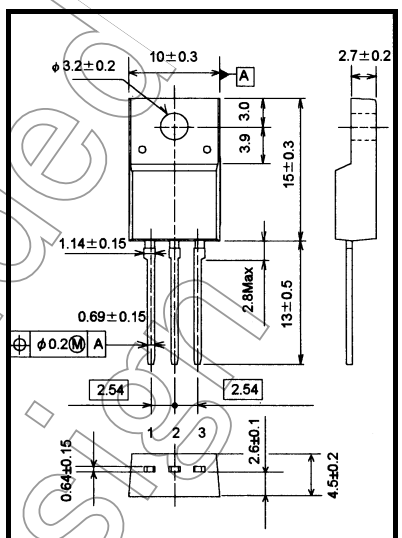
TOSHIBA Field Effect Transistor Silicon N-Channel MOS Type (π-MOSVI)

2SK3562

Switching Regulator Applications

- Low drain-source ON-resistance: $R_{DS\ (ON)}$ = 0.9 Ω (typ.)
- High forward transfer admittance: $|Y_{fs}|$ = 5.0 S (typ.)
- Low leakage current: I_{DSS} = 100 μA (max) (V_{DS} = 600 V)
- Enhancement mode: V_{th} = 2.0 to 4.0 V (V_{DS} = 10 V, I_D = 1 mA)

Unit: mm



JEDEC	—
JEITA	SC-67
TOSHIBA	2-10U1B

Weight : 1.7 g (typ.)

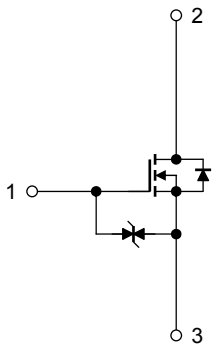
Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	600	V
Drain-gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	600	V
Gate-source voltage		V_{GSS}	±30	V
Drain current	DC (Note 1)	I_D	6	A
	Pulse (t = 1 ms) (Note 1)	I_{DP}	24	
Drain power dissipation (Tc = 25°C)		P_D	40	W
Single pulse avalanche energy (Note 2)		E_{AS}	345	mJ
Avalanche current		I_{AR}	6	A
Repetitive avalanche energy (Note 3)		E_{AR}	4	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	-55 to 150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th\ (ch-c)}$	3.125	°C/W
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	62.5	°C/W



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

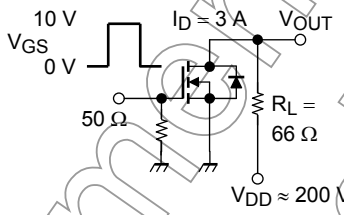
Note 2: V_{DD} = 90 V, T_{ch} = 25°C (initial), L = 16.8 mH, I_{AR} = 6 A, R_G = 25 Ω

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

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

Not Recommended for New Design

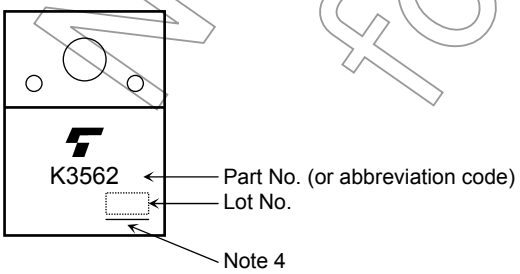
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±25 V, V_{DS} = 0 V	—	—	±10	μA
Gate-source breakdown voltage		$V_{(BR)\ GSS}$	I_G = ±10 μA, V_{DS} = 0 V	±30	—	—	V
Drain cut-off current		I_{DSS}	V_{DS} = 600 V, V_{GS} = 0 V	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 10 mA, V_{GS} = 0 V	600	—	—	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 = 3 A	—	0.9	1.25	Ω
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = 10 V, I_D = 3 A	1.2	5.0	—	S
Input capacitance		C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	—	1050	—	pF
Reverse transfer capacitance		C_{rss}		—	10	—	
Output capacitance		C_{oss}		—	110	—	
Switching time	Rise time	t_r		—	20	—	ns
	Turn-on time	t_{on}		—	40	—	
	Fall time	t_f		—	35	—	
	Turn-off time	t_{off}	Duty ≤ 1%, t_w = 10 μs	—	130	—	
Total gate charge		Q_g	V_{DD} ≈ 400 V, V_{GS} = 10 V, I_D = 6 A	—	28	—	nC
Gate-source charge		Q_{gs}		—	16	—	
Gate-drain charge		Q_{gd}		—	12	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	6	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	24	A
Forward voltage (diode)	V_{DSF}	I_{DR} = 6 A, V_{GS} = 0 V	—	—	−1.7	V
Reverse recovery time	t_{rr}	I_{DR} = 6 A, V_{GS} = 0 V,	—	1000	—	ns
Reverse recovery charge	Q_{rr}	dI_{DR}/dt = 100 A/μs	—	7.0	—	μC

