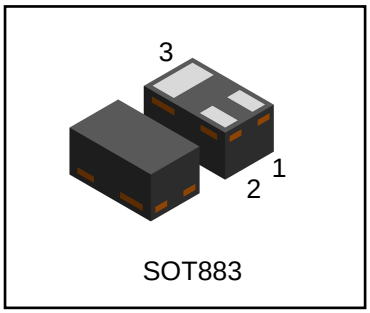
Small Signal MOSFET
380 mAmps, 60 Volts

N–Channel SOT883

L2N7002KN3T5G



SOT883

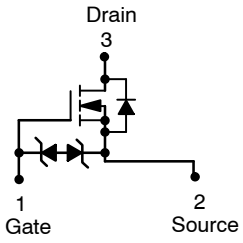
Features

- ESD Protected
- Low $R_{DS(on)}$
- Surface Mount Package
- This is a Pb–Free Device
- We declare that the material of product are Halogen Free and compliance with RoHS requirements.

Applications

- Low Side Load Switch
- Level Shift Circuits
- DC–DC Converter
- Portable Applications i.e. DSC, PDA, Cell Phone, etc.

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	I_D MAX (Note 1)
60 V	1.8 Ω @ 10 V	380 mA
	2.5 Ω @ 5.0 V	



MAXIMUM RATINGS (T_J = 25°C unless otherwise stated)

Rating	Symbol	Value	Unit
Drain–to–Source Voltage	V_{DSS}	60	V
Gate–to–Source Voltage	V_{GS}	±20	V
Drain Current (Note 1) Steady State T_A = 25°C T_A = 85°C t < 5 s T_A = 25°C T_A = 85°C	I_D	 320 230 380 270	mA
Power Dissipation (Note 1) Steady State	P_D	250	mW
Pulsed Drain Current (t_p = 10 μs)	I_{DM}	1.5	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	–55 to +150	°C
Source Current (Body Diode)	I_S	300	mA
Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)	T_L	260	°C
Gate–Source ESD Rating (HBM, Method 3015)	ESD	2000	V

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Junction–to–Ambient – Steady State (Note 1)	$R_{\theta JA}$	500	°C/W

1. Surface–mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces)

ORDERING INFORMATION

Device	Marking	Shipping
L2N7002KN3T5G	RK	10000 Tape & Reel

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition		Min	Typ	Max	Units
OFF CHARACTERISTICS							
Drain–to–Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA		60			V
Drain–to–Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$				71		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 60 V	T_J = 25°C			1	μA
			T_J = 125°C			500	
		V_{GS} = 0 V, V_{DS} = 50 V	T_J = 25°C			100	nA
Gate–to–Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±10	μA
ON CHARACTERISTICS (Note 2)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250 μA		1.0		2.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				4.0		mV/°C
Drain–to–Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 500 mA				1.8	Ω
		V_{GS} = 5.0 V, I_D = 50 mA				2.5	
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D = 200 mA			80		S
CHARGES AND CAPACITANCES							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 25 V			32.8		pF
Output Capacitance	C_{OSS}				5.4		
Reverse Transfer Capacitance	C_{RSS}				2.9		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 10 V; I_D = 200 mA			0.7		nC
Threshold Gate Charge	$Q_{G(TH)}$				0.1		
Gate–to–Source Charge	Q_{GS}				0.3		
Gate–to–Drain Charge	Q_{GD}				0.1		
SWITCHING CHARACTERISTICS, V_{GS} = V (Note 3)							
Turn–On Delay Time	$t_{d(ON)}$	V_{GS} = 10 V, V_{DD} = 10 V, I_D = 500 mA			9.9		ns
Rise Time	t_r				5.0		
Turn–Off Delay Time	$t_{d(OFF)}$				39.4		
Fall Time	t_f				17.9		
DRAIN–SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 115 mA	T_J = 25°C			1.4	V
			T_J = 85°C		0.7		

2. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%
3. Switching characteristics are independent of operating junction temperatures

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TYPICAL ELECTRICAL CHARACTERISTICS

