$V_{(BR)DSS}$ = 300 V, $R_{DS(ON)}$ = 0.15 Ω
N-channel Power MOSFET

SUK3015

Data Sheet

Description

SUK3015 includes a low on-resistance N-channel power MOSFET with Zener diode for ESD protection. The package of SUK3015 is TO220S-2L that is surface mount package and high heat release.

Features

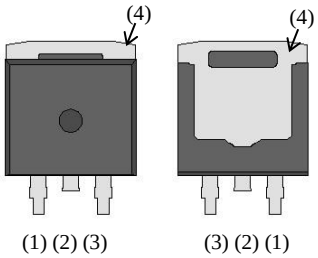
- Suitable for High Reliability and Automotive Requirement
- Bare Lead Frame: Pb-free (RoHS Compliant)
- Low On-resistance
- Gate-to-Source ESD Protection Zener Diode
- 100% Avalanche Tested
- $V_{(BR)DSS}$ ---------- 300 V (I_D = 100 μA)
- I_D ---------- ±15 A
- $R_{DS(ON)}$ ---------- 0.15 Ω max. (I_D = 7 A, V_{GS} =10 V)
- t_{rr} ---------- 160 ns (typ.)

Applications

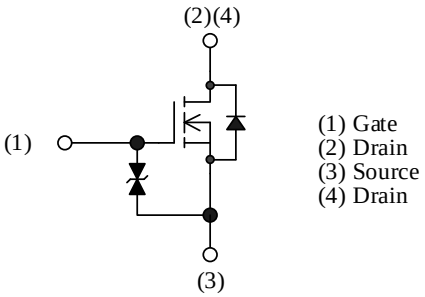
- DC/DC Converter
- Other Switched-mode Power Supply

Package

TO220S-2L



Not to scale



Absolute Maximum Ratings

Unless otherwise specified, T_A = 25 °C.

Parameter	Symbol	Conditions	Rating	Unit
Drain-to-Source Voltage	V_{DS}		300	V
Gate-to-Source Voltage	V_{GS}		±25	V
Continuous Drain Current	I_D		±15	A
Pulsed Drain Current	I_{DM}	Pulse width ≤ 100 µs, duty cycle ≤ 1 %	±60	A
Avalanche Energy	E_{AS}	V_{DD} = 49 V, L = 120 µH, I_{AS} =26.7 A, V_{GS} = 16 V, R_G = 0 Ω, unclamped; see Figure 1.	50	mJ
Avalanche Current	I_{AS}		26.7	A
Power Dissipation	P_D	T_C = 25 °C	89	W
Maximum Drain-to-Source dv/dt 1	dv/dt1	V_{DD} = 49 V, L = 120 µH, I_{AS} =26.7 A, V_{GS} = 16 V, R_G = 0 Ω, unclamped; see Figure 1.	3.0	V/ns
Maximum Diode Recovery dv/dt 2	dv/dt2	V_{DD} = 200 V, L = 0.2 mH, I_{SDP} = 15 A; see Figure 2.	8.5	V/ns
Maximum Diode Recovery di/dt	di/dt	V_{DD} = 200 V, L = 0.2 mH, I_{SDP} = 15 A; see Figure 2.	190	A/µs
Operating Junction Temperature	T_J		150	°C
Storage Temperature	T_{STG}		−55 to 150	°C

Electrical Characteristics

Unless otherwise specified, T_A = 25 °C.

