

N-Channel Enhancement Mode MOSFET

1 Features

- $V_{DS} = 20V$, $I_D = 3A$
- $R_{DS(ON)} < 90m\Omega$ @ $V_{GS}=4.5V$
- $R_{DS(ON)} < 115m\Omega$ @ $V_{GS}=2.5V$
- High density cell design for extremely low $R_{DS(ON)}$
- Lead free product is acquired
- Conventional SOT-323 Package

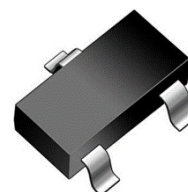
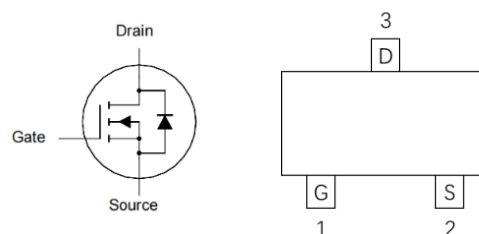
2 Applications

- Direct logic-level interface: TTL/CMOS
- Drivers: relays, solenoids, lamps, hammers, display, memories, transistors, etc. Load switch
- Battery operated systems
- Solid-state relays

3 Description

The SLMT220V3CN provide the best combination of fast switching, low on-resistance and cost-effectiveness. The MOSFET is the N-Channel enhancement mode power field effect transistors with high cell density, trench technology. This high density process and design have been optimized switching performance and especially tailored to minimize on-state resistance.

4 Pin Configuration and Top View



SOT-323

5 Device Information

PART NUMBER	MARKING	PACKAGE	BODY SIZE
SLMT220V3CN	$\bar{N}$	SOT-323	2.20 mm x 2.40mm

6 Absolute maximum Ratings @25°C

RATING	SYMBOL	VALUE	UNITS
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current	I_D	3	A
Total power dissipation	P_D	0.6	W
Channel temperature	T_J	-55 to +150	°C
Range of storage temperature	T_{STG}	-55 to +150	°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	°C/W

7 Electrical characteristics (@25°C unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0V$	20	22		V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.48	0.70	1.05	V
Drain Cut Off Current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V$			1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 10V, V_{DS} = 0V$			± 0.1	μA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 4.5V, I_D = 3A$		76	90	m Ω
		$V_{GS} = 2.5V, I_D = 2A$		96	115	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 10V, I_D = 2A$		5		S
Dynamic Characteristics						
Input Capacitance	C_{ISS}	$V_{DS} = 10V,$ $V_{GS} = 0V,$ $f = 1MHz$		450		pF
Reverse Transfer Capacitance	C_{RSS}			60		pF
Output Capacitance	C_{OSS}			86		pF
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 10V, I_D = 1A,$ $V_{GS} = 4.5V, R_{GEN} = 3\Omega$		11		ns
Turn-On Rise Time	t_r			4.2		ns
Turn-Off Delay Time	$t_{d(off)}$			20.1		ns
Turn-Off Fall Time	t_f			4.8		ns
Total Gate Charge	Q_g	$V_{DS} = 10V, I_D = 2A,$ $V_{GS} = 4.5V$		5.6		nC
Gate Source Charge	Q_{gs}			0.9		nC
Gate Drain Charge	Q_{gd}			1.5		nC
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_{SD} = 3A$		0.8	1.2	V

