

# SLV2302C

## 20V N -Channel MOSFET

### General Description

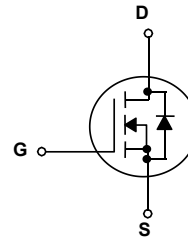
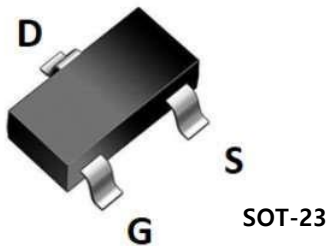
This Power MOSFET is produced using Msemitek's advanced TRENCH technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

### Application

- PWM Application
- Load Switch
- Power Management

### Features

- N-Channel: 20V 3.0A  
 $R_{DS(on)Typ} = 50m\Omega @ V_{GS} = 4.5V$   
 $R_{DS(on)Typ} = 72m\Omega @ V_{GS} = 2.5V$
- Very Low On-resistance  $R_{DS(ON)}$
- Low Crss
- Fast switching
- Improved dv/dt capability



### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	SLV2302C	Units
$V_{DSS}$	Drain-Source Voltage	20	V
$I_D$	Drain Current - Continuous ( $T_C = 25^\circ\text{C}$ ) - Continuous ( $T_C = 70^\circ\text{C}$ )	3.0	A
		2.4	A
$I_{DM}$	Drain Current - Pulsed (Note 1)	10	A
$V_{GSS}$	Gate-Source Voltage	$\pm 10$	V
$P_D$	Power Dissipation ( $T_C = 25^\circ\text{C}$ )	1.0	W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	125	$^\circ\text{C/W}$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$T_L$	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

\* Drain current limited by maximum junction temperature.

## Package Marking

Part Number	Top Marking	Package	Packing Method	MOQ	QTY
SLV2302C	2302C	SOT-23	Tape & Reel	3000	180000

## Electrical Characteristics

 $T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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### Off Characteristics

$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	20	--	--	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	$\mu\text{A}$
		$V_{DS} = 16\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	$\mu\text{A}$
$I_{GSSF}$	Gate-Body Leakage Current, Forward	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
$I_{GSSR}$	Gate-Body Leakage Current, Reverse	$V_{GS} = -10\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

### On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.45	-	1.1	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 4.5\text{ V}, I_D = 3\text{ A}$	--	50	70	m $\Omega$
		$V_{GS} = 2.5\text{ V}, I_D = 2.0\text{ A}$	-	72	90	

### Dynamic Characteristics

$C_{iss}$	Input Capacitance	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	125	-	pF
$C_{oss}$	Output Capacitance		--	27.6	-	pF
$C_{rss}$	Reverse Transfer Capacitance		--	25.5	-	pF

### Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 5\text{ V}, V_{DS} = 10\text{ V}, I_D = 3\text{ A},$ $R_G = 6\text{ }\Omega, R_L = 2.7\text{ }\Omega$	--	4.0	--	ns
$t_r$	Turn-On Rise Time		--	30	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	10	--	ns
$t_f$	Turn-Off Fall Time		--	3.4	--	ns
$Q_g$	Total Gate Charge	$V_{DS} = 10\text{ V}, I_D = 3\text{ A},$ $V_{GS} = 5\text{ V}$	--	4.76	--	nC
$Q_{gs}$	Gate-Source Charge		--	4.17	--	nC
$Q_{gd}$	Gate-Drain Charge		--	0.6	--	nC

### Drain-Source Diode Characteristics and Maximum Ratings

$I_S$	Maximum Continuous Drain-Source Diode Forward Current	--	--	3.0	A
$I_{SM}$	Maximum Pulsed Drain-Source Diode Forward Current	--	--	6	A
$V_{SD}$	Drain to Source Diode Forward Voltage, $V_{GS} = 0\text{ V}, I_{SD} = 3\text{ A}, T_J = 25^\circ\text{C}$	--	--	1.2	V

#### Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Device mounted on FR-4 PCB, 1inch x 0.85inch x 0.062 inch
3. Pulse Test: Pulse Widths $\leq$ 300 $\mu\text{s}$ , Duty Cycles $\leq$ 0.5%

