120N10

N-Channel Enhancement-Mode MOSFET (100V, 120A)

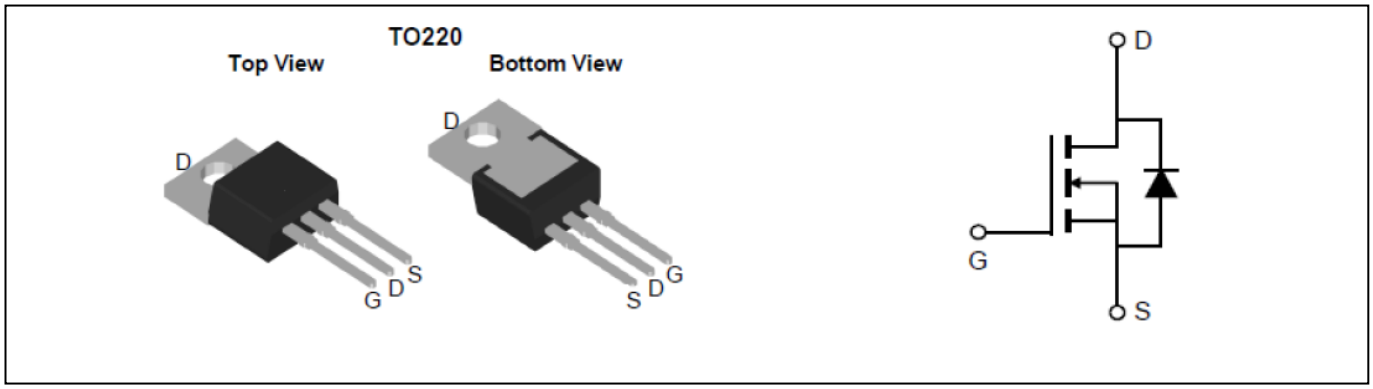
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(on)}$ (mΩ) Max
100V	120A	4.3 @ V_{GS} = 10 V,I_D=88A

Features

- Special process technology for high ESD capability
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation
- Ordering information: 120N10 - (Lead (Pb) - free and halogen - free)

Application

- Motor Drives
- UPS (Uninterruptible Power Supplies)
- DC/DC converter
- General purpose applications



Absolute Maximum Ratings (T_A=25℃, unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current (Continuous)	120	A
I_{DM}	Drain Current (Pulsed)	480	A
P_D	Total Power Dissipation @T_C=25℃	230	W
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	℃
I_{AS}	Avalanche Current with Single Pulse(L=0.5mH)	24	A
E_{AS}	Avalanche Energy with Single Pulse(L=0.5mH)	144	mJ
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62.5	℃/W

Electrical Characteristics (T_A=25℃, unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=80V, V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
• On Characteristics[c]						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	2	-	4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=50A	-	4.0	4.5	mΩ
R_g	Gate Resistance	V_{DS}=0V, V_{GS}=0V, f= 1MHz	-	3.3	-	Ω
g_{fs}	Forward Transconductance	V_{DS}=50V, I_D=20A	-	40	-	S
• Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=50V, V_{GS}=0V, f=1MHz	-	6900	-	pF
C_{oss}	Output Capacitance		-	1250	-	
C_{rss}	Reverse Transfer Capacitance		-	47	-	
• Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=50V, I_D=20A, V_{GS}=10V	-	117	-	nC
Q_{gs}	Gate-Source Charge		-	40	-	
Q_{gd}	Gate-Drain Charge		-	37	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=50V, R_L=2.5Ω, I_D=20A, V_{GS}=10V, R_G=10Ω	-	48	-	nS
t_r	Turn-on Rise Time		-	56	-	
$t_{d(off)}$	Turn-off Delay Time		-	75	-	
t_f	Turn-off Fall Time		-	33	-	
• Drain-Source Diode Characteristics						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_{SD}=50A	-	-	1.3	V

Note:
c: Guaranteed by design , not subject to production testing .

