



CTL43NS20-R3

N-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage V_{DS} 200 V
- Drain-Source On-Resistance
 $R_{DS(ON)}$ 3.6 Ω , at V_{GS} = 10V, I_D = 430mA
 $R_{DS(ON)}$ 3.7 Ω , at V_{GS} = 4.5V, I_D = 425mA
- Continuous Drain Current at $T_A=25^\circ C$ I_D =0.43A
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

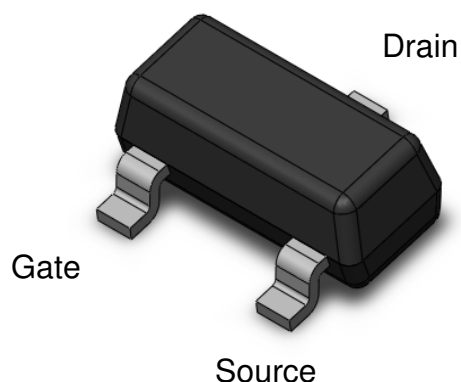
Applications

- Power Management
- LCD Display inverter
- DC/DC Converter
- Load Switch

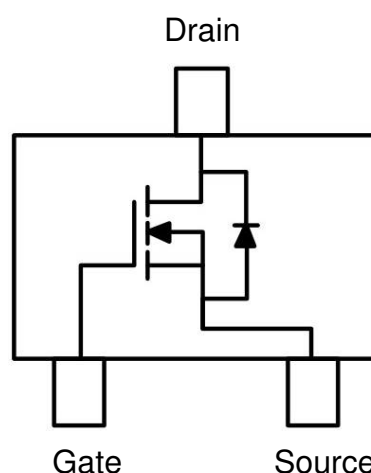
Description

The CTL43NS20-R3 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

Package Outline



Schematic





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Absolute Maximum Rating at 25°C

Symbol	Parameters	Test Conditions	Min	Notes
V _{DS}	Drain-Source Voltage	200	V	
V _{GS}	Gate-Source Voltage	±20	V	
I _D	Continuous Drain Current @T _A =25°C	0.43	A	1
I _{DM}	Pulsed Drain Current	1.7	A	1
P _D	Total Power Dissipation @T _A =25°C	1.25	W	2
T _{STG}	Storage Temperature Range	-55 to 150	°C	
T _J	Operating Junction Temperature Range	-55 to 150	°C	

Thermal Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
R _{θJA4}	Thermal Resistance Junction-Ambient (t=10s)		--	100	--	°C /W	1,4



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Electrical Characteristics $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Static Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	200	-	-	V	
I _{DSS}	Drain-Source Leakage Current	V _{DS} = 200V, V _{GS} = 0V	-	-	1	μA	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA	

On Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
R _{DS(ON)}	Drain-Source On-Resistance	V _{GS} = 10V, I _D = 430mA	-	3.6	4.3	Ω	3
		V _{GS} = 4.5V, I _D = 425mA	-	3.7	4.5	Ω	
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} = V _{DS} , I _D = 250μA	1.0	---	3.0	V	3

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C _{ISS}	Input Capacitance	V _{GS} = 0V, V _{DS} = 15V f = 1MHz	-	373	-	pF	
C _{OSS}	Output Capacitance		-	25	-		
C _{RSS}	Reverse Transfer Capacitance		-	8	-		

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
T _{D(ON)}	Turn-On Delay Time	V _{DS} = 25V , R _L = 25Ω, V _{GS} = 10V, R _G = 25Ω	-	10	-	ns	
T _R	Rise Time		-	16	-		
T _{D(OFF)}	Turn-Off Delay Time		-	33	-		
T _F	Fall Time		-	9	-		
Q _G	Total Gate Charge	V _{DS} = 10V , V _{GS} = 4.5V, I _D = 0.35A	-	4.3	-	nC	
Q _{GS}	Gate-Source Charge		-	2.7	-		
Q _{GD}	Gate-Drain Charge		-	1.1	-		



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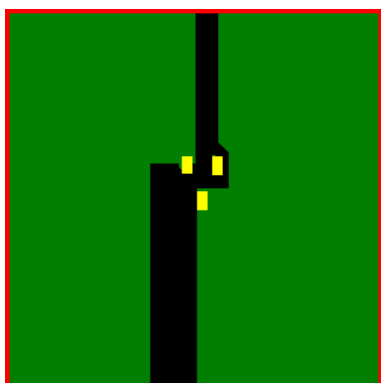
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Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _D = 430mA	-	0.8	1.2	V	
I _{SD}	Body Diode Continuous Current		-	-	1	A	1