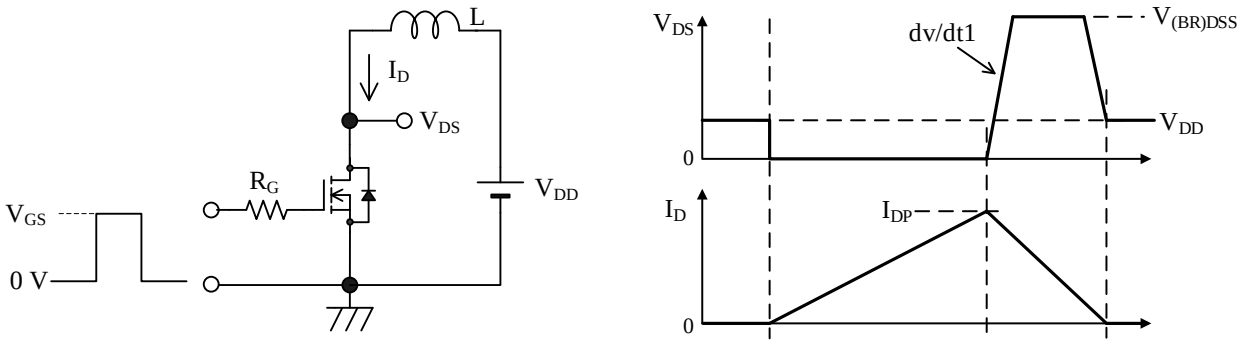
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 100 µA, V_{GS} = 0 V	300	—	—	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS} = 300 V, V_{GS} = 0 V	—	—	100	µA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS} = ±20 V	—	—	10	µA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} = 10 V, I_D = 1 mA	1.5	2.0	2.5	V
Static Drain-to-Source On-resistance	$R_{DS(ON)}$	I_D = 7 A, V_{GS} = 10 V	—	—	0.15	Ω
Input Capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	—	1800	—	pF
Output Capacitance	C_{oss}		—	420	—	
Reverse Transfer Capacitance	C_{rss}		—	85	—	
Turn-on Delay Time	$t_{d(ON)}$	V_{DD} = 200 V, I_D = 7 A, V_{GS} = 10 V, R_G = 15.6 Ω, R_L = 28.6 Ω; see Figure 3.	—	15	—	ns
Turn-on Rise Time	t_r		—	34	—	
Turn-off Delay Time	$t_{d(OFF)}$		—	112	—	
Turn-off Fall Time	t_f		—	144	—	
Source-to-Drain Diode Forward Voltage	V_{SD}	I_{SD} = 7 A, V_{GS} = 0 V	—	—	1.2	V
Source-to-Drain Diode Reverse Recovery Time	t_{rr}	I_{SDP} = 15 A, di/dt = 100 A/µs; see Figure 2.	—	160	—	ns

Thermal Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Thermal Resistance (Junction-to-Case)	$R_{\theta JC}$		—	—	1.4	°C/W

