

TMG120N15T

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

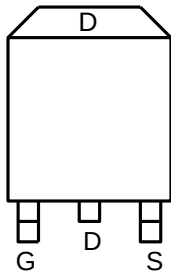
General Features

$V_{DS} = 150V$ $I_D = 120A$

$R_{DS(ON)} = 9.5 m\Omega (typ.) @ V_{GS} = 10V$

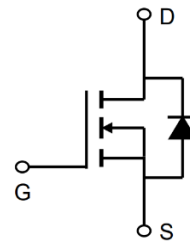
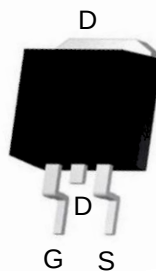
100% UIS Tested

100% R_g Tested



Marking: G120N15

T:TO-263-3L



Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	120	A
	$T_C = 100^\circ C$		76	
Pulsed Drain Current ¹		I_{DM}	352	A
Single Pulse Avalanche Energy ²		EAS	204.8	mJ
Total Power Dissipation	$T_C = 25^\circ C$	P_D	178.6	W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	R_{θJA}	52	$^\circ C/W$
Thermal Resistance from Junction-to-Case	R_{θJC}	0.7	$^\circ C/W$

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Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	150	-	-	V
Gate-body Leakage Current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = 150V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	100	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.7	2.5	V
Drain-Source On-Resistance ⁴		R _{DS(on)}	V _{GS} = 10V, I _D = 20A	-	9.5	11	mΩ
Forward Transconductance ⁴		g _{fs}	V _{DS} = 10V, I _D = 20A	-	69	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C _{iss}	V _{DS} = 75V, V _{GS} = 0V, f = 1MHz	-	2910	-	pF
Output Capacitance		C _{oss}		-	268	-	
Reverse Transfer Capacitance		C _{rss}		-	9.4	-	
Gate Resistance		R _g	f = 1MHz	-	3.2	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q _g	V _{GS} = 10V, V _{DS} = 75V, I _D = 20A	-	45	-	nC
Gate-Source Charge		Q _{gs}		-	15	-	
Gate-Drain Charge		Q _{gd}		-	8.5	-	
Turn-On Delay Time		t _{d(on)}	V _{GS} =10V, V _{DD} = 75V, R _G = 3Ω, I _D = 20A	-	16	-	ns
Rise Time		t _r		-	12	-	
Turn-Off Delay Time		t _{d(off)}		-	30	-	
Fall Time		t _f		-	18	-	
Body Diode Reverse Recovery Time		t _{rr}	I _F =20A, dI/dt=100A/μs	-	76	-	ns
Body Diode Reverse Recovery Charge		Q _{rr}		-	182	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V _{SD}	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current	T _C =25°C	I _S	-	-	-	120	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)} = 150°C
2. The EAS data shows Max. rating. The test condition is V_{DD} = 50V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 32A.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper. The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.



