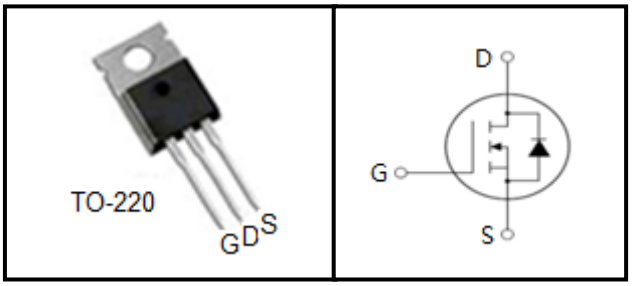
100V N-Channel Trench MOSFET

FEATURES

- High Density Cell Design for Ultra Low Rdson
- Fully Characterized Avalanche Voltage and Current
- Good Stability with High E_{AS}
- Excellent Package for Good Heat Dissipation



APPLICATIONS

- Power Switching Application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

RoHS

Device Marking and Package Information		
Device	**Package**	**Marking**
TMP120N10A	TO-220	120N10A

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted			
Parameter	**Symbol**	**Value**	**Unit**
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	100	V
Continuous Drain Current	I_D	110	A
Pulsed Drain Current (note1)	I_{DM}	440	A
Gate-Source Voltage	V_{GSS}	±20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	1000	mJ
Avalanche Current (note1)	I_{AR}	60	A
Power Dissipation (T_C = 25ºC)	P_D	208	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+175	ºC

Thermal Resistance			
Parameter	**Symbol**	**Value**	**Unit**
Thermal Resistance, Junction-to-Case	R_{thJC}	0.72	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	

Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
		V_{DS} = 100V, V_{GS} = 0V, T_J = 150ºC	--	--	100	
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 30A	--	7.5	9.0	mΩ
Forward Transconductance (Note3)	g_{fs}	V_{DS} = 5V, I_D = 20A	40	--	--	S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	5560	--	pF
Output Capacitance	C_{oss}		--	480	--	
Reverse Transfer Capacitance	C_{rss}		--	300	--	
Total Gate Charge	Q_g	V_{DD} = 50V, I_D = 20A, V_{GS} = 10V	--	130	--	nC
Gate-Source Charge	Q_{gs}		--	24	--	
Gate-Drain Charge	Q_{gd}		--	49	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 50V, I_D = 2A, R_G = 2.5Ω	--	28	--	ns
Turn-on Rise Time	t_r		--	30	--	
Turn-off Delay Time	$t_{d(off)}$		--	41	--	
Turn-off Fall Time	t_f		--	16	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	120	A
Pulsed Diode Forward Current	I_{SM}		--	--	480	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 20A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Time	t_{rr}	I_F = 20A, di_F/dt = 500A/μs	--	45	--	ns
Reverse Recovery Charge	Q_{rr}		--	54	--	nC

Notes

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2. I_{AS} = 60A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