Marking

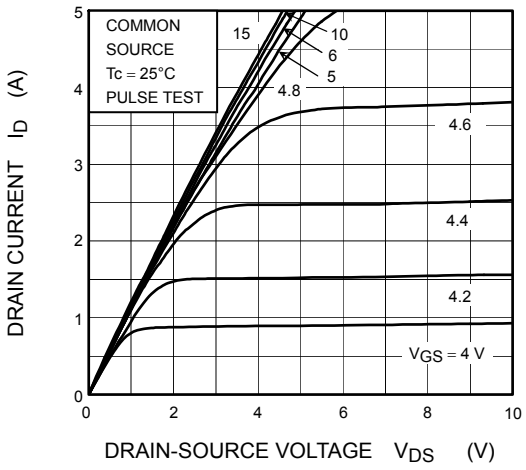


Note 4: A line under a Lot No. identifies the indication of product Labels.
Not underlined: [[Pb]]/INCLUDES > MCV
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

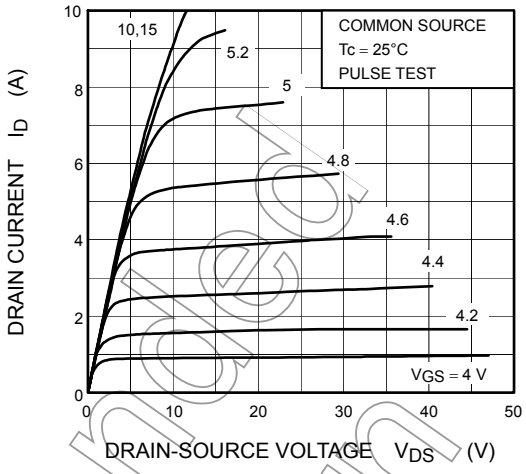
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Not Recommended for New Design