Typical Characteristics

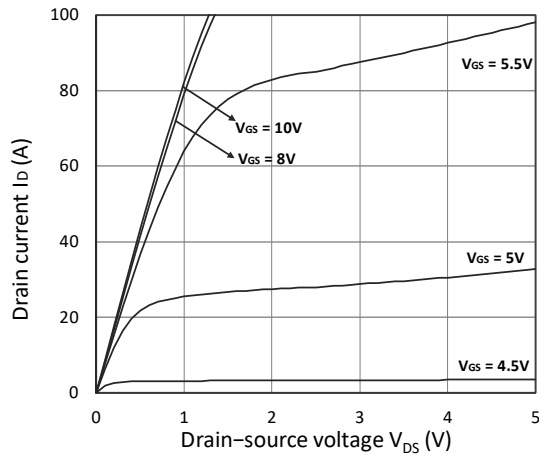


Figure 1. Output Characteristics

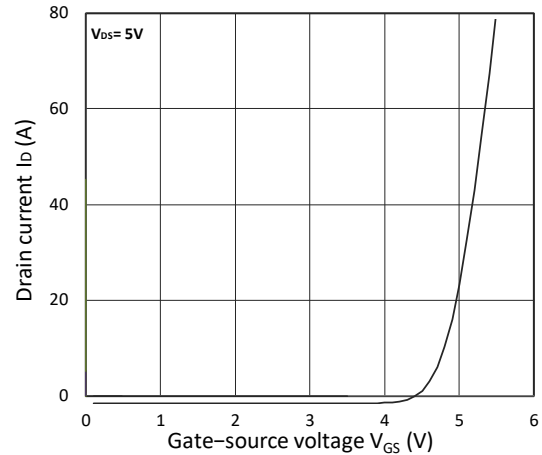


Figure 2. Transfer Characteristics

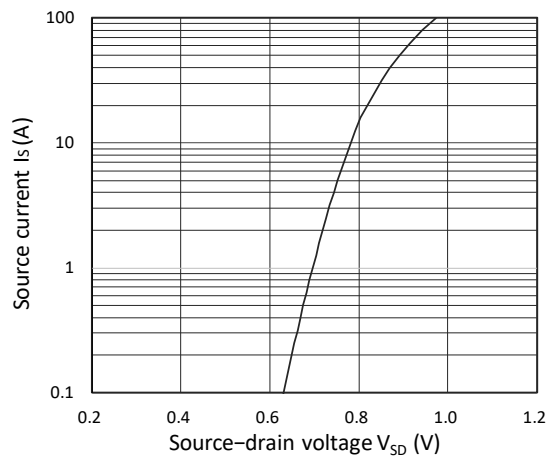
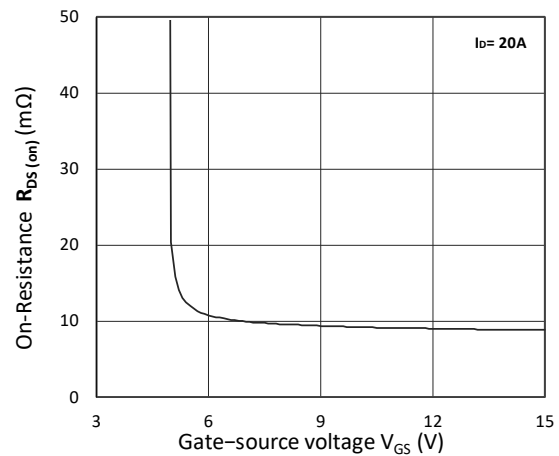
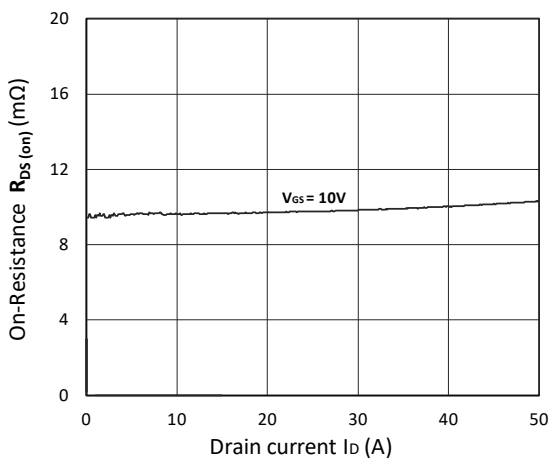
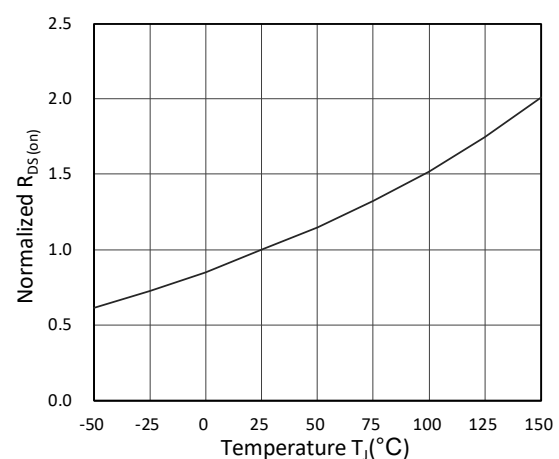


Figure 3. Forward Characteristics of Reverse

Figure 4. $R_{DS(on)}$ vs. V_{GS} Figure 5. $R_{DS(on)}$ vs. I_D Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