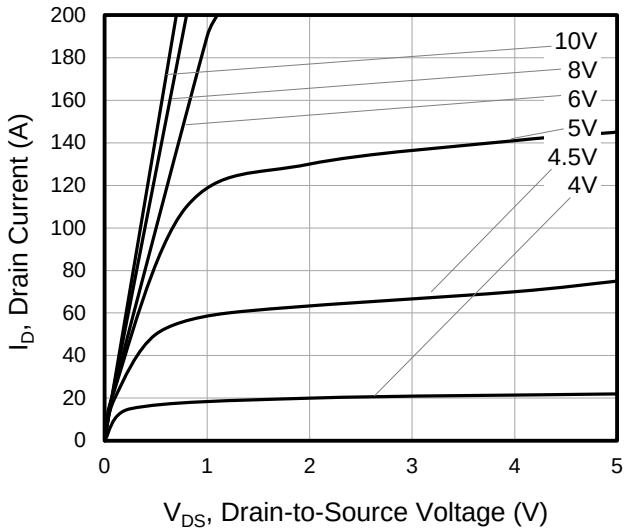


Figure 2. Transfer Characteristics

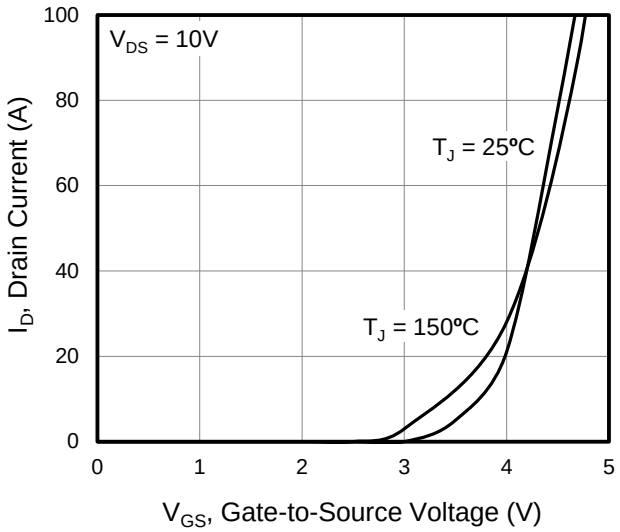


Figure 3. On-Resistance vs. Drain Current

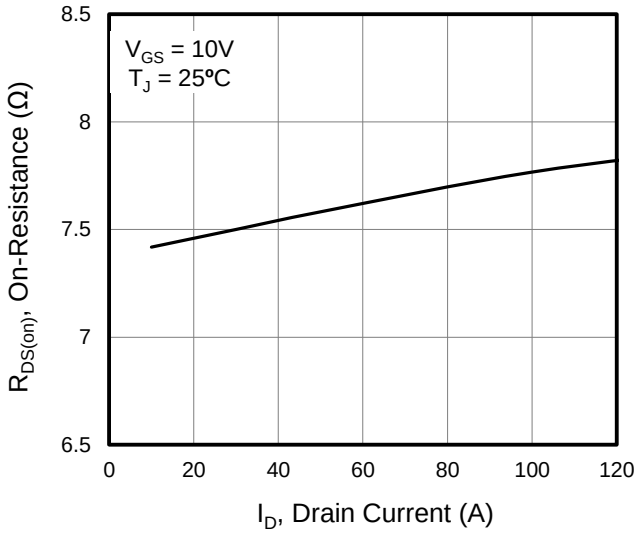


Figure 4. Capacitance

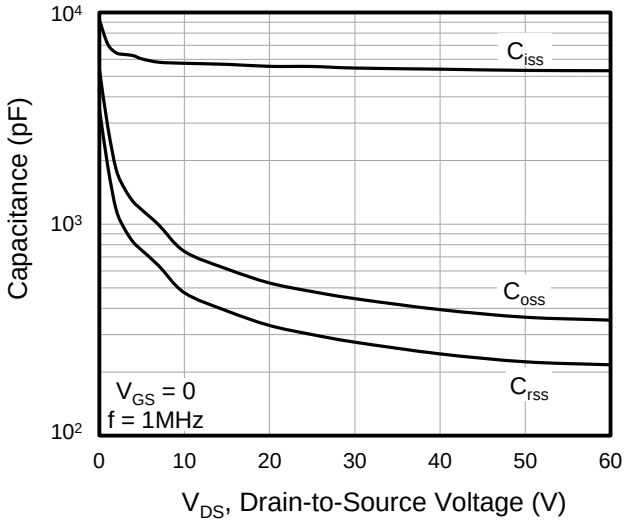


Figure 5. Gate Charge

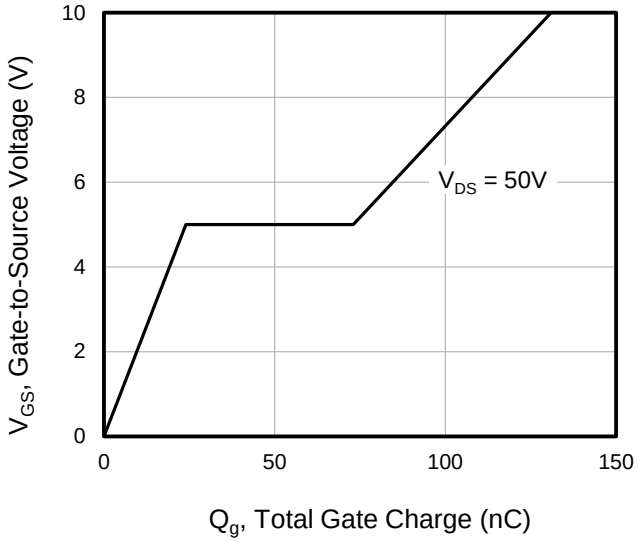
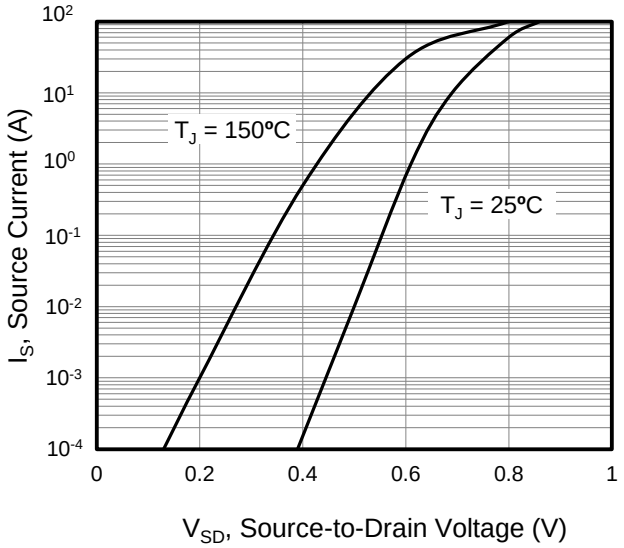


