



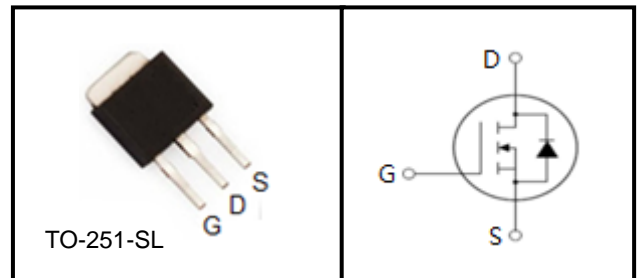
## 20V N-Channel Trench MOSFET

### FEATURES

- Trench Power MOSFET Technology
- Low  $R_{DS(ON)}$
- Low Gate Charge
- Optimized For Fast-switching Applications

### APPLICATIONS

- Synchronous Rectification in DC/DC and AC/DC Converters
- Isolated DC/DC Converters in Telecom and Industrial



Device Marking and Package Information		
Device	Package	Marking
TTE08N02AT	TO-251-SL	08N02AT

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
		TO-251-SL	
Drain-Source Voltage ( $V_{GS} = 0\text{V}$ )	$V_{DSS}$	20	V
Continuous Drain Current	$I_D$	8	A
Pulsed Drain Current (note1)	$I_{DM}$	32	A
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	3.5	mJ
Avalanche Current (note1)	$I_{AR}$	5.0	A
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	2.3	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+150	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
		TO-251-SL	
Thermal Resistance, Junction-to-Case	$R_{thJC}$	25	K/W
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	62	



Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
		$V_{DS} = 20V, V_{GS} = 0V, T_J = 150^\circ\text{C}$	--	--	100	
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 12V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.6	--	1.6	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4A$	--	37	43	$m\Omega$
		$V_{GS} = 4.5V, I_D = 4A$	--	44	52	$m\Omega$
		$V_{GS} = 3.5V, I_D = 4A$	--	48	56	$m\Omega$
Forward Transconductance (Note3)	$g_{fs}$	$V_{DS} = 10V, I_D = 1A$	--	5	--	S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 10V,$ $f = 1.0\text{MHz}$	--	384	--	$\mu F$
Output Capacitance	$C_{oss}$		--	48	--	
Reverse Transfer Capacitance	$C_{rss}$		--	19	--	
Total Gate Charge	$Q_g$	$V_{DD} = 20V, I_D = 4A,$ $V_{GS} = 10V$	--	24	--	nC
Gate-Source Charge	$Q_{gs}$		--	1.6	--	
Gate-Drain Charge	$Q_{gd}$		--	3.4	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 1A,$ $R_G = 2.5\Omega$	--	5	--	ns
Turn-on Rise Time	$t_r$		--	6	--	
Turn-off Delay Time	$t_{d(off)}$		--	9	--	
Turn-off Fall Time	$t_f$		--	7	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	8	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	8	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 1A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 1A,$ $di_F/dt = 100A/\mu s$	--	10	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	5	--	nC

**Notes**

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2.  $I_{AS} = 5A, V_{DD} = 20V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse Width  $\leq 300\mu s, \text{Duty Cycle } \leq 1\%$