Note:

1. The power dissipation is limited by 150°C junction temperature.
2. Device mounted on a glass-epoxy board



FR-4
25.4 × 25.4 mm .
2 Oz Copper

Actual Size

3. The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
4. Thermal Resistance follow JESD51-3.



Typical Characteristic Curves

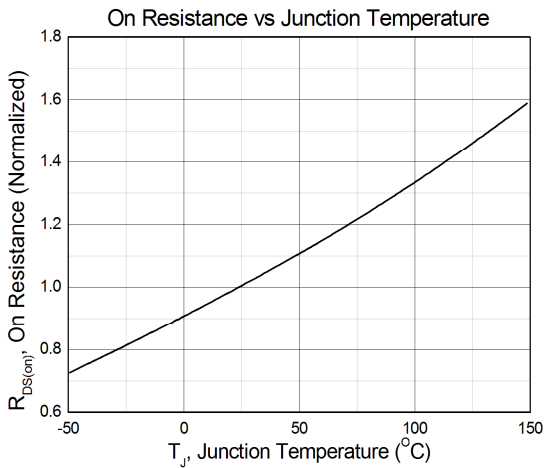


Figure 1

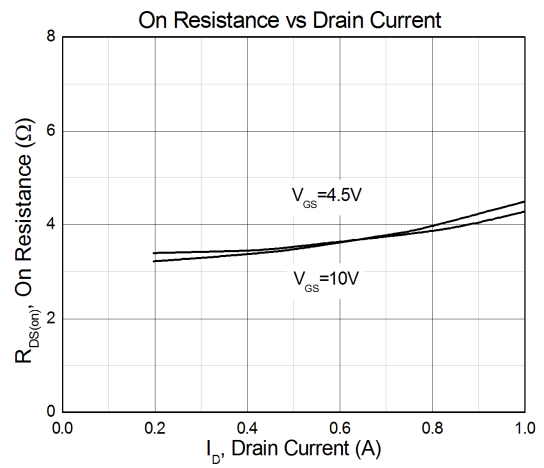


Figure 2

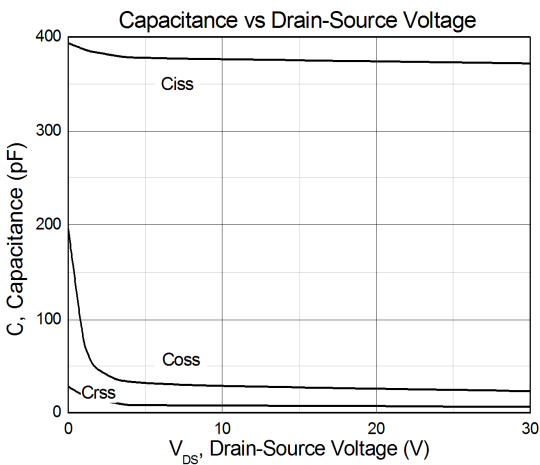


Figure 3

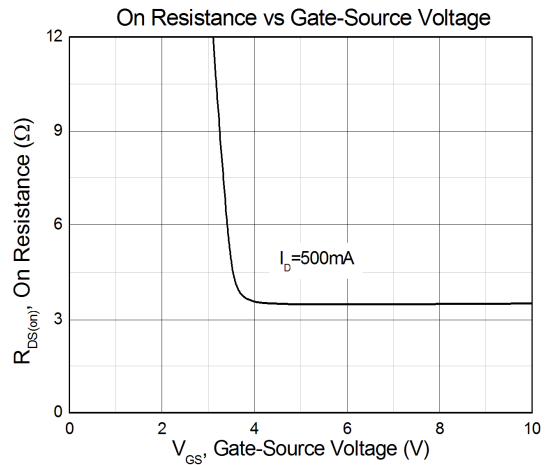


Figure 4

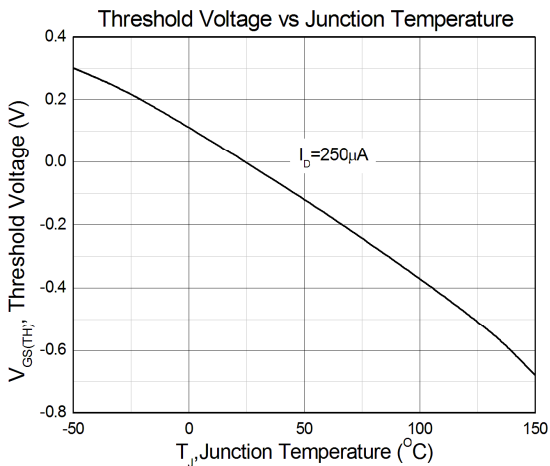


Figure 5

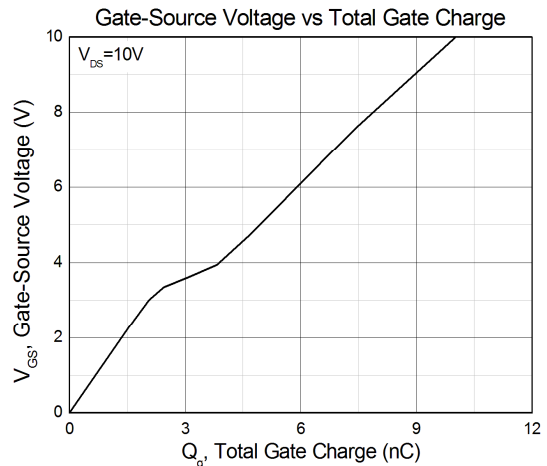
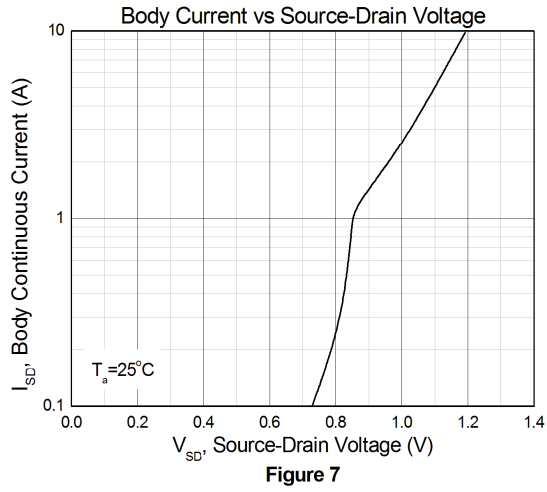