### N- Channel Typical Characteristics

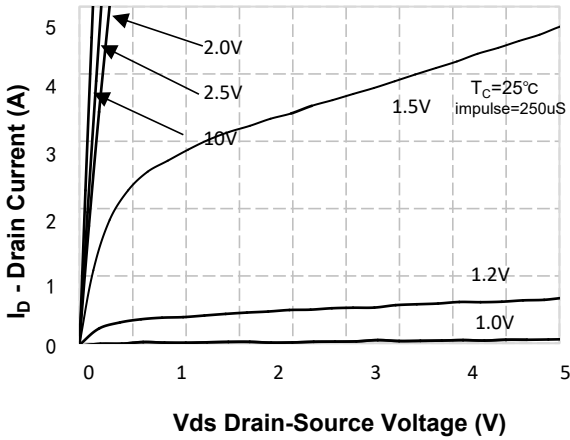


Figure 1. On-Region Characteristics

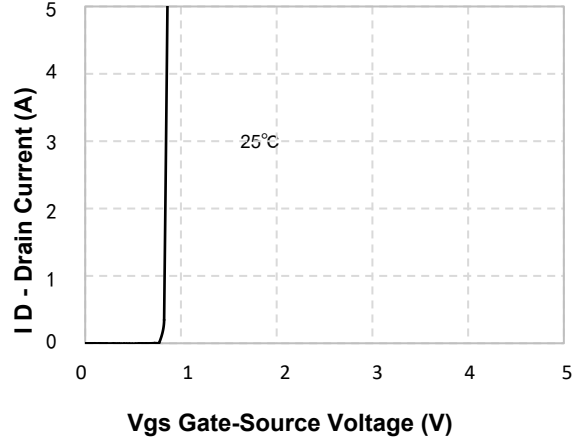


Figure 2. Transfer Characteristics

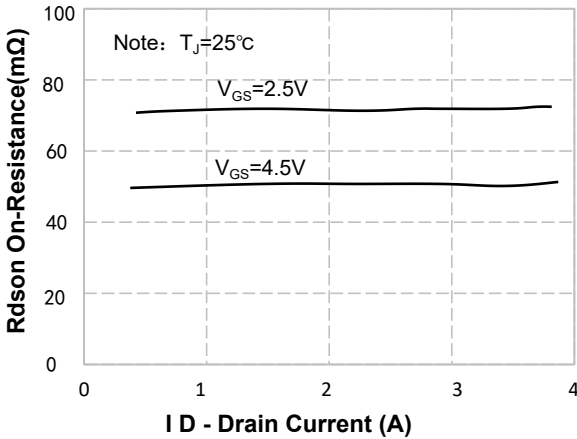


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

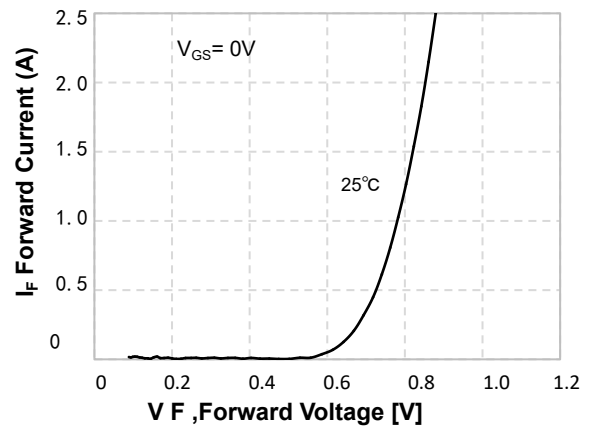


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

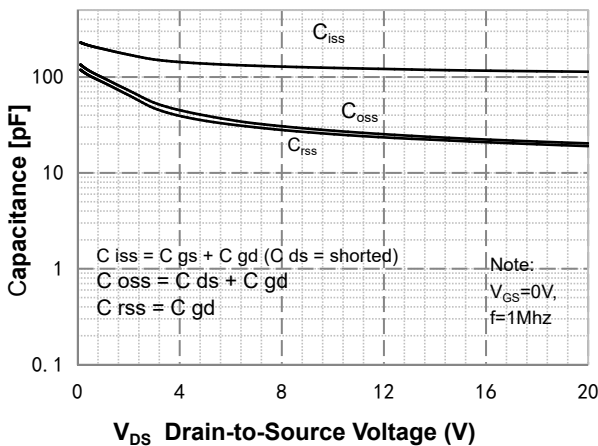