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics

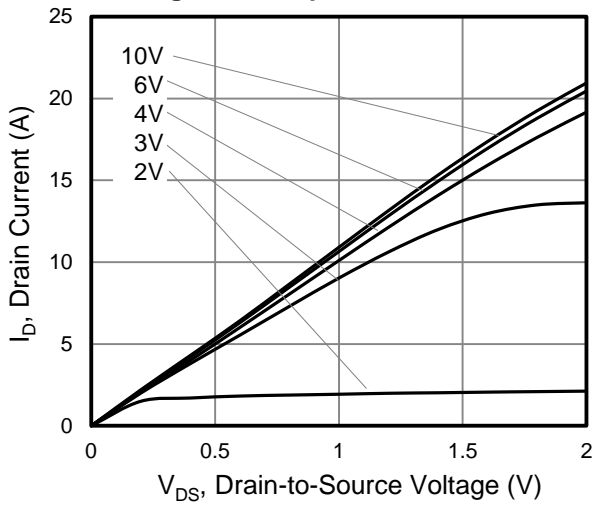


Figure 2. Transfer Characteristics

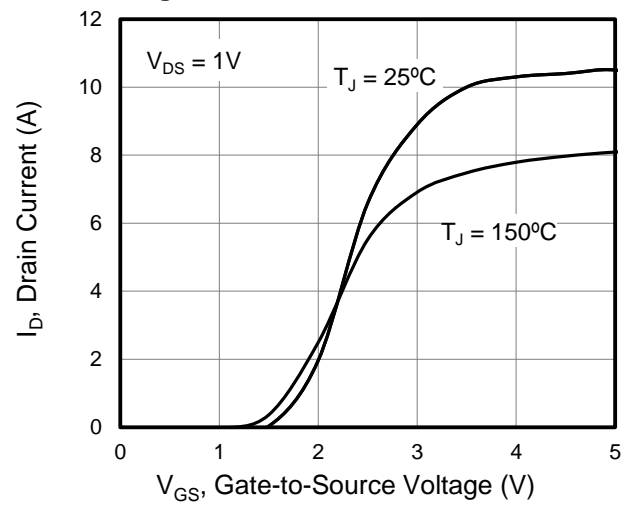


Figure 3. On-Resistance vs. Drain Current

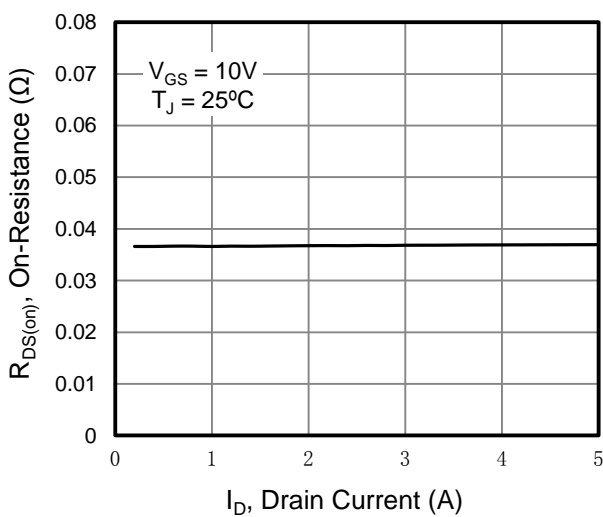


Figure 4. Capacitance

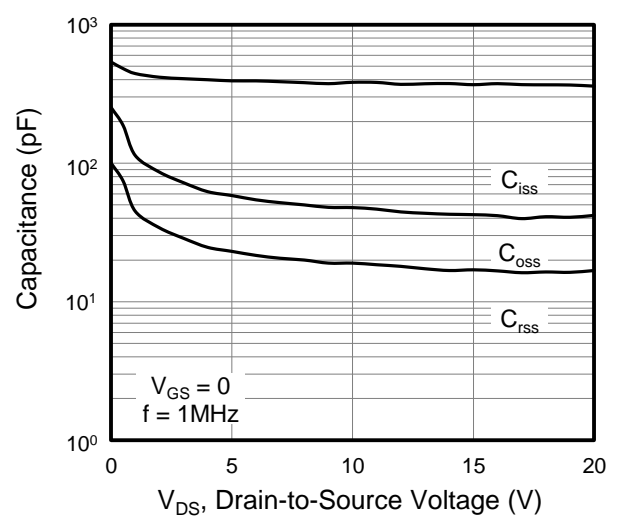


Figure 5. Gate Charge

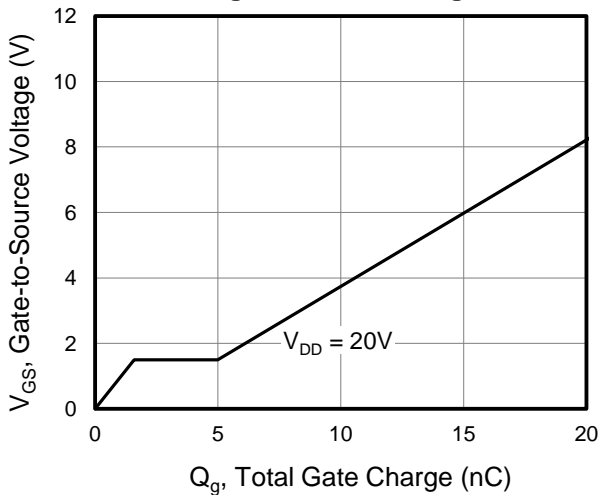
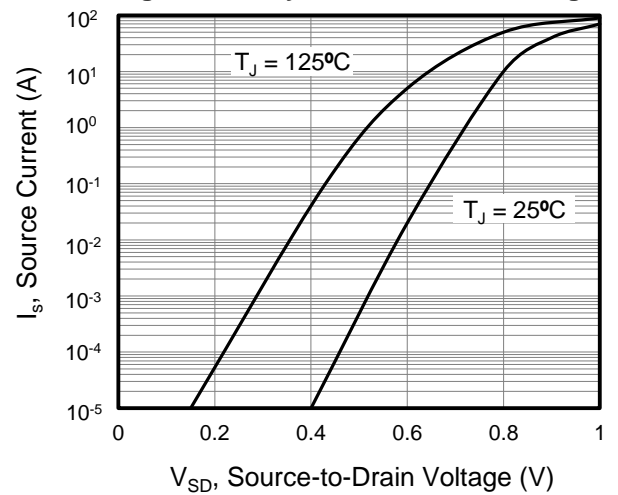