8 Typical Characteristics

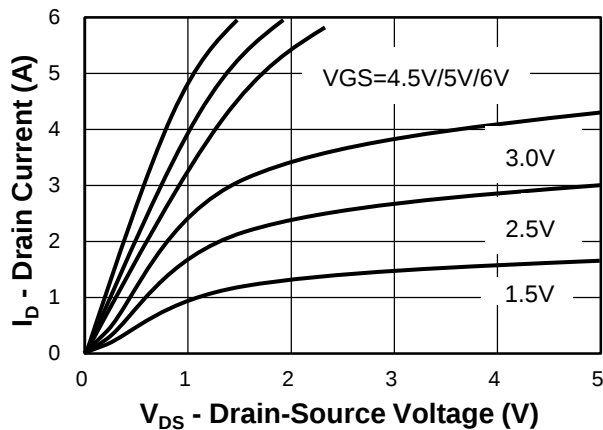


Fig 1. Output Characteristics

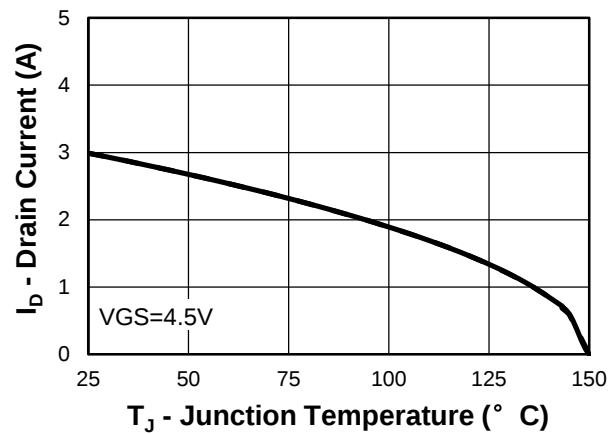


Fig 2. Drain Current

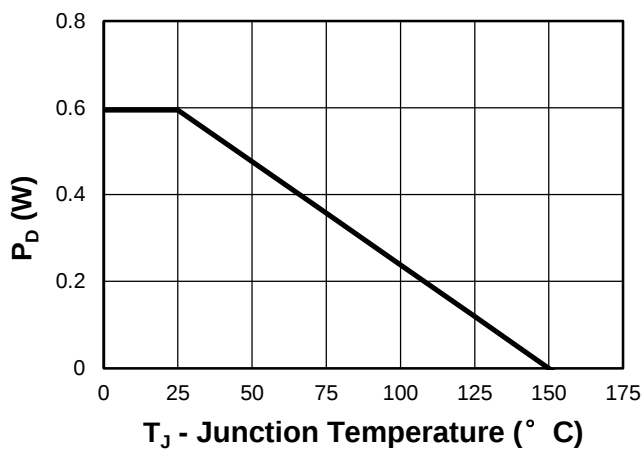


Fig 3. Power Dissipation

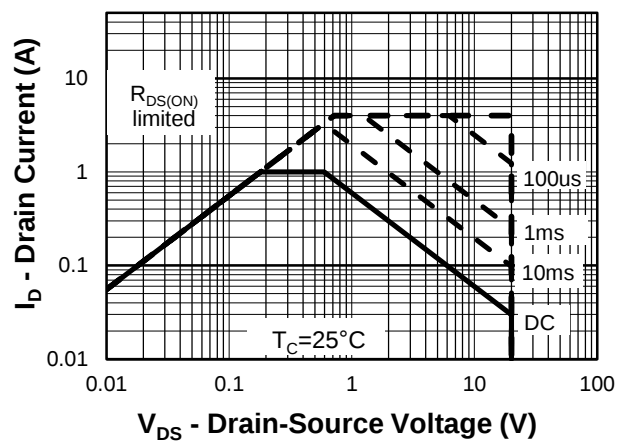


Fig 4. Safe Operation Area(SOA)