Typical Performance Characteristics

Figure 1: Output Characteristics

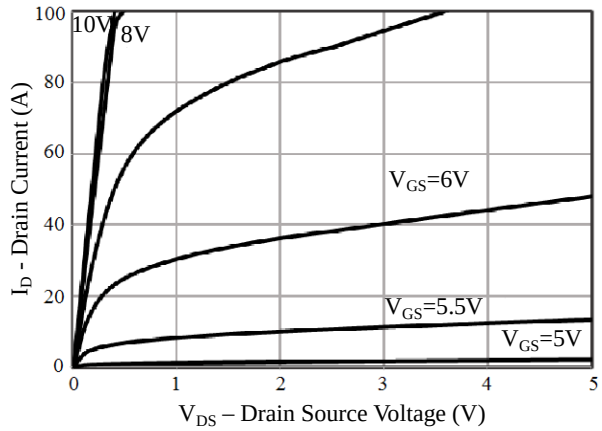


Figure 2: Transfer Characteristics

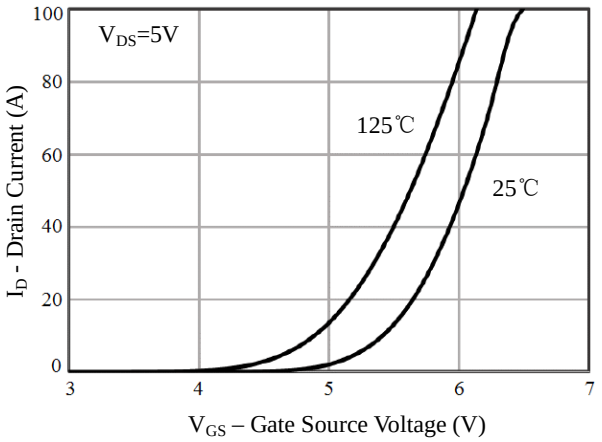


Figure 3: On-Resistance vs. I_D and V_{GS}

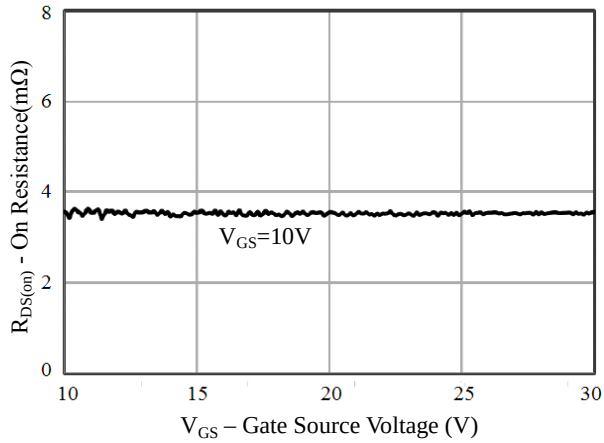


Figure 4: On-Resistance vs. Junction Temperature

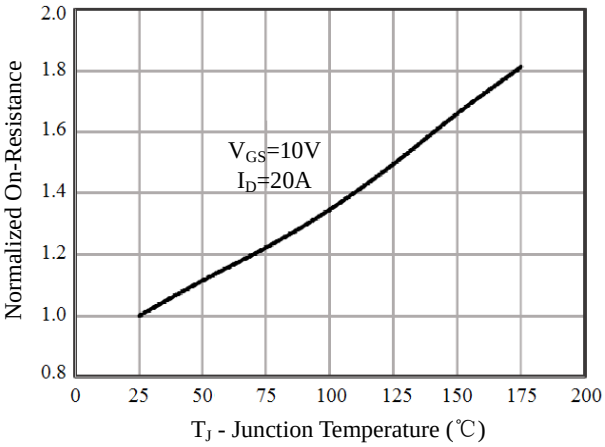


Figure 5: On-Resistance vs. Gate-Source Voltage

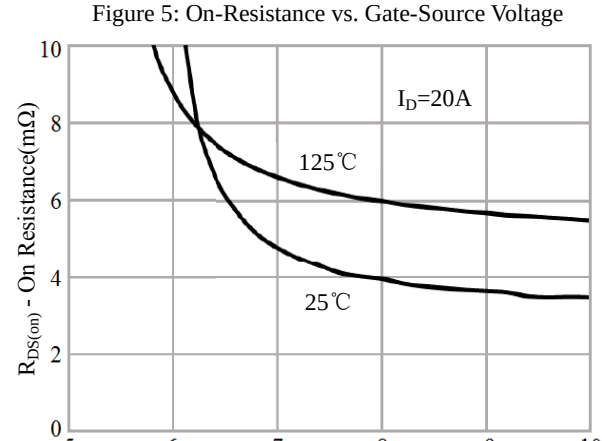