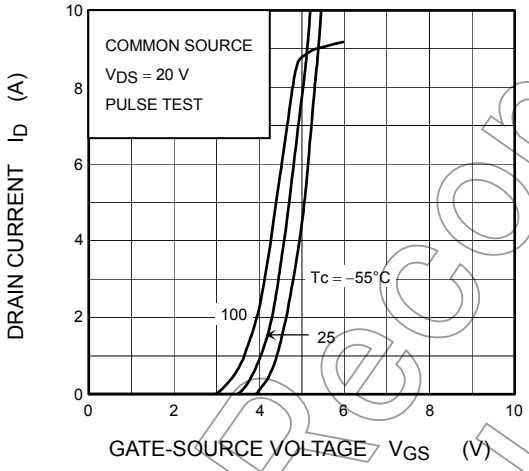
$I_D - V_{DS}$



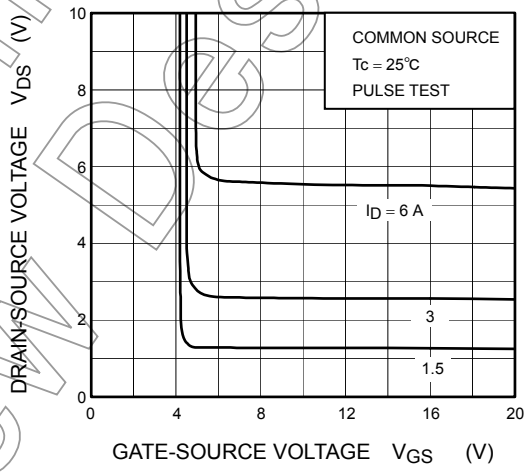
$I_D - V_{DS}$



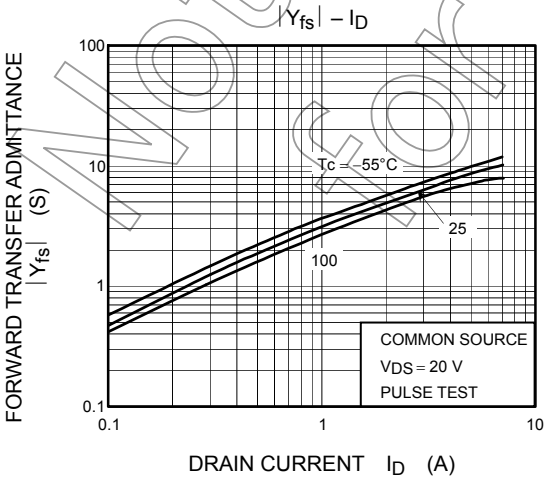
$I_D - V_{GS}$



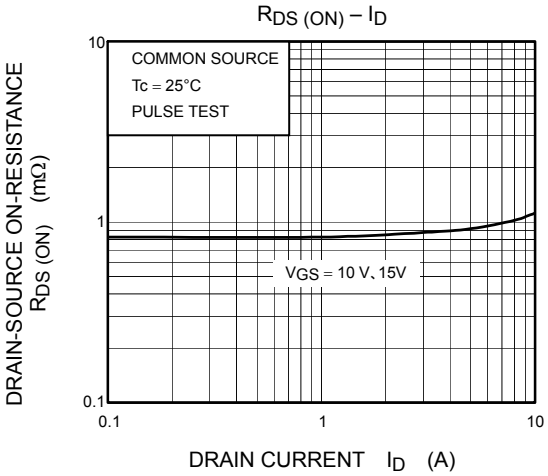
$V_{DS} - V_{GS}$



$|Y_{fs}| - I_D$

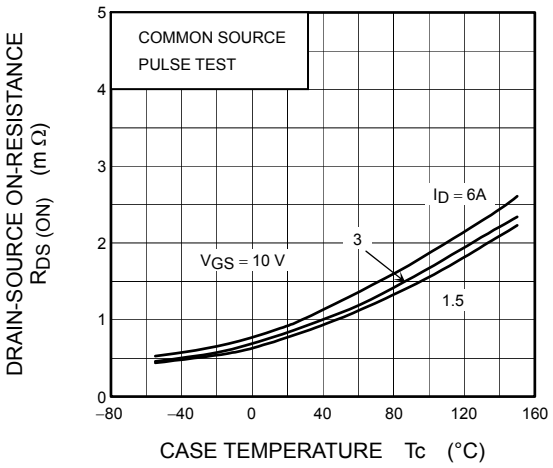


$R_{DS\ (ON)} - I_D$

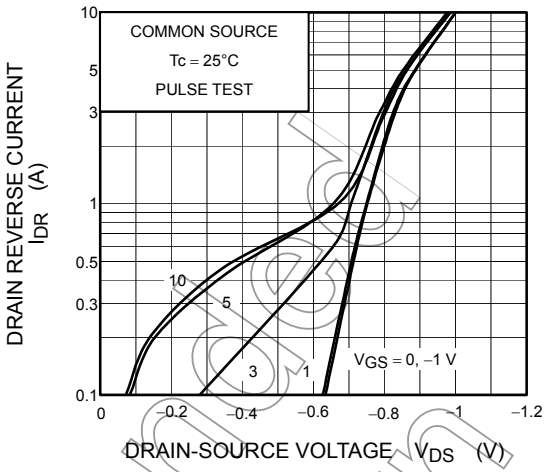