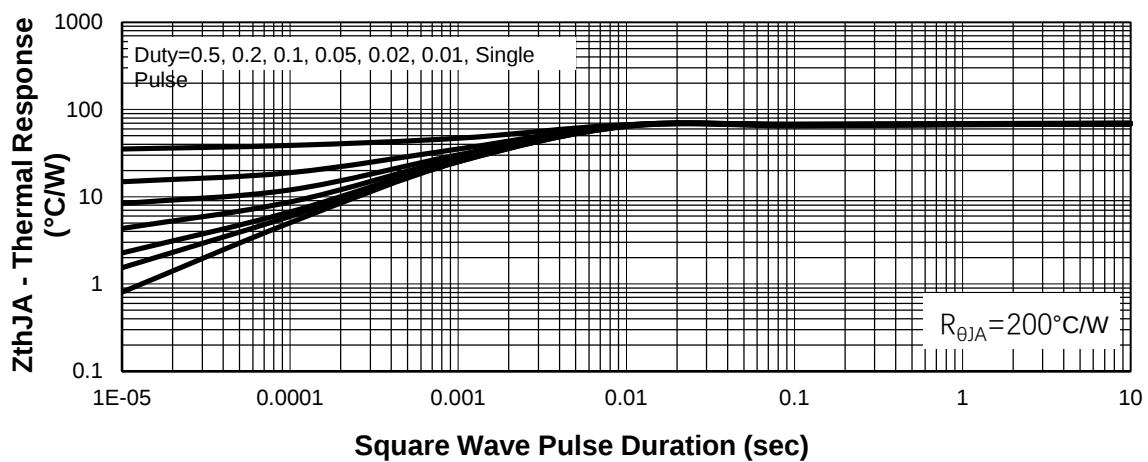


Fig 5. Thermal Transient Impedance

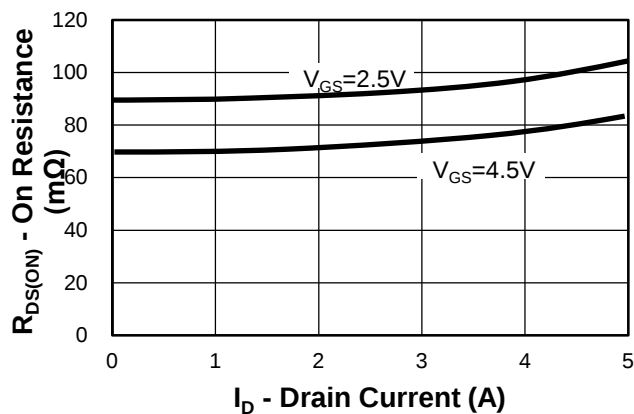


Fig 6. Rdson vs. Drain Current Characteristics

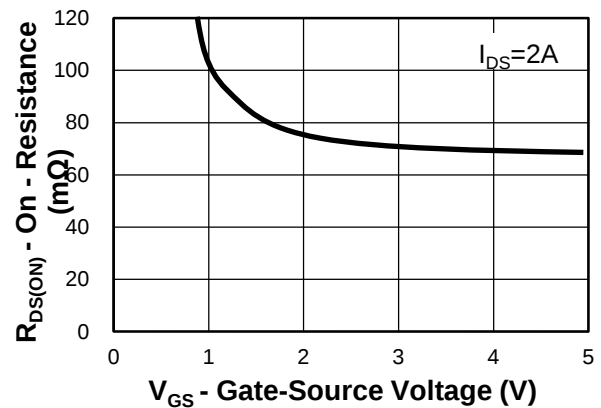


Fig 7. Gate-Source on Resistance

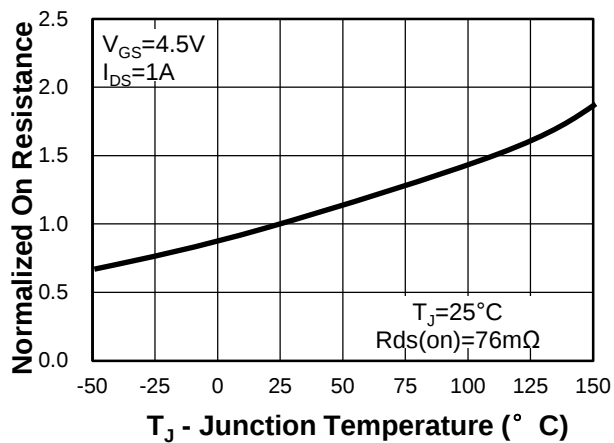


Fig 8. Rdson vs. Junction Tem Characteristics

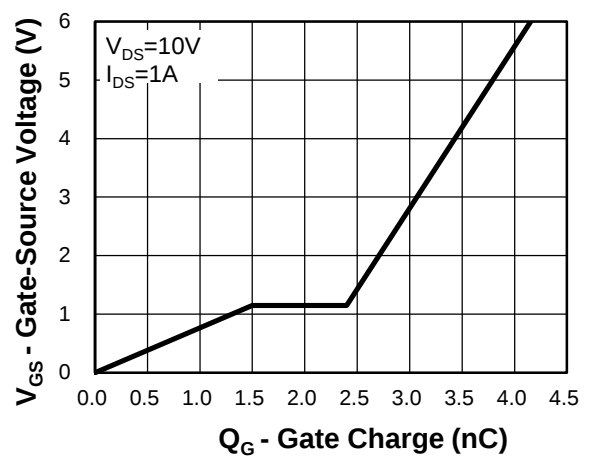


Fig 9. Gate Charge Characteristics

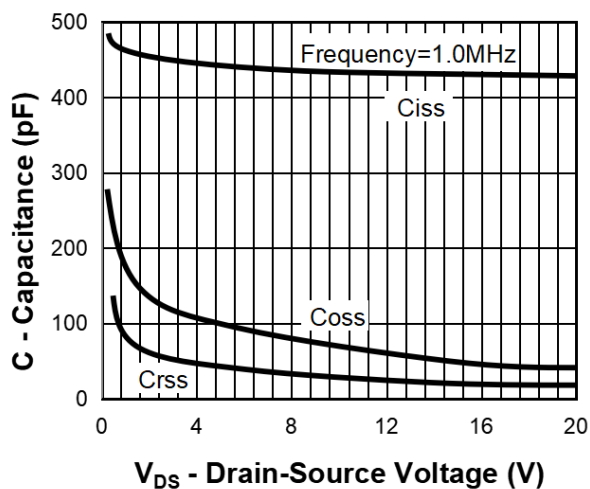


Fig 10. Capacitance Characteristics

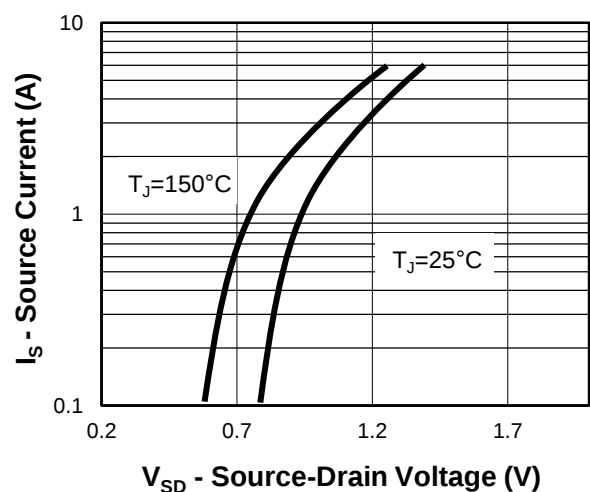


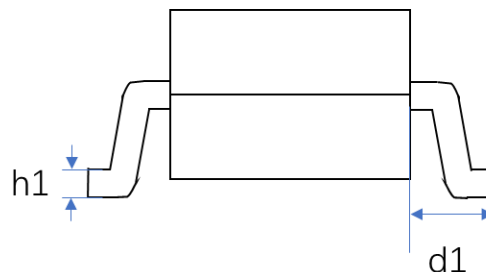
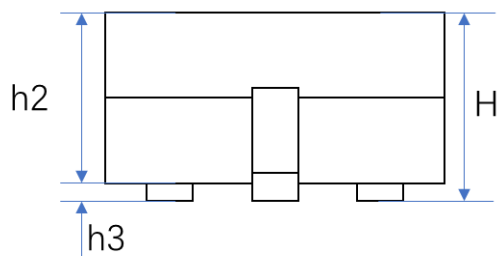
Fig 11. Source-Drain Diode Forward

The graph illustrates the temperature profile for reflow soldering. The Y-axis represents Temperature in degrees Celsius (°C), ranging from 0 to 300. The X-axis represents Time. The process is divided into three main phases: Preliminary Heating, Soldering, and Cooling. Two temperature profiles are shown: one for 120°C and one for 100°C. The 120°C profile reaches a peak temperature of 260°C (+0/-5°C), while the 100°C profile reaches a peak temperature of 245°C (+0/-5°C). The Soldering phase is indicated by a vertical line at the peak temperature, with a duration of less than 10s. The Cooling phase is