Figure 6. Body Diode Forward Voltage



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. On-Resistance vs. Temperature

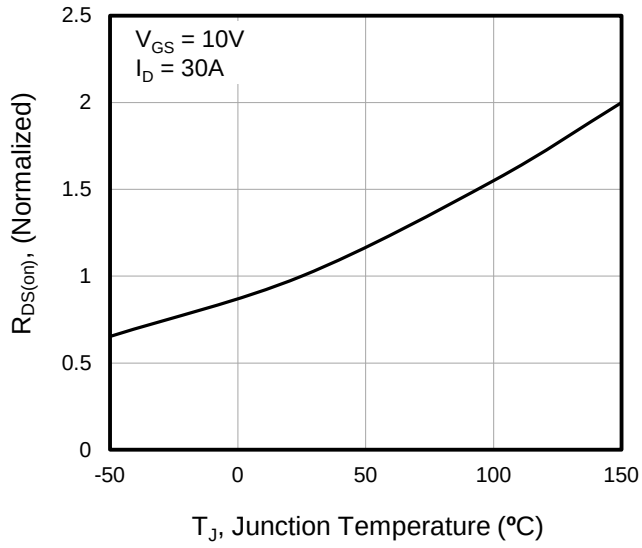


Figure 8. Threshold Voltage vs. Temperature

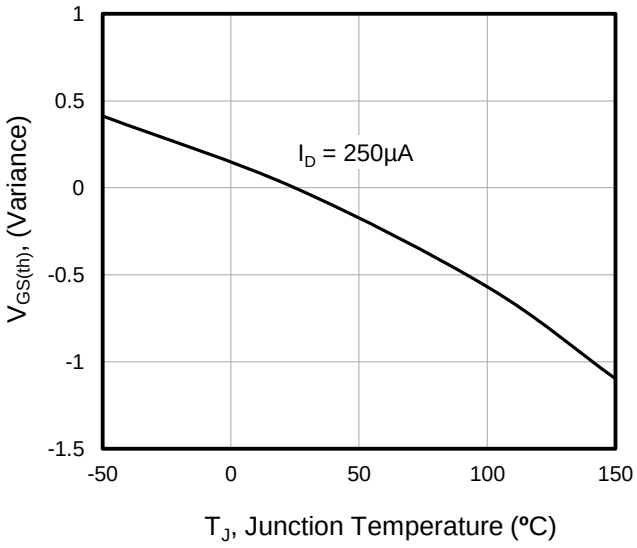


Figure 9. Transient Thermal Impedance