Not Recommended for New Design

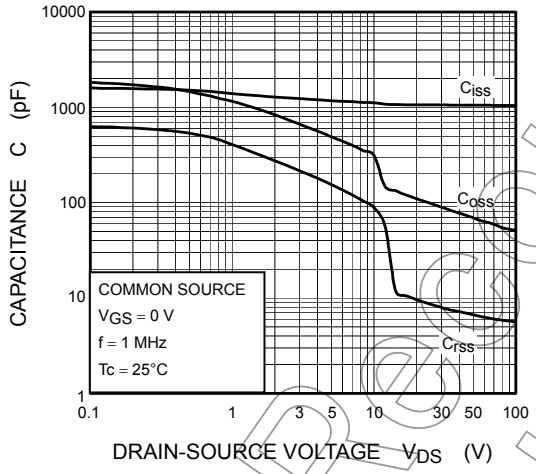
$R_{DS\ (ON)}$ – Tc



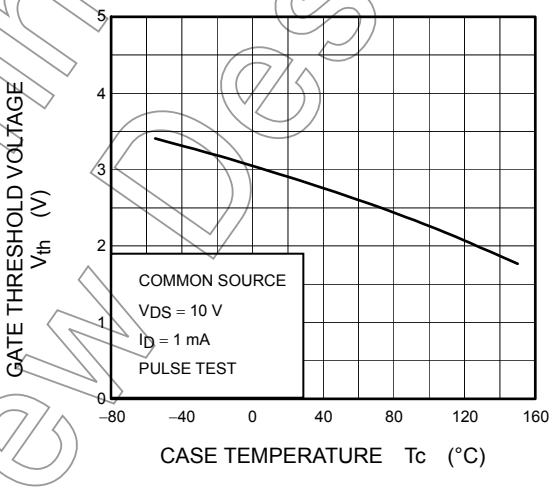
I_{DR} – V_{DS}



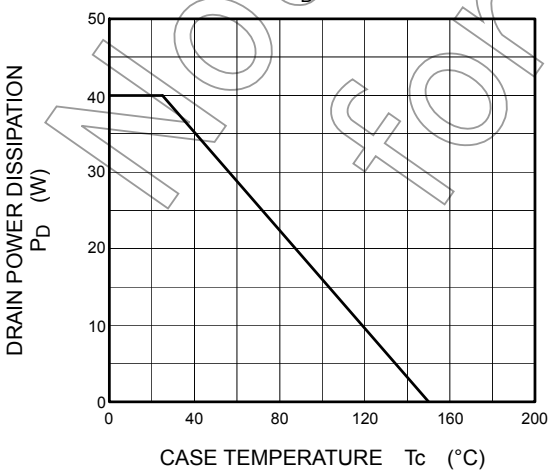
CAPACITANCE – V_{DS}



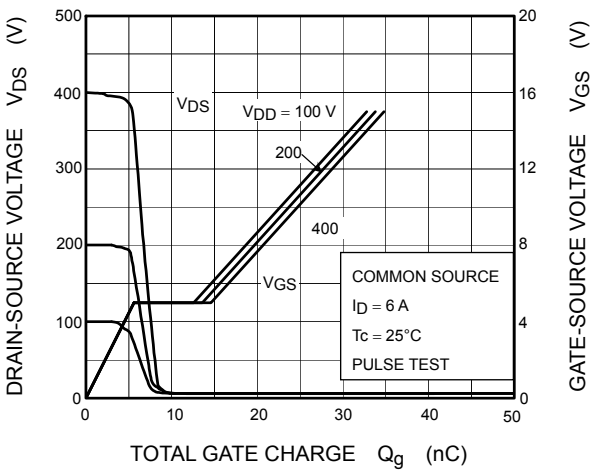
V_{th} – Tc



P_D – Tc

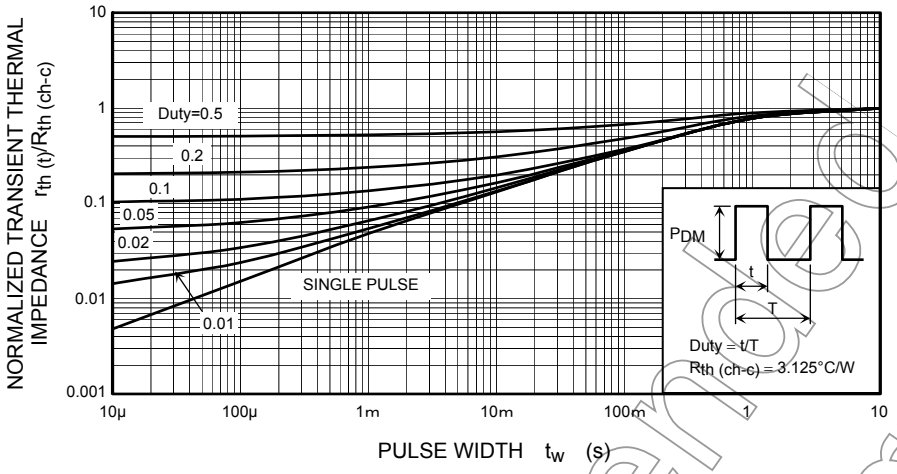


DYNAMIC INPUT / OUTPUT CHARACTERISTICS