Figure 6. Body Diode Forward Voltage





Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 7. On-Resistance vs. Junction Temperature

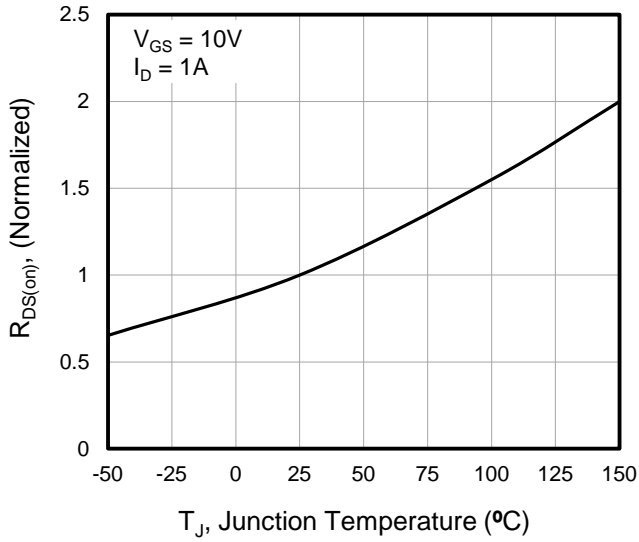


Figure 8. Threshold Voltage vs. Junction Temperature

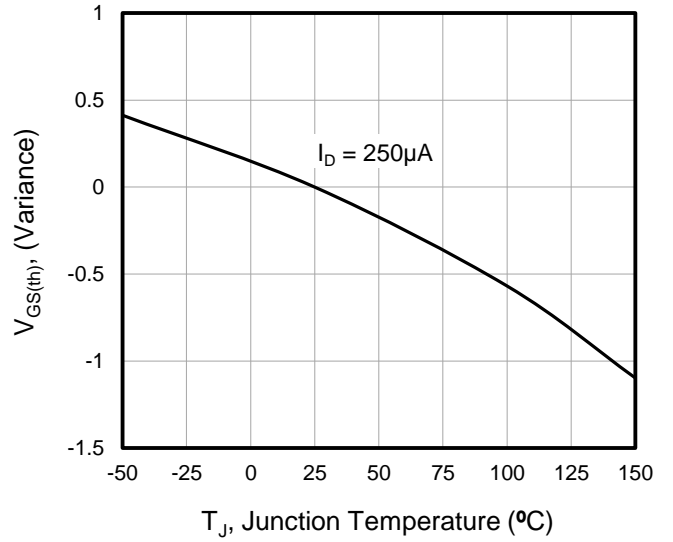


Figure 9. Transient Thermal Impedance

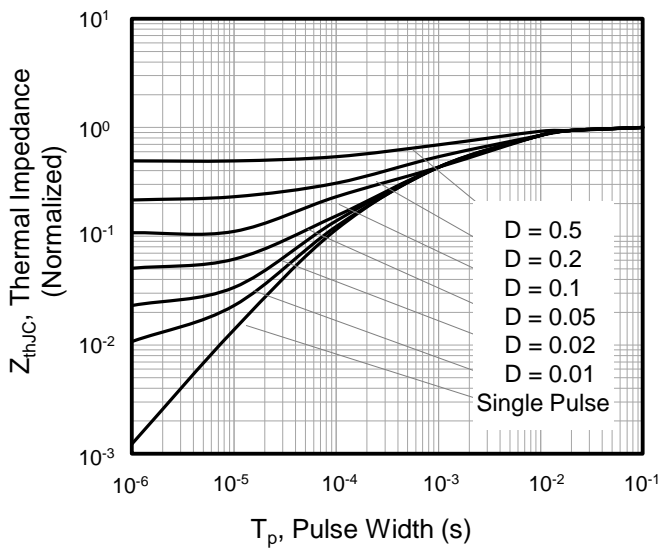




Figure A: Gate Charge Test Circuit and Waveform



Figure B: Resistive Switching Test Circuit and Waveform