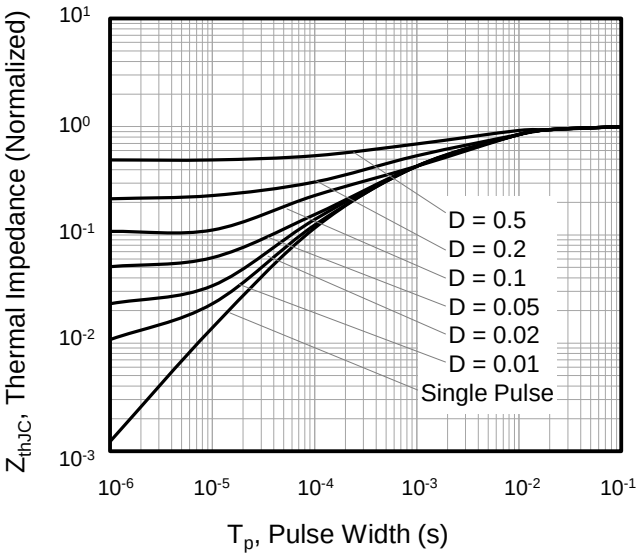


Figure A：Gate Charge Test Circuit and Waveform

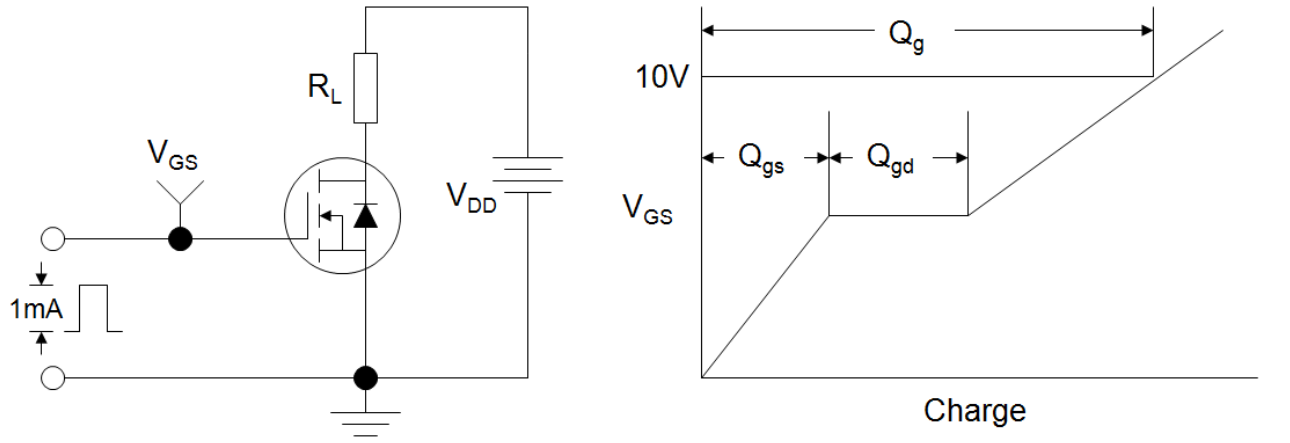


Figure B：Resistive Switching Test Circuit and Waveform

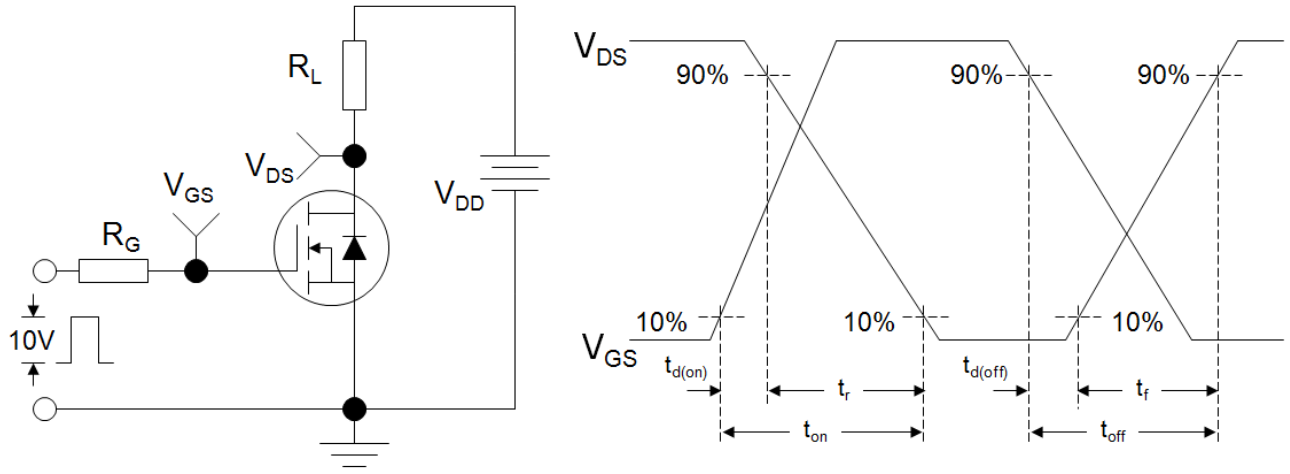
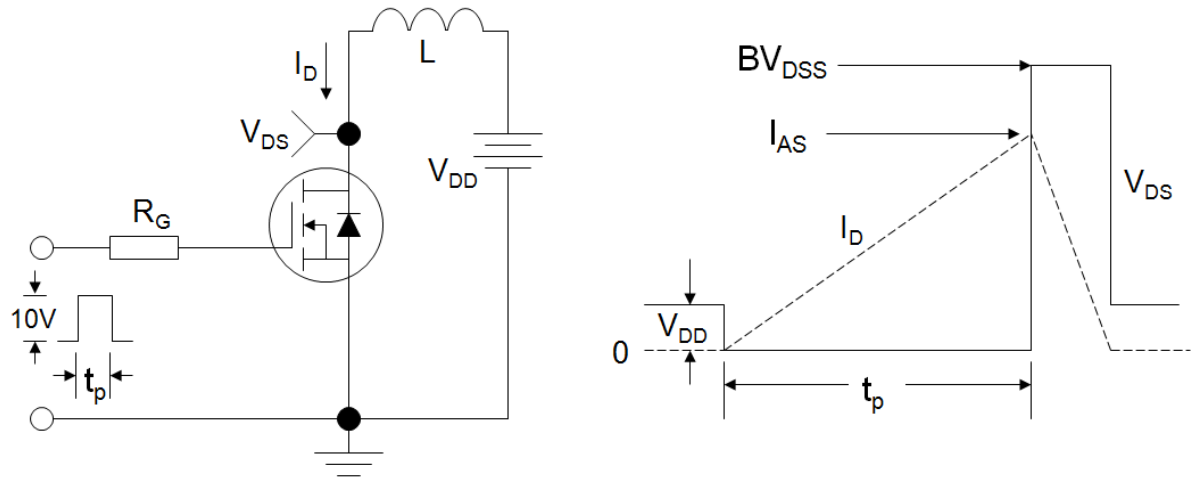
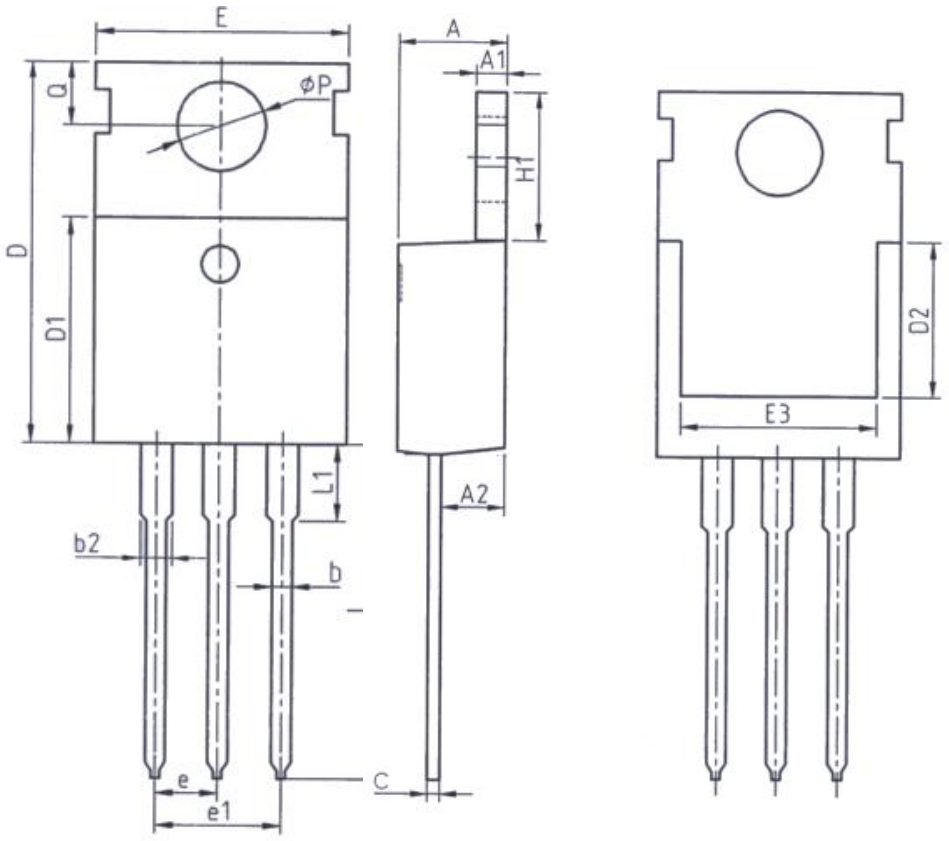


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



TO-220



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	–

Unit: mm		
Symbol	Min.	Max.
E	9.70	10.30
E3	7.00	–
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	13.80
L1	–	3.40
P	3.40	3.80
Q	2.60	3.00

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