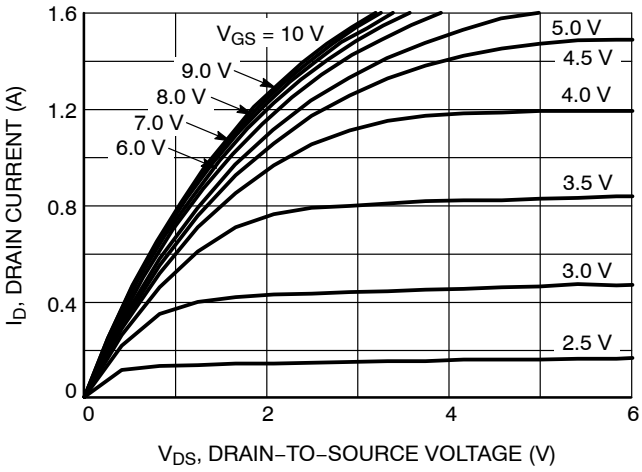

Figure 1. On−Region Characteristics

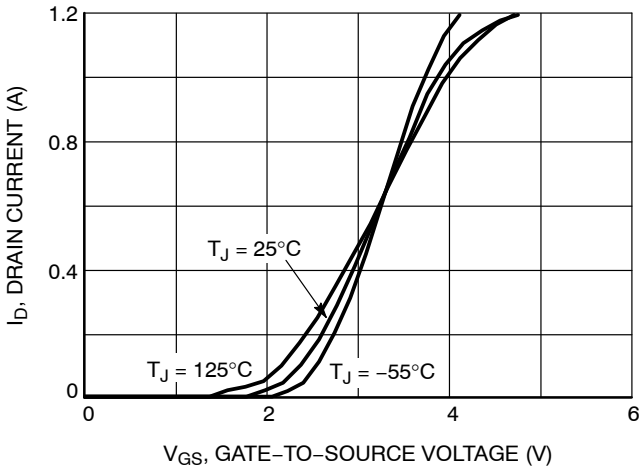

Figure 2. Transfer Characteristics

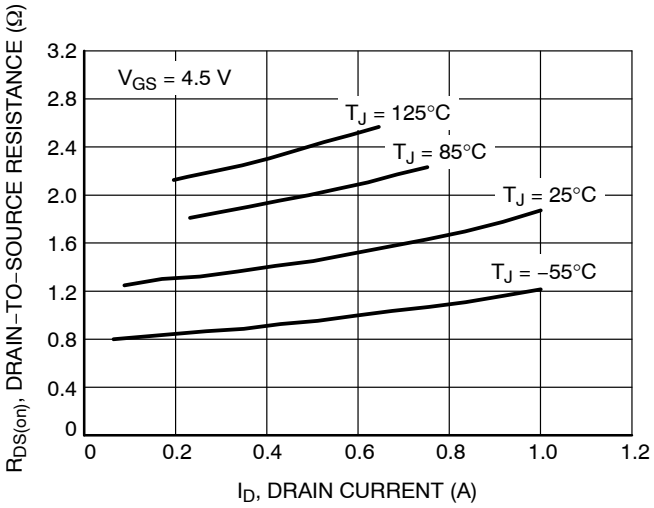

Figure 3. On−Resistance vs. Drain Current and Temperature

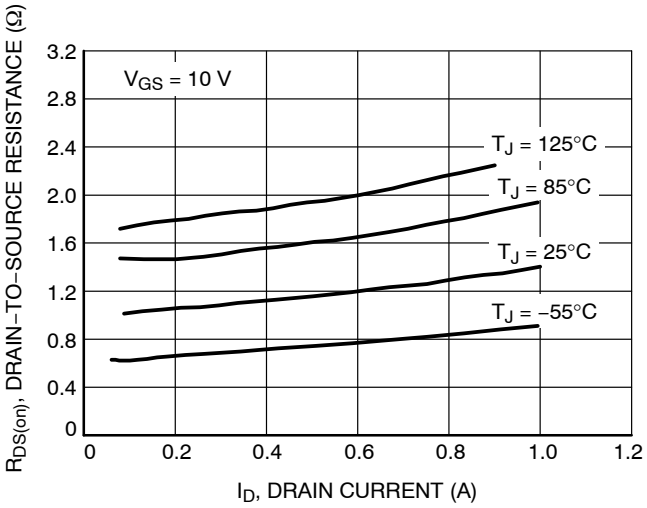

Figure 4. On−Resistance vs. Drain Current and Temperature