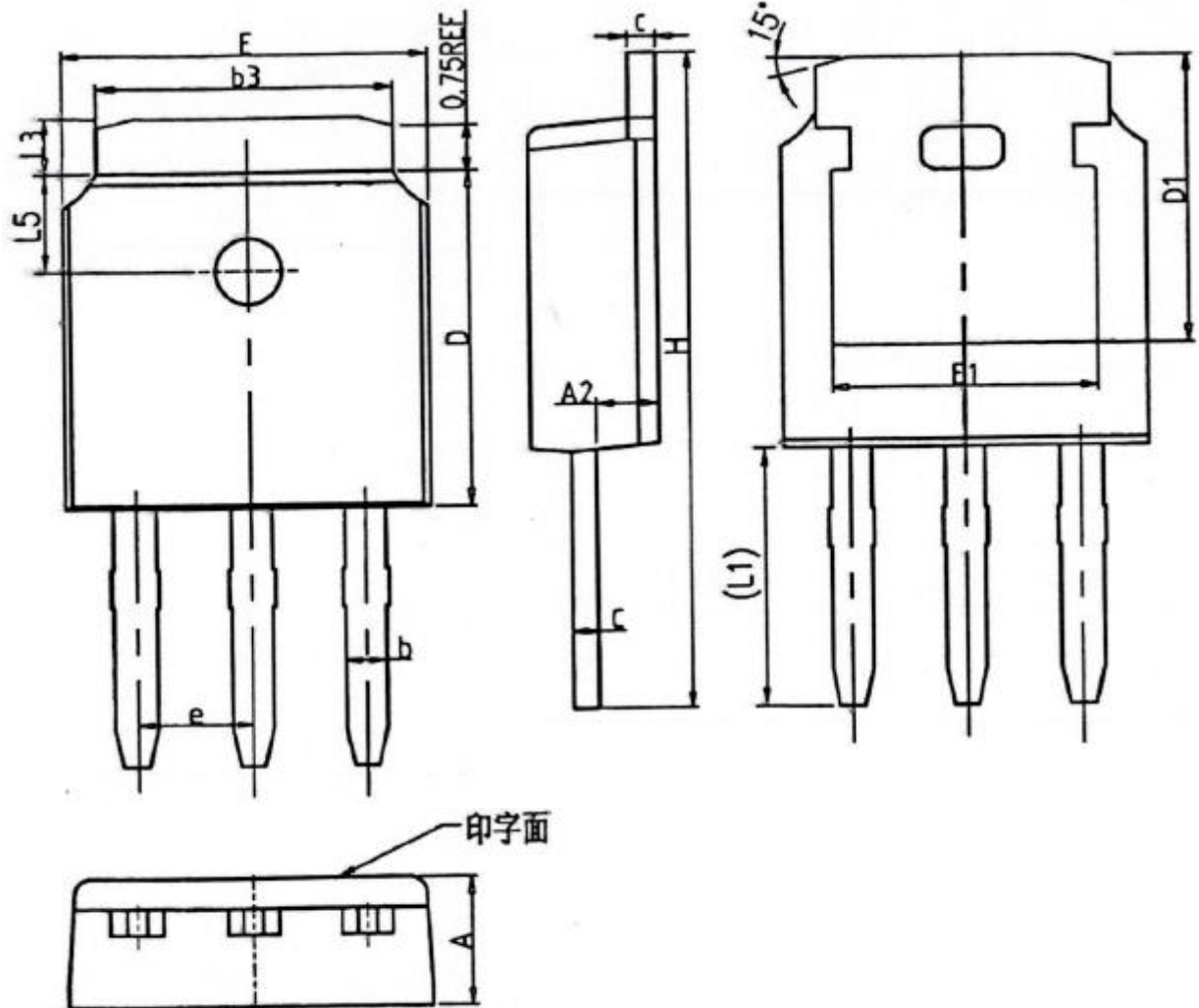


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





## TO-251-SL



Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A2	0.97	1.17
b	0.68	0.90
b2	0.00	0.10
b2'	0.00	0.10
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22

Unit: mm		
Symbol	Min.	Max.
D1	5.30REF	
E	6.40	6.80
E1	4.63	-
e	2.286BSC	
H	16.22	16.82
L1	9.15	9.65
L3	0.88	1.28
L5	1.65	1.95



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