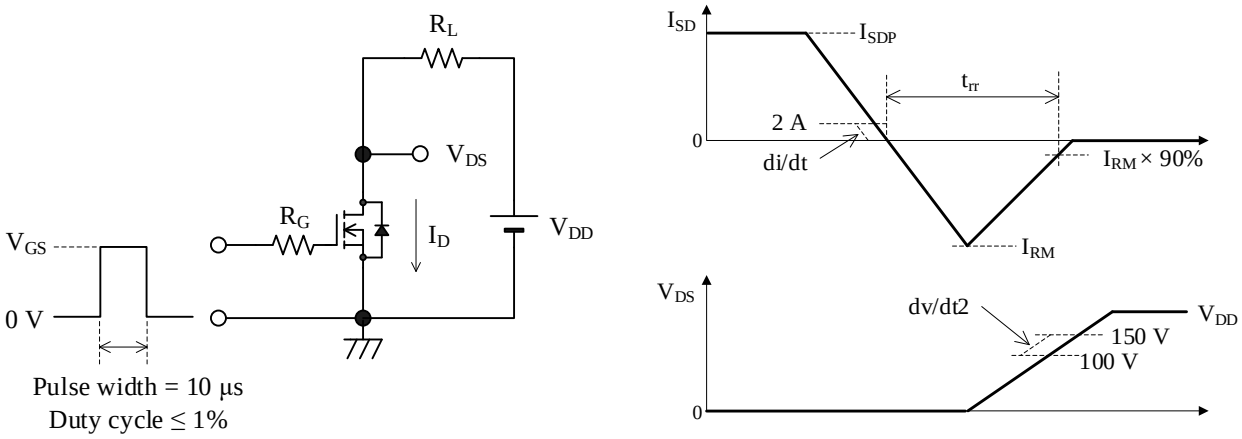
Mechanical Characteristics

Parameter	Conditions	Min.	Typ.	Max.	Unit
Package Weight		—	1.4	—	g



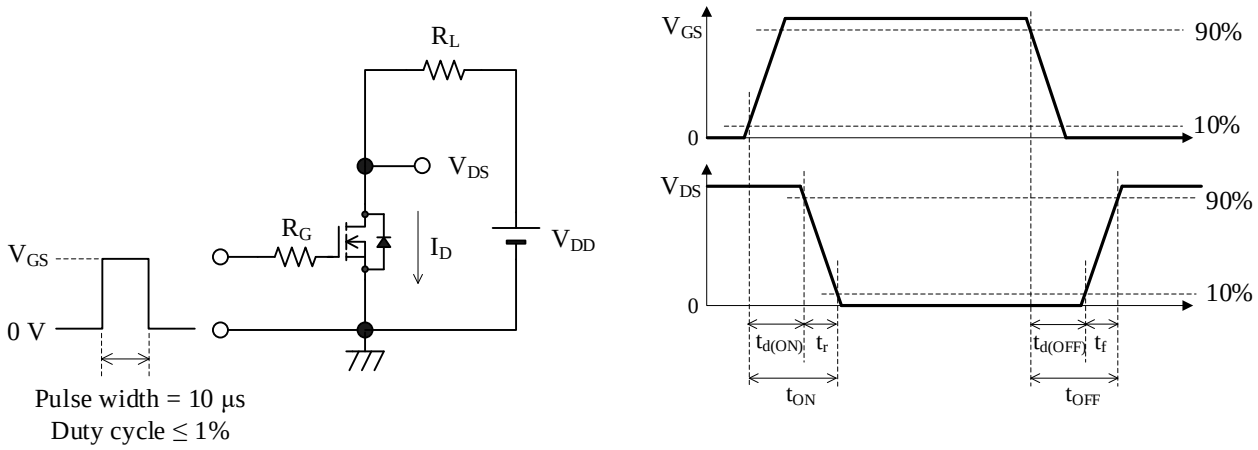
(a) Test Circuit (b) Waveform

Figure 1. Unclamped Inductive Switching Energy Test



(a) Test Circuit (b) Waveform

Figure 2. Diode Reverse Recovery Time Test



(a) Test Circuit (b) Waveform

Figure 3. Resistive Load Switching Time Test

Derating Curve