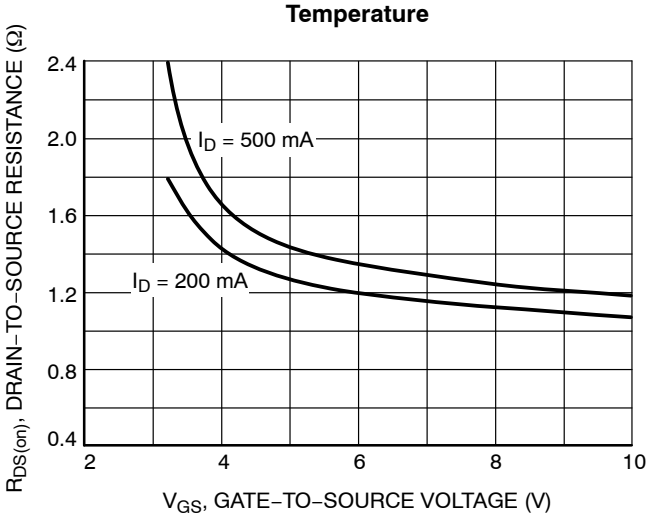

Figure 5. On−Resistance vs. Gate−to−Source Voltage

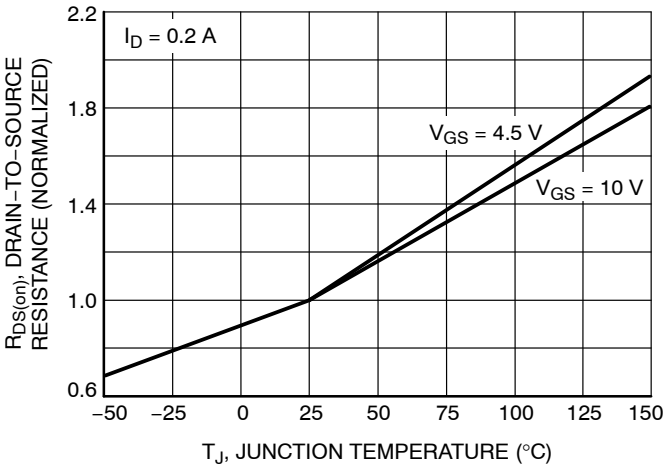

Figure 6. On−Resistance Variation with Temperature

TYPICAL ELECTRICAL CHARACTERISTICS

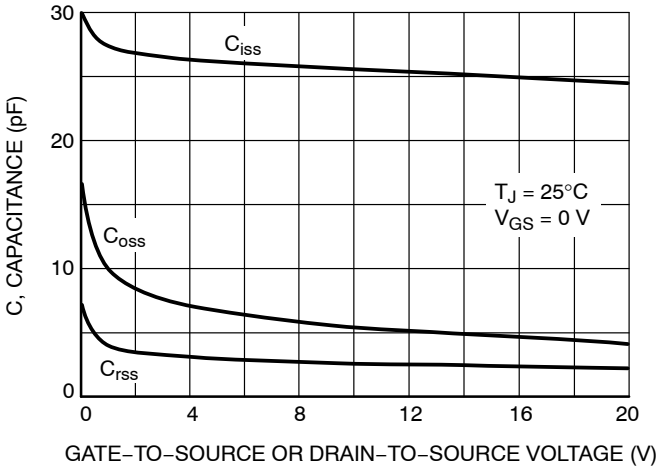

Figure 7. Capacitance Variation

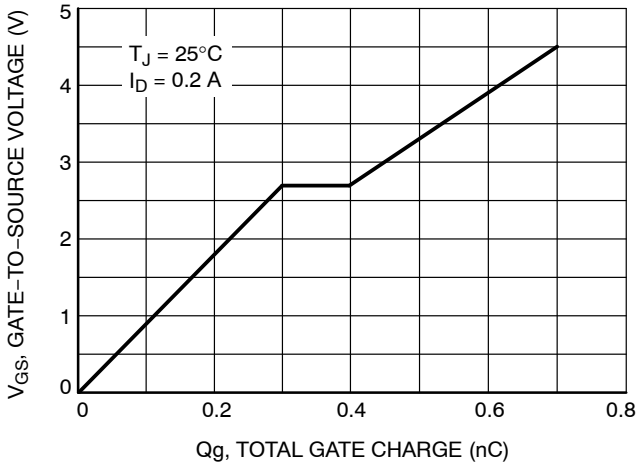