Figure 6



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Test Circuits & Waveforms

Figure 8: Gate Charge Test Circuit

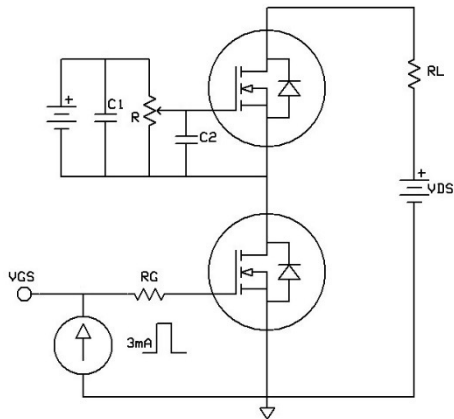


Figure 9: Gate Charge Waveform

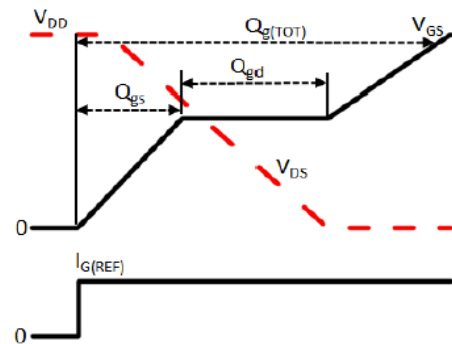


Figure 10: Switching Time Test Circuit

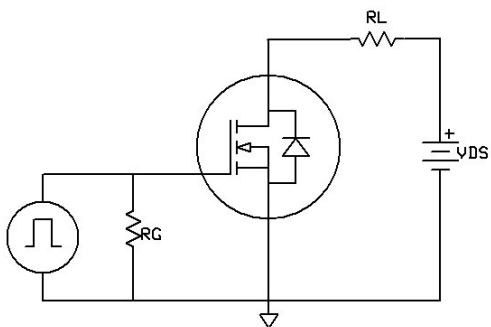
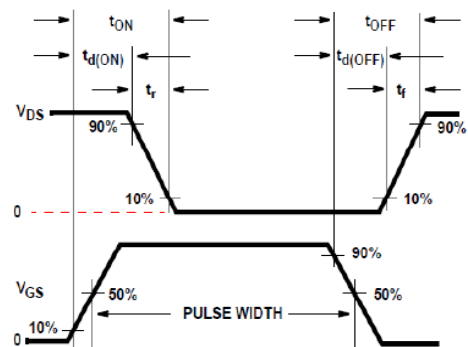
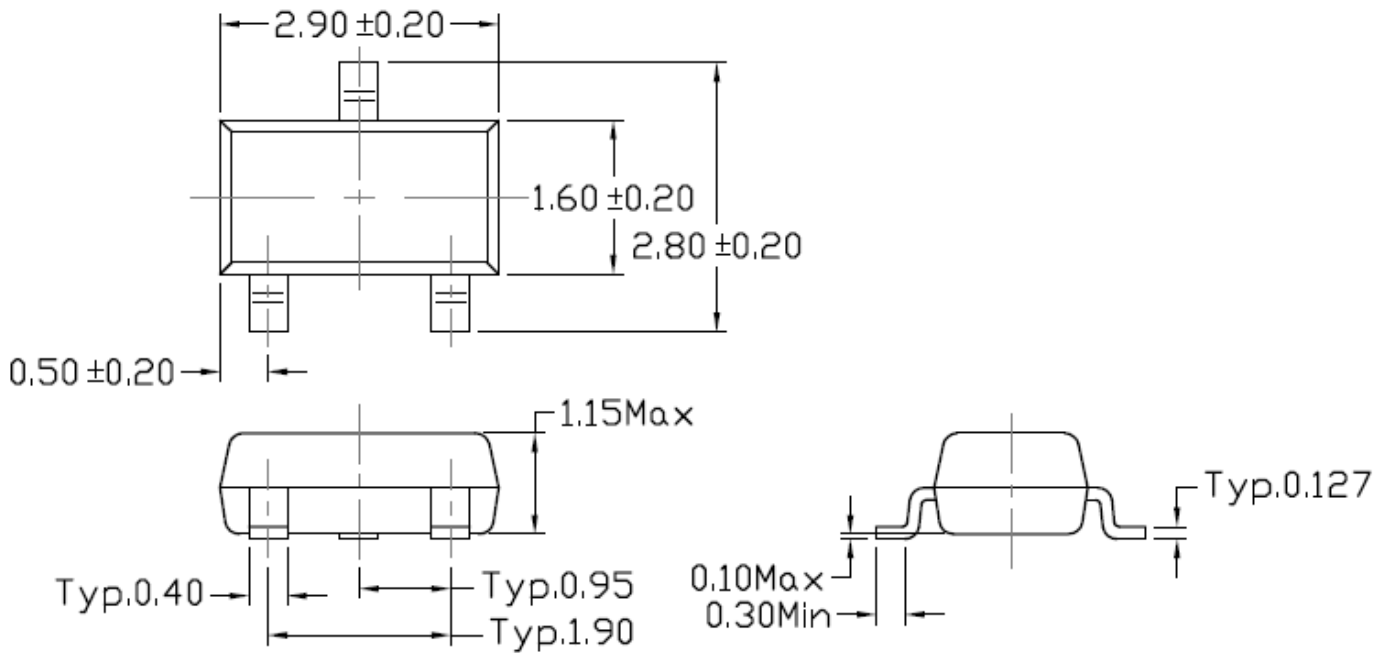


Figure 11: Switching Time Waveform



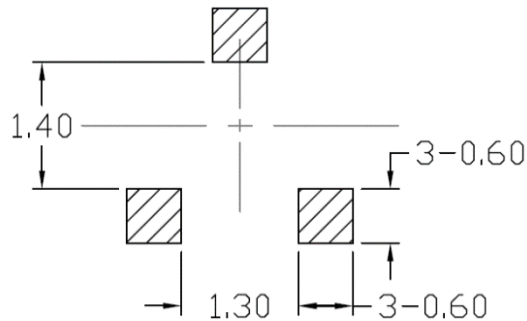


Package Dimension (SC-59)