indicated by a vertical line at the end of the process, with a duration of more than 1 min. The Preliminary Heating phase is indicated by a horizontal line at the start of the process, with a duration of 2 to 5 min.

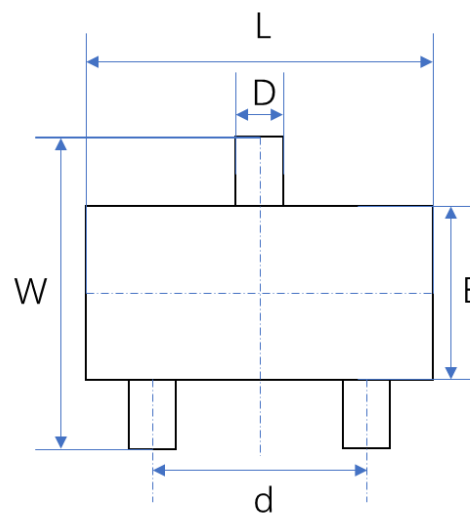
Technical drawing of a rectangular panel with dimensions and components. The panel is 8.00 ± 0.10 units high and 4.00 ± 0.10 units wide. It features a central horizontal slot with a width of 2.00 ± 0.05 units. The panel is divided into sections by vertical lines, with a distance of 4.00 ± 0.10 units between the first and second vertical lines. The panel is labeled with dimensions and tolerances: 8.00 ± 0.10, 4.00 ± 0.10, 2.00 ± 0.05, 4.00 ± 0.10, 1.75 ± 0.10, and 3.50 ± 0.05. A note indicates the unit is mm: Unit: mm. A legend at the top shows a right-pointing arrow labeled 'USER DIRECTION OF FEED'.

11 Product dimension

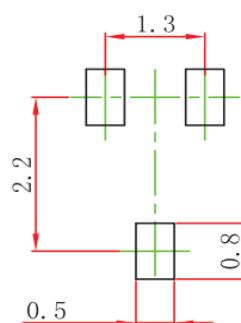
SOT-323



DIM	UNITS (mm)		
	MIN.	TYP.	MAX.
L	2.00	2.10	2.20
W	2.15	2.27	2.40
D	0.20	0.30	0.40
E	1.15	1.25	1.35
d	1.20	1.30	1.40
d1	-	0.53	-
H	0.90	-	1.10
h1	0.08	-	0.15
h2	0.9	-	1.00
h3	0.00	-	0.10



12 PCB Layout Footprints (Units: mm)



13 Ordering Information

Part Number	Packaging	Reel Size
SLMT220V3CN	3000/Tape & Reel	7 inch