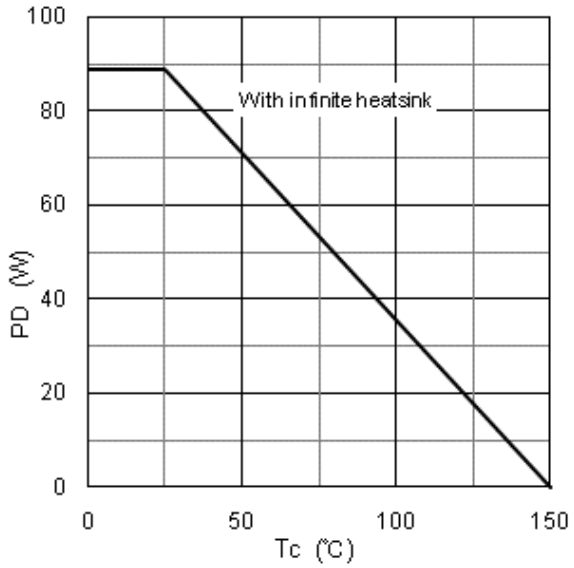


Figure 4. P_D vs. T_C

Typical Characteristic Curves

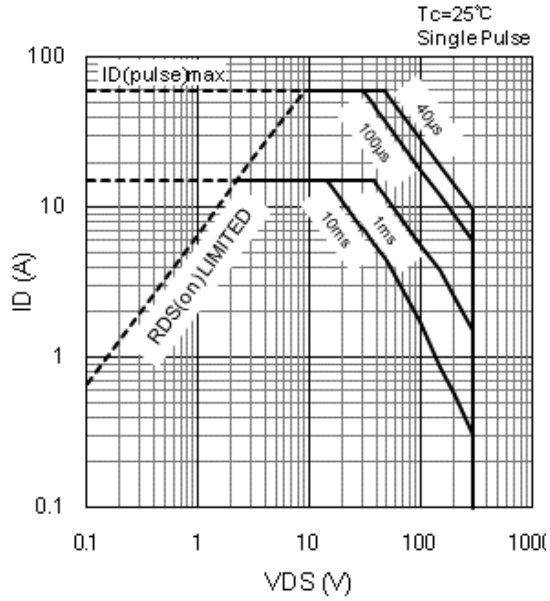


Figure 5. Safe Operating Area

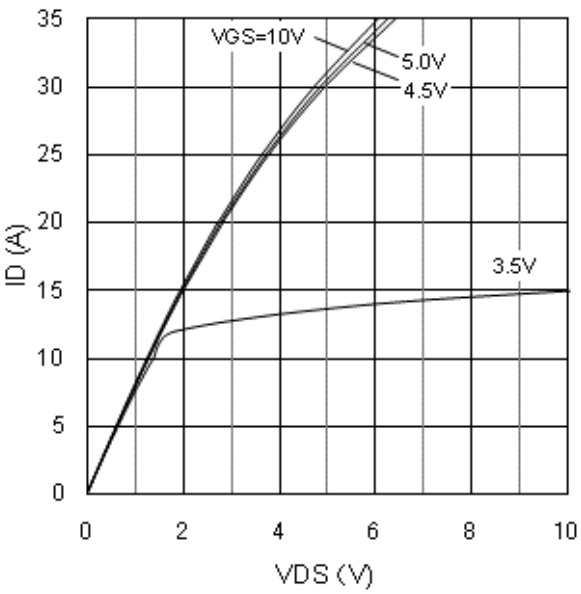


Figure 6. I_D vs. V_{DS}

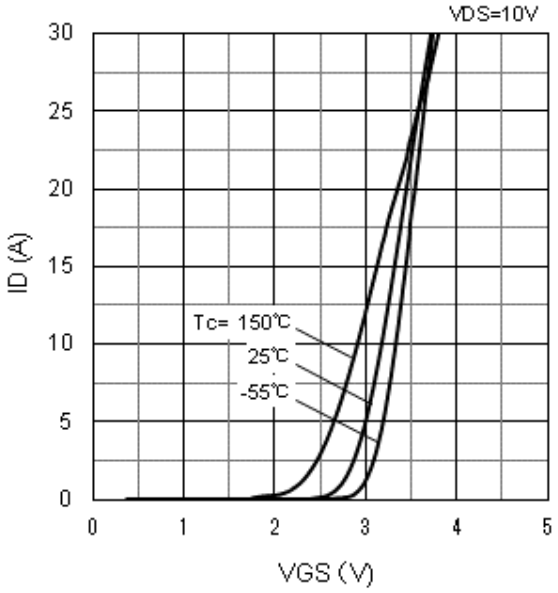


Figure 7. I_D vs. V_{GS}

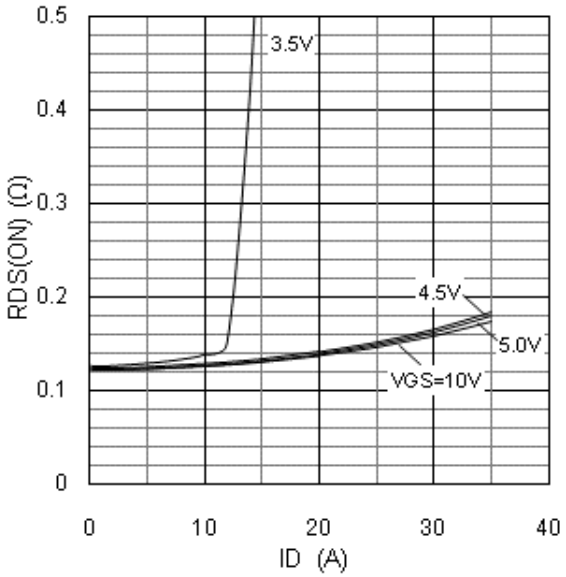


Figure 8. $R_{DS(ON)}$ vs. I_D

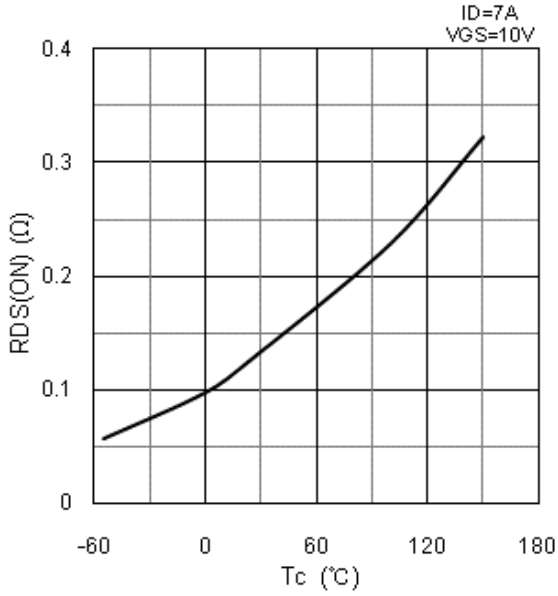