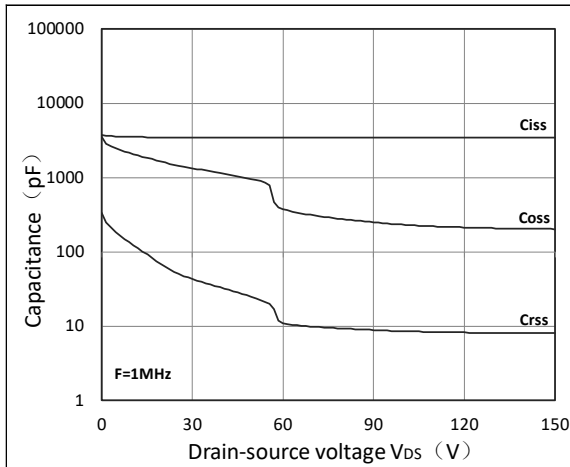


Figure 7. Capacitance Characteristics

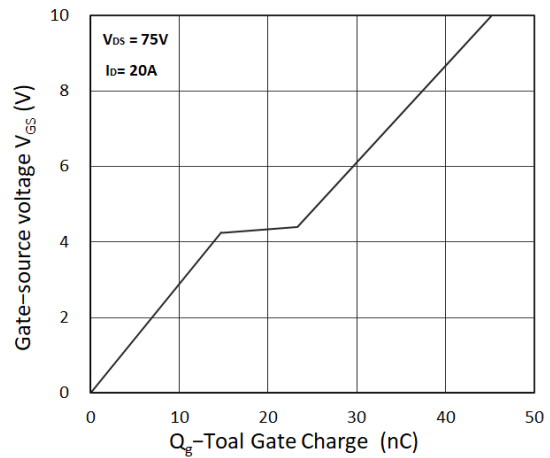


Figure 8. Gate Charge Characteristics

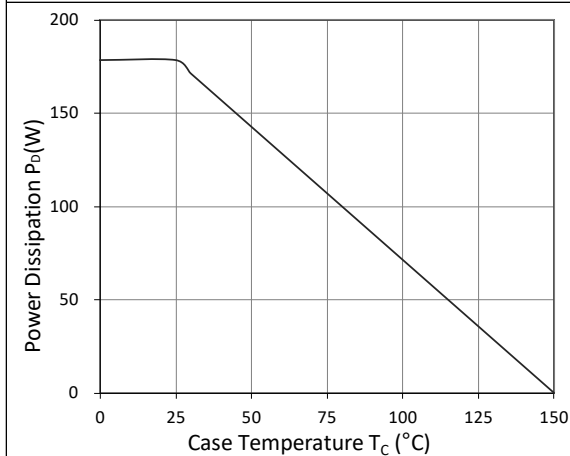


Figure 9. Power Dissipation

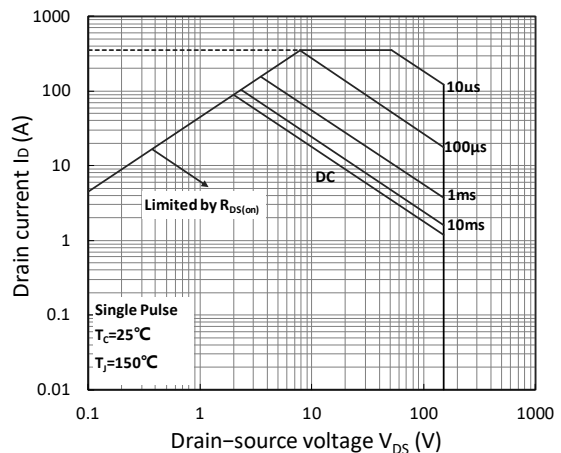


Figure 10. Safe Operating Area

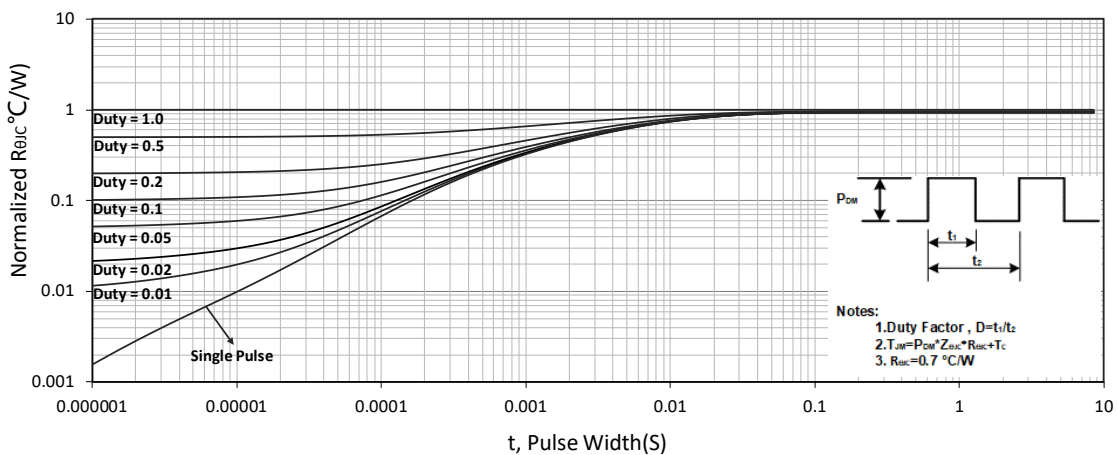


Figure 11. Normalized Maximum Transient Thermal Impedance