Figure 5. Capacitance Characteristics

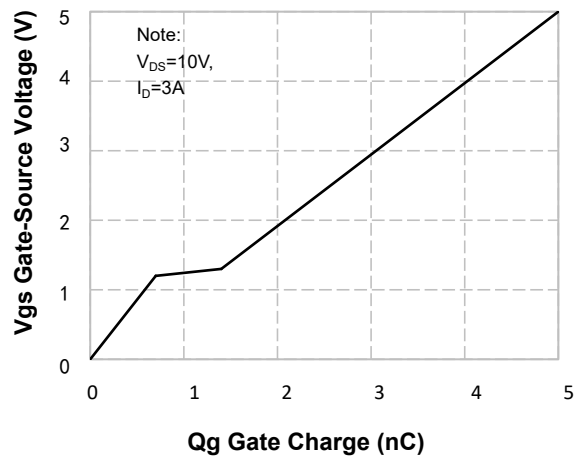
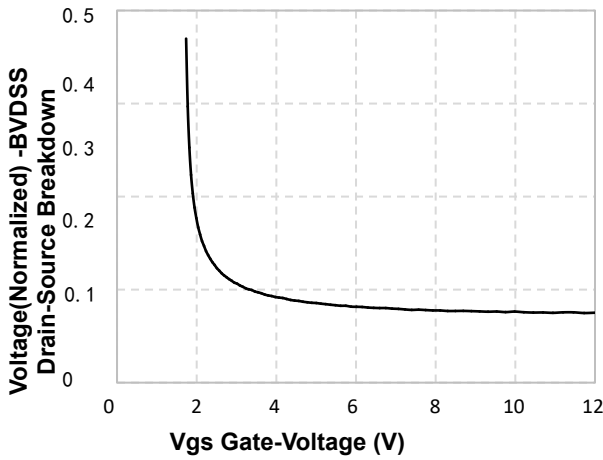
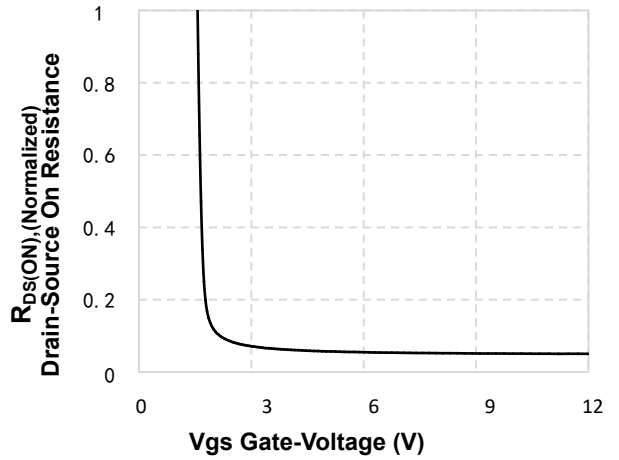


Figure 6. Gate Charge Characteristics

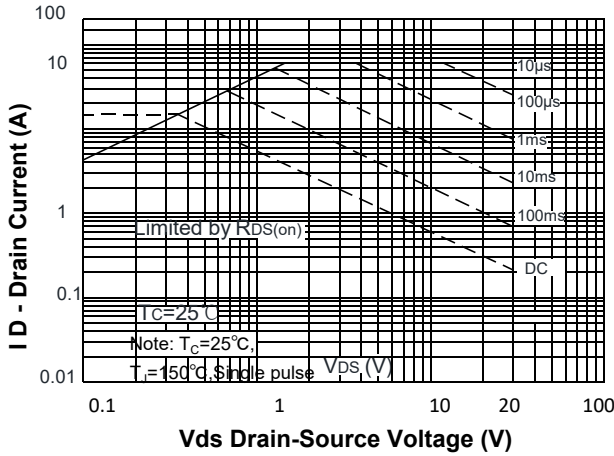
**N- Channel Typical Characteristics** (Continued)



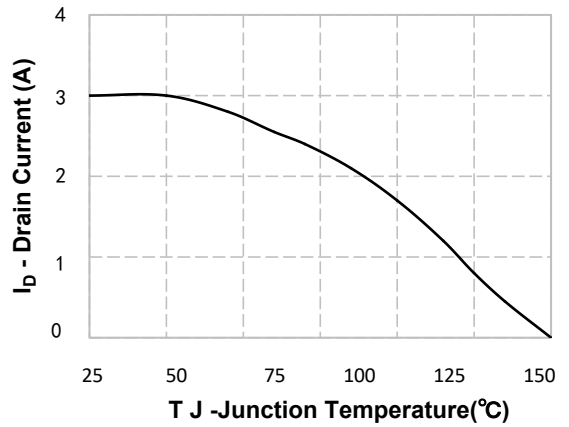
**Figure 7. Breakdown Voltage Variation vs Gate-Voltage**