Note: Dimensions in mm

Recommended pad layout for surface mount leadform



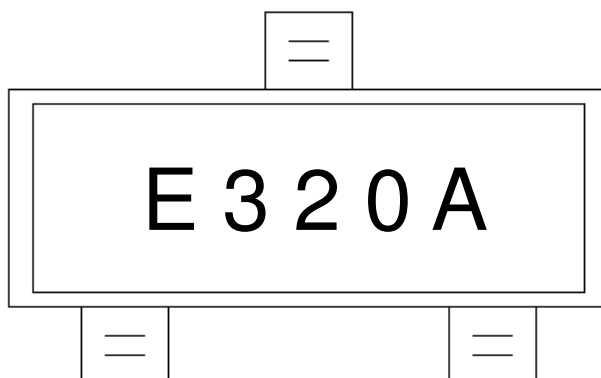
Note: Dimensions in mm



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Marking Information



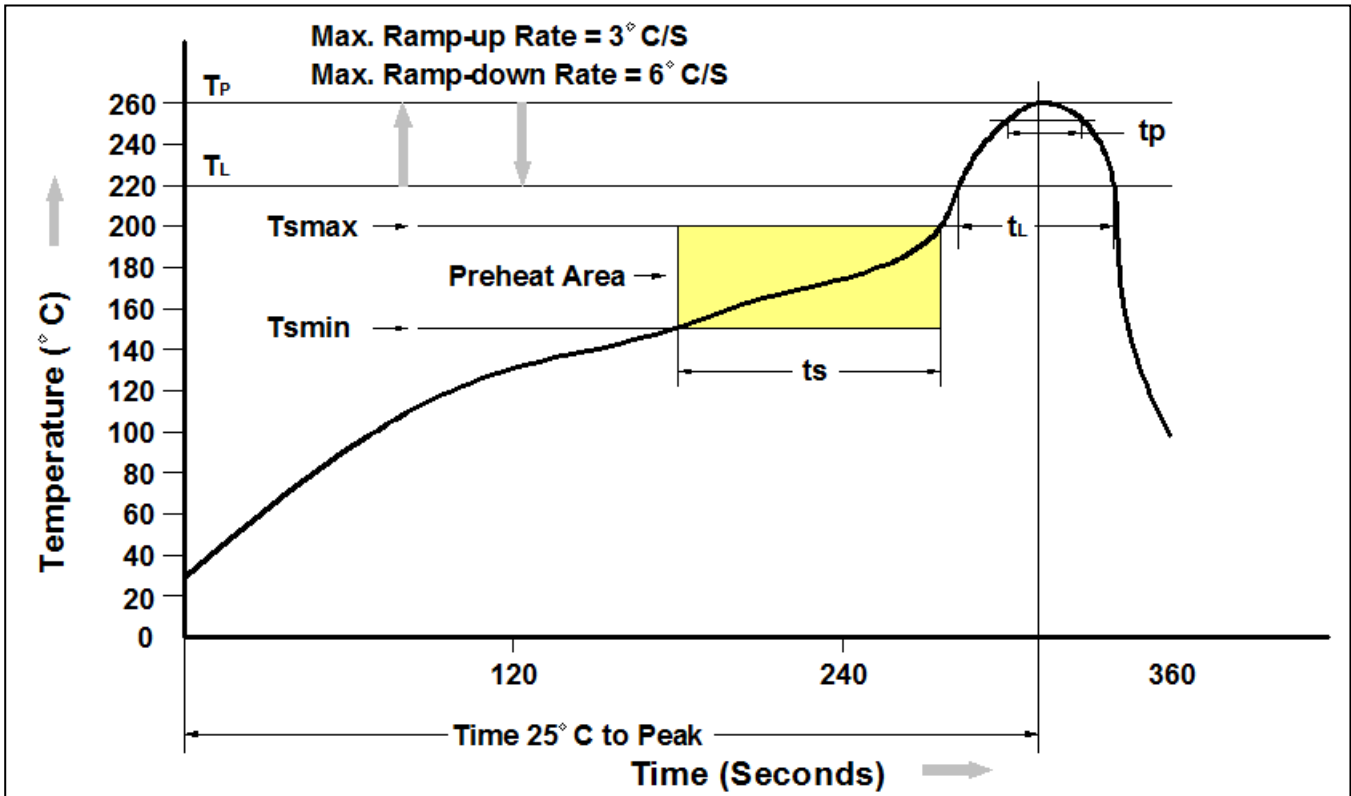
E302A: Device Number

Ordering Information

Part Number	Description	Quantity
CTLM43NS20-R3	SC-59 Reel	3000 pcs



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150 °C
Temperature Max. (Tsmax)	200 °C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Ramp-up Rate (tL to tP)	3 °C/second max.
Liquidous Temperature (TL)	217 °C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Body Package Temperature	260 °C +0 °C / -5 °C
Time (tP) within 5 °C of 260 °C	30 seconds
Ramp-down Rate (TP to TL)	6 °C/second max
Time 25 °C to Peak Temperature	8 minutes max.



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