Figure 9. $R_{DS(ON)}$ vs. T_C

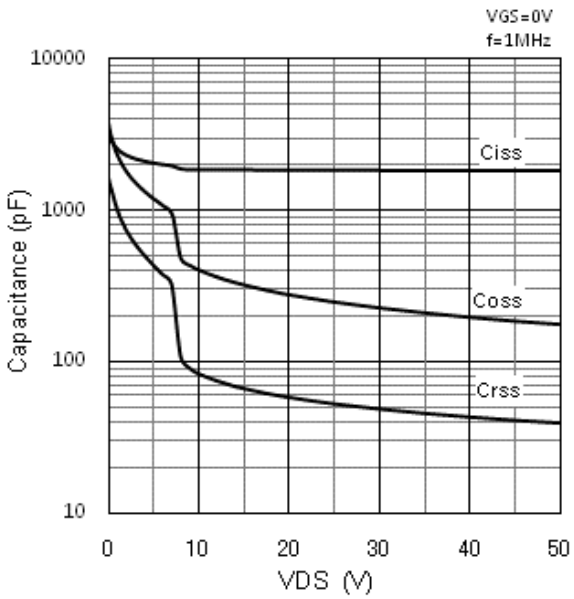


Figure 10. Capacitance vs. V_{DS}

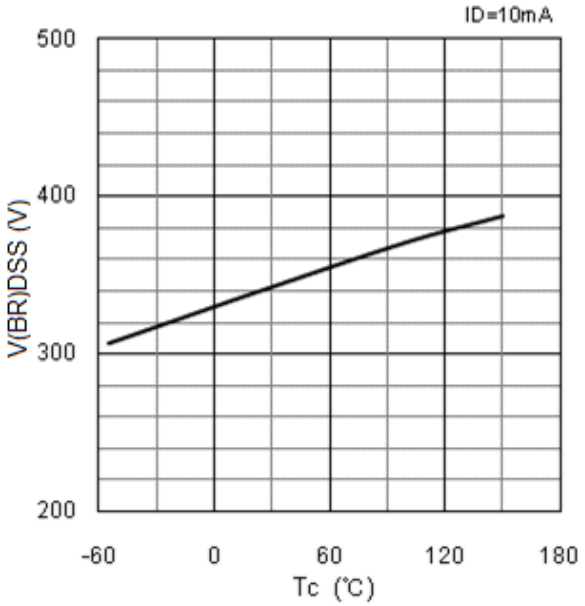


Figure 11. $V_{(BR)DSS}$ vs. T_C

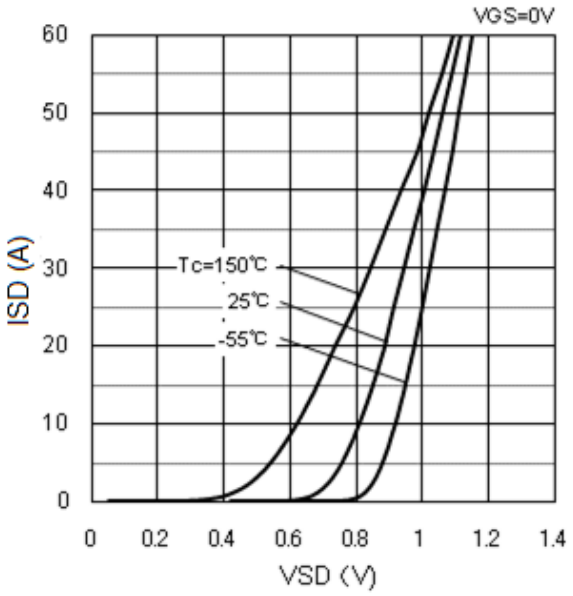


Figure 12. I_{SD} vs. V_{SD}

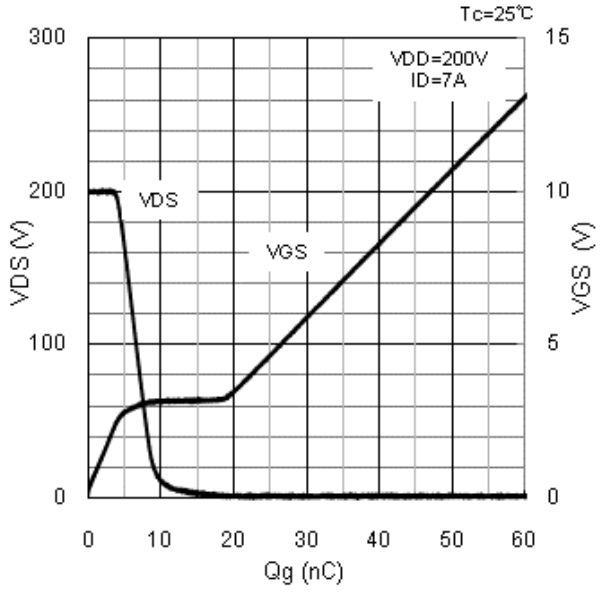


Figure 13. V_{DS} vs. Q_G

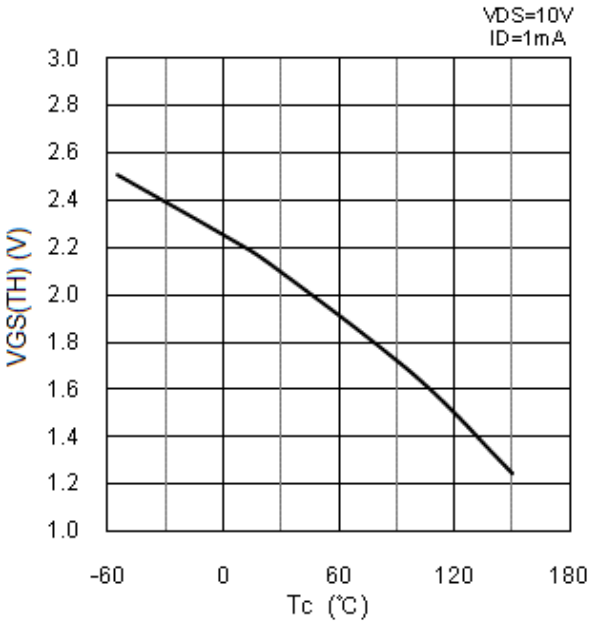


Figure 14. $V_{GS(TH)}$ vs. T_C

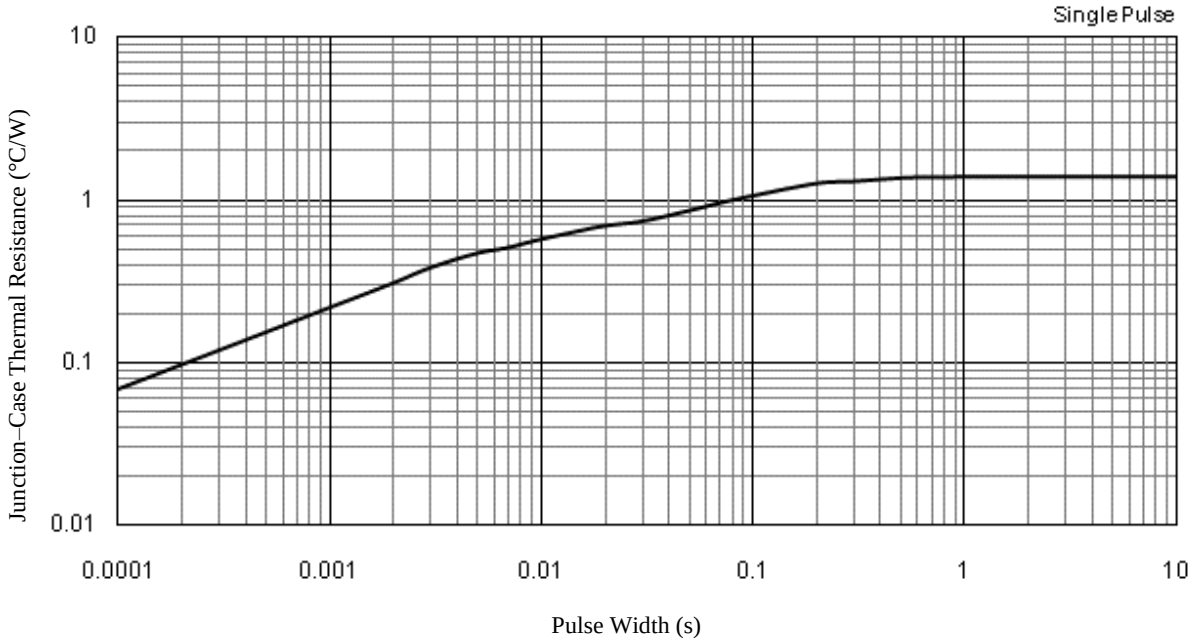