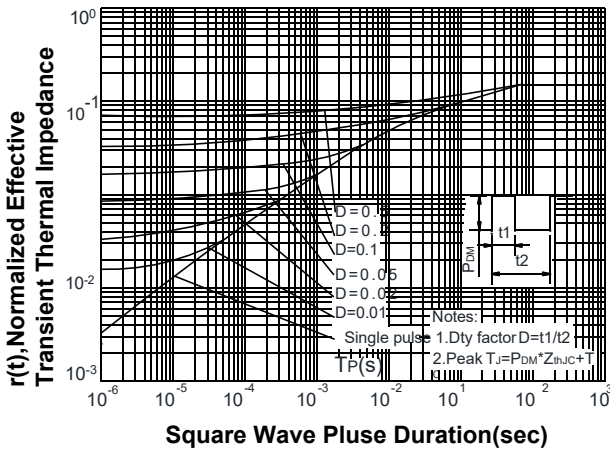
**Figure 8. On-Resistance Variation vs Gate Voltage**



**Figure 9. Maximum Safe Operating Area**

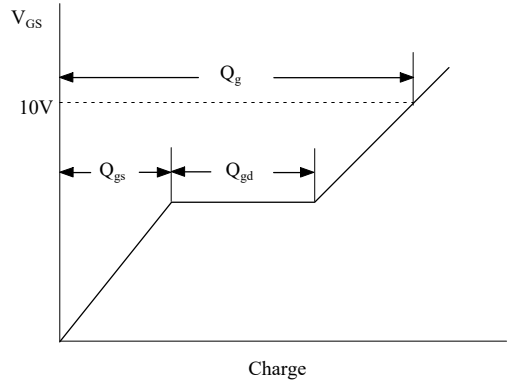


**Figure 10. Maximum Continuous Drain Current vs Temperature**

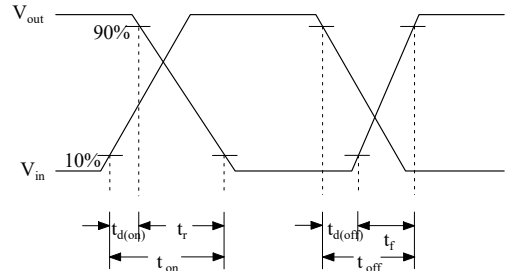
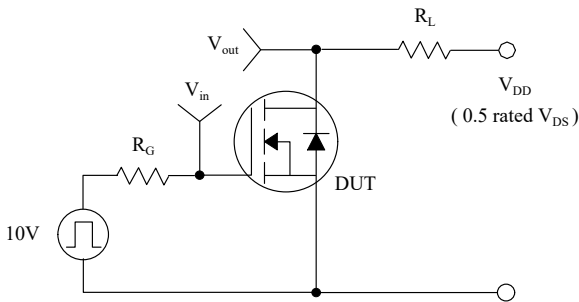


**Figure 11. Transient Thermal Response Curve**

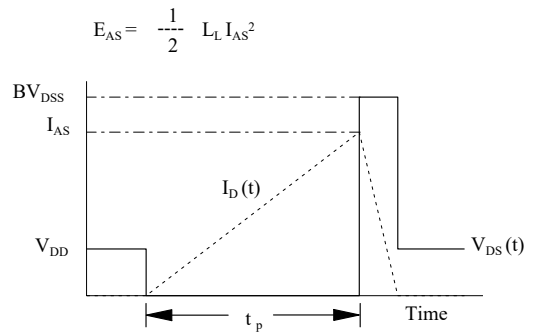
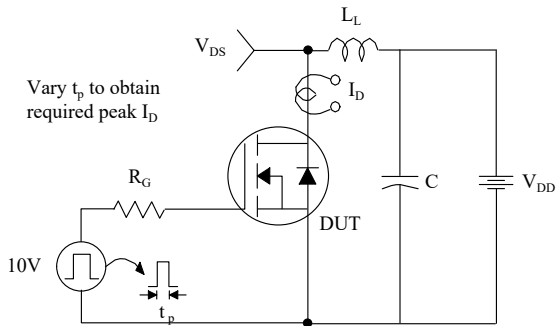
### Gate Charge Test Circuit & Waveform