Test Circuit

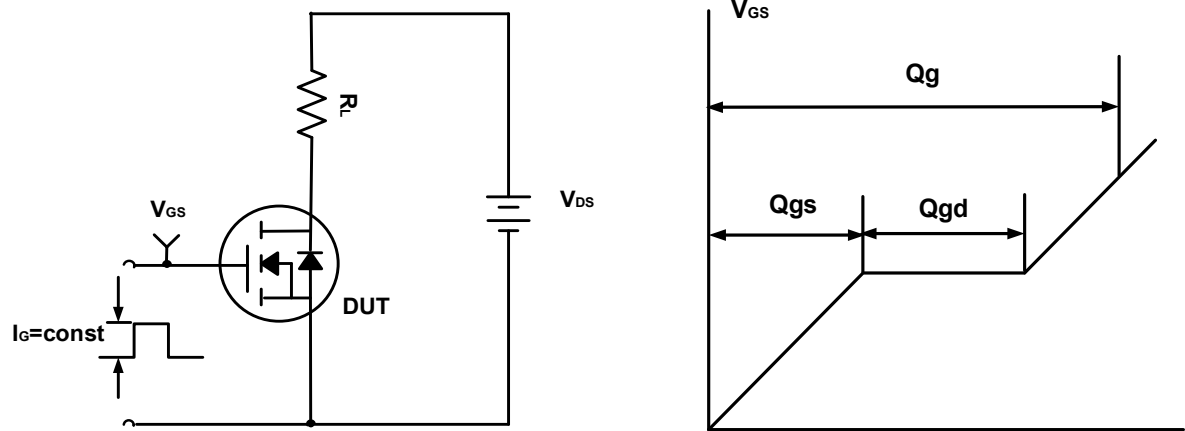


Figure A. Gate Charge Test Circuit & Waveforms

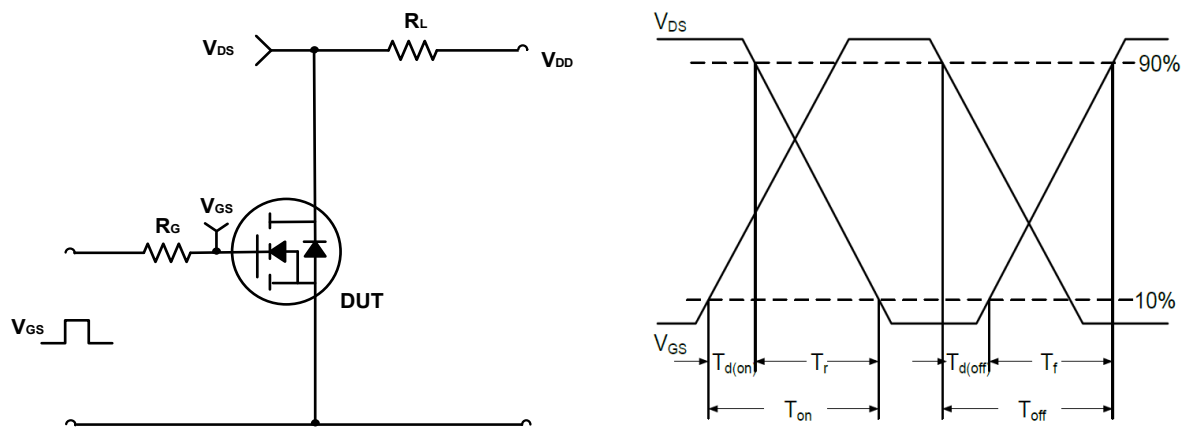


Figure B. Switching Test Circuit & Waveforms

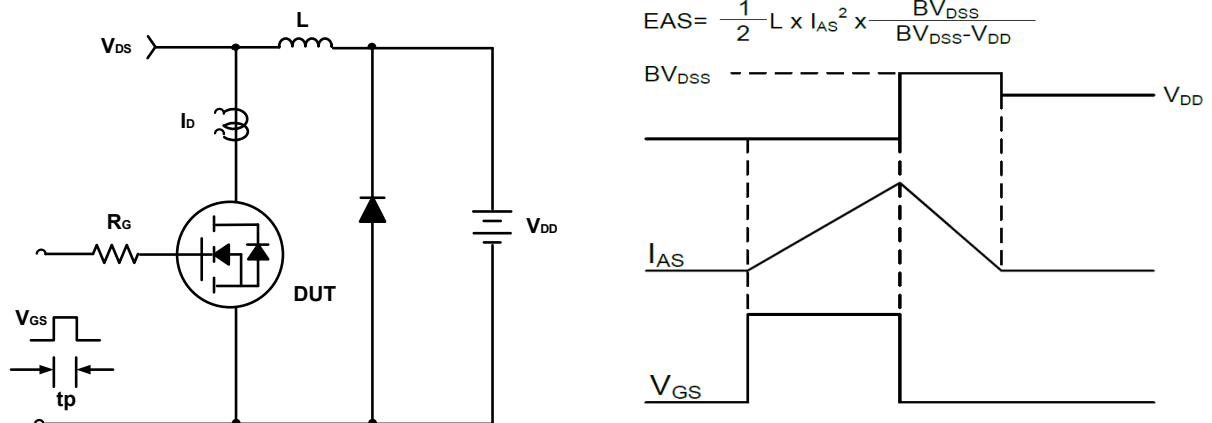
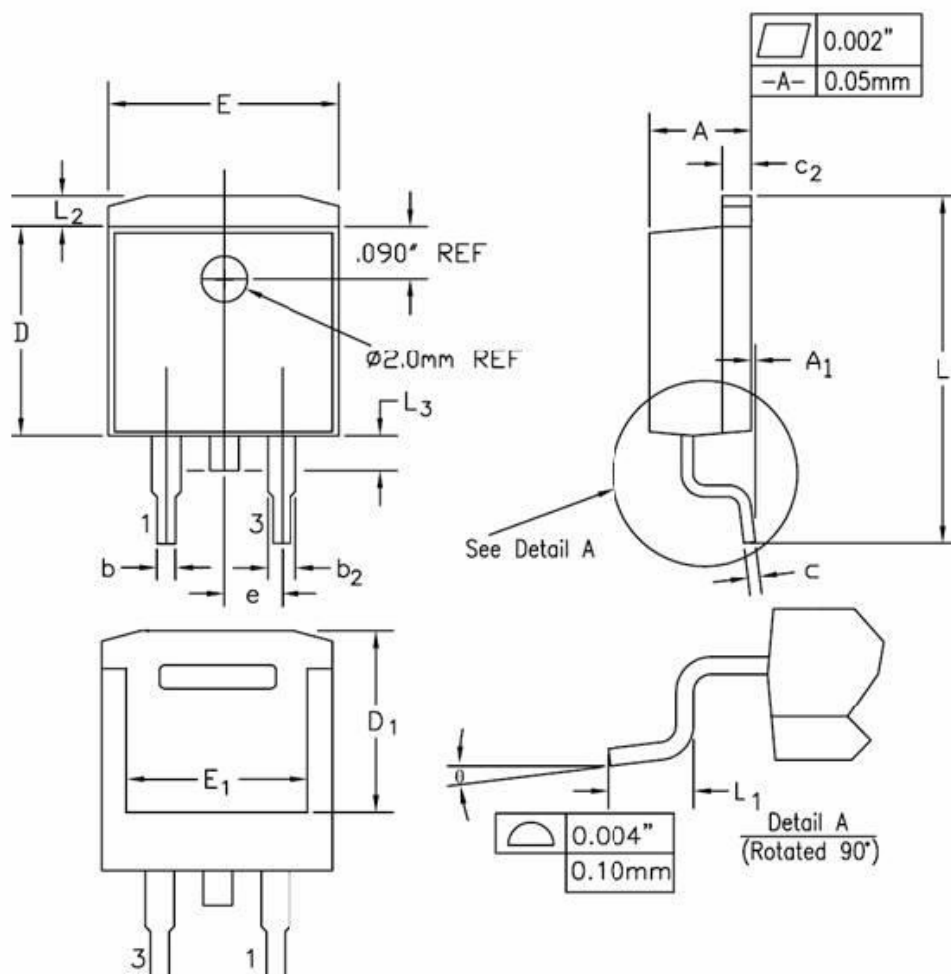


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Package Information:TO-263-3L



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.170	0.180	4.32	4.57	
A1	-	0.010	-	0.25	
b	0.028	0.037	0.71	0.94	
b2	0.045	0.055	1.15	1.40	
c	0.018	0.024	0.46	0.61	
c2	0.048	0.055	1.22	1.40	
D	0.350	0.370	8.89	9.40	
D1	0.315	0.324	8.01	8.23	
E	0.395	0.405	10.04	10.28	
E1	0.310	0.318	7.88	8.08	
e	0.100 BSC.		2.54 BSC.		
L	0.580	0.620	14.73	15.75	
L1	0.090	0.110	2.29	2.79	
L2	0.045	0.055	1.15	1.39	
L3	0.050	0.070	1.27	1.77	
θ	0°	8°	0°	8°	