 10, 15 V
Drain-source on resistance RDS (ON) (Ω)
Drain current ID (A)