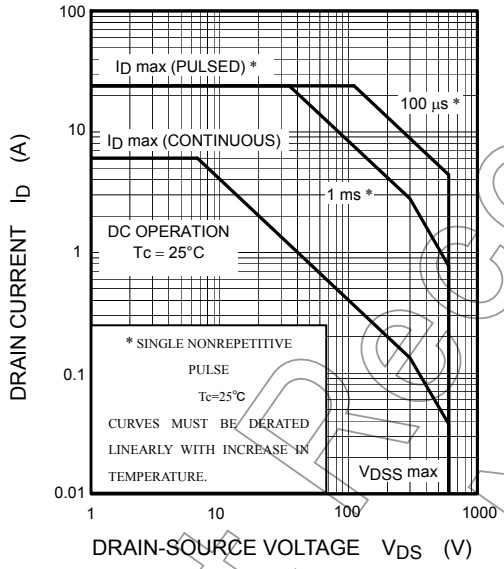


Not Recommended for New Design

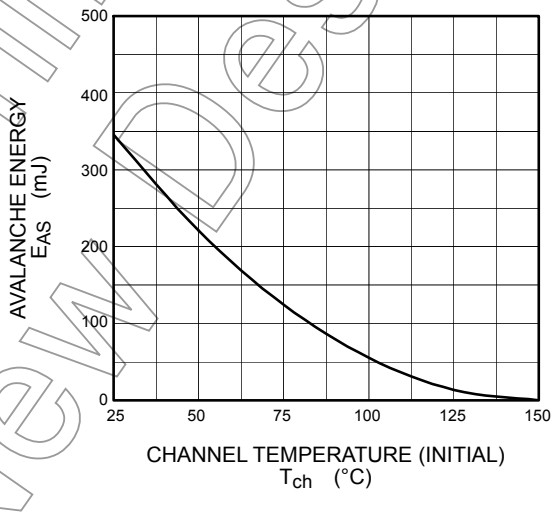
$r_{th} - t_w$

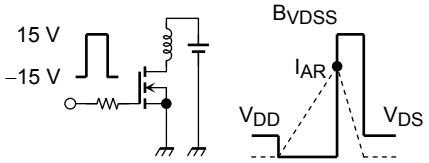


SAFE OPERATING AREA



$E_{AS} - T_{ch}$





TEST CIRCUIT WAVEFORM

$R_G = 25\ \Omega$
$V_{DD} = 90$ V, L = 16.8mH

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

Not Recommended for New Design