### Resistive Switching Test Circuit & Waveforms



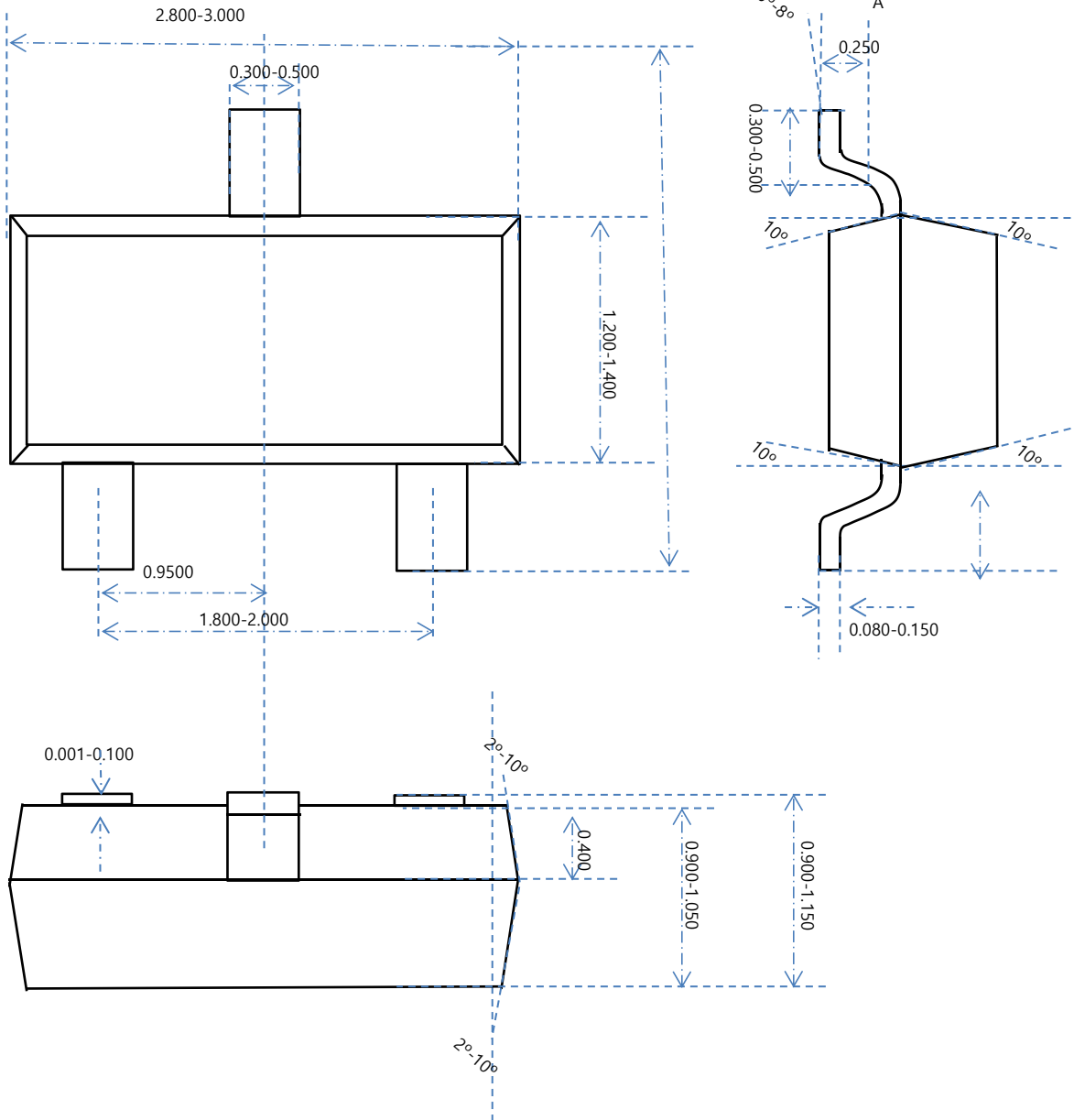
### Unclamped Inductive Switching Test Circuit & Waveforms



# Peak Diode Recovery dv/dt Test Circuit & Waveforms



# SOT-23 OUTLINE



**NOTE:**

- 1.The plastic package is not marked as smooth surfaceRa=0.1; Subglossy surfaceRa=0.8
- 2.Undeclared tolerance±0.25,Unmarked filletRmax=0.25

NAME	SOT-23 OUTLINE	UNIT	mm	DESIGNED	Shawn	THIRD ANGLE SYSTEM
DWGNO		PAGE	1 OF 1	CHECKED		
VERSION	Ver1.0	ISSUE DATE		APPROVED		

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