Figure 8. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

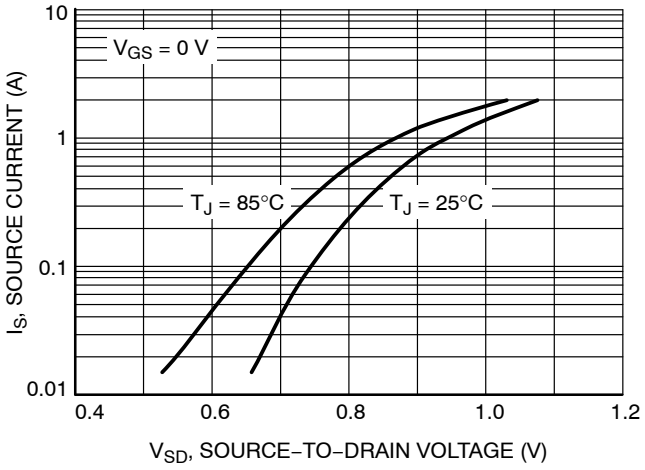

Figure 9. Diode Forward Voltage vs. Current

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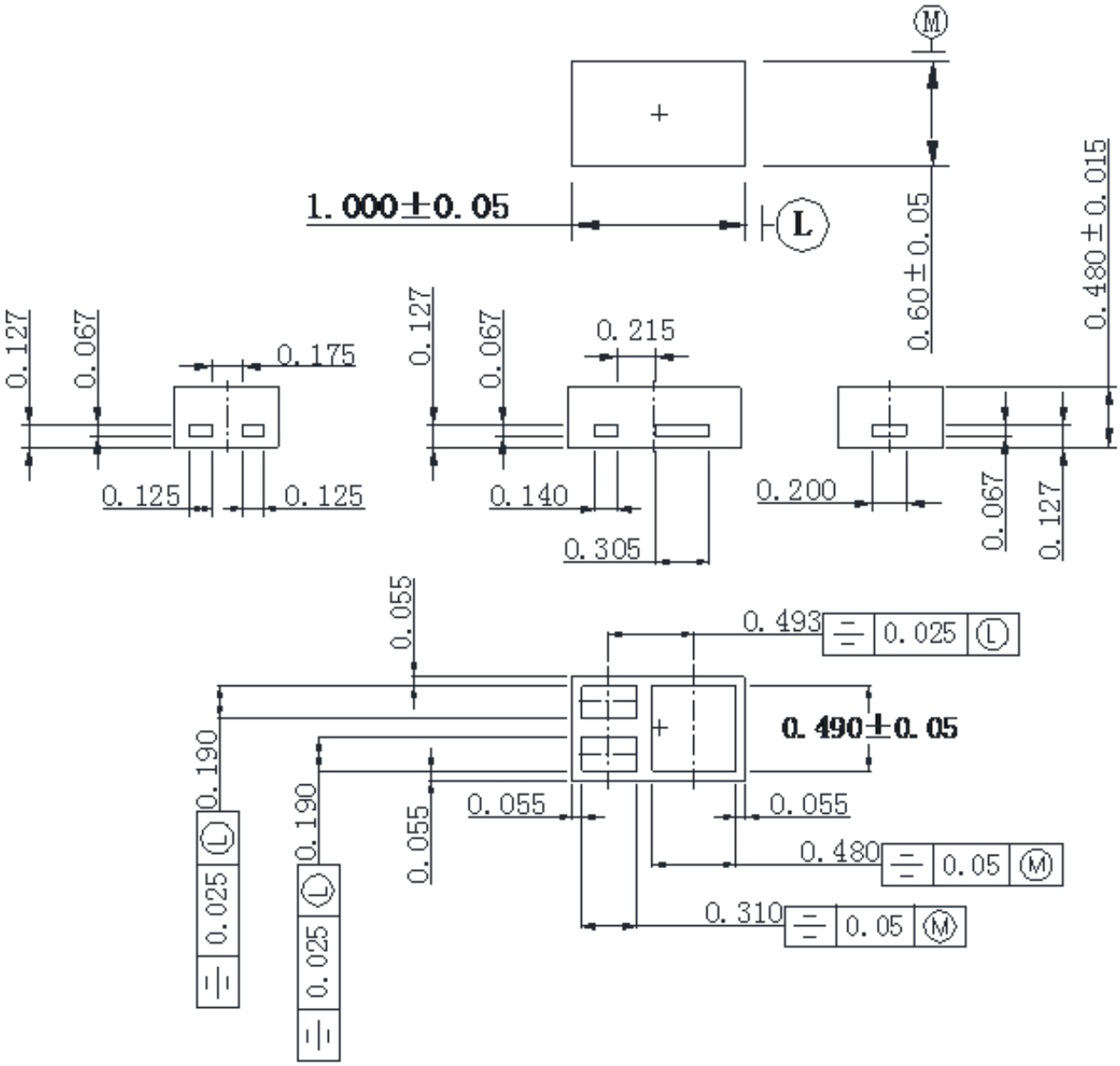
DIMENSION OUTLINE: Unit:mm



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