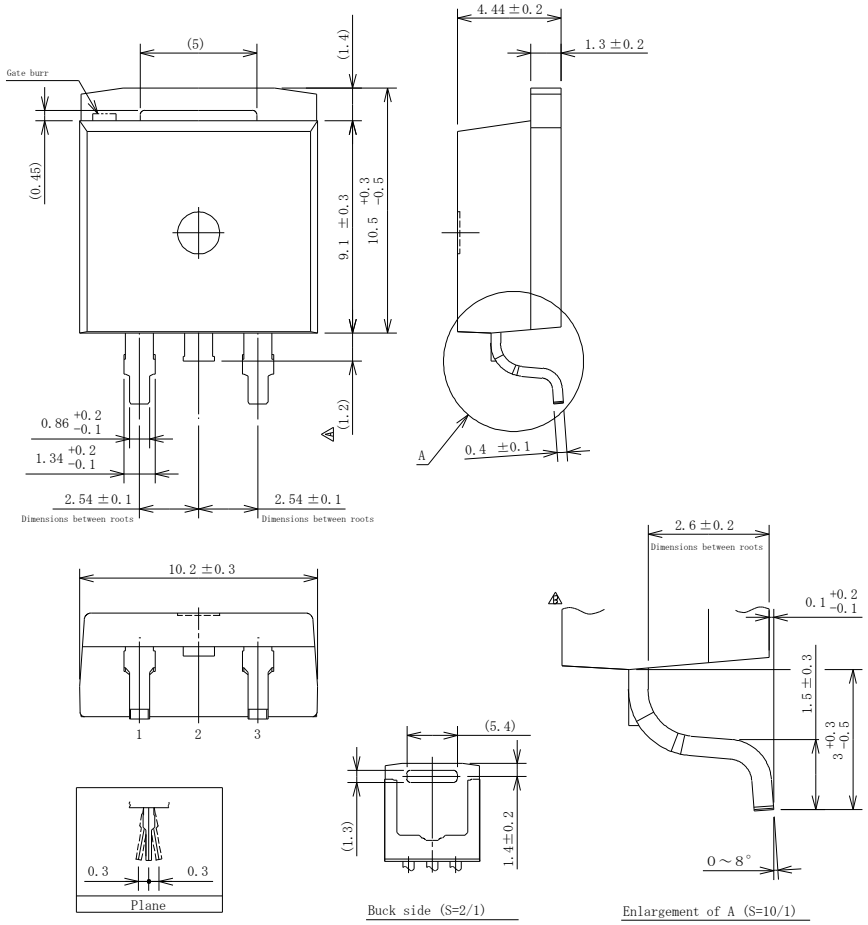


Figure 15. Transient Thermal Resistance Characteristics

Physical Dimensions

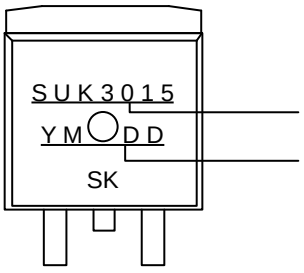
● **TO220S-2L Package**



NOTES:

- Dimensions in millimeters
- Maximum gate burr height is 0.3mm.
- Bare lead frame: Pb-free (RoHS compliant)
- Moisture Sensitivity Level 3 (MSL 3)
- When soldering the products, it is required to minimize the working time within the following limits:
  Reflow:
  Preheat: 150 °C to 200 °C / 60 s to 120 s
  Solder heating: 240 °C / 30s, 3 times (245 °C peak)
  Soldering Iron: 350 °C / 3.5 s, 1 time

Marking Diagram



Part Number

Lot Number

Y is the last digit of the year of manufacture (0 to 9)

M is the month of the year (1 to 9, O, N or D)

DD is the day of the month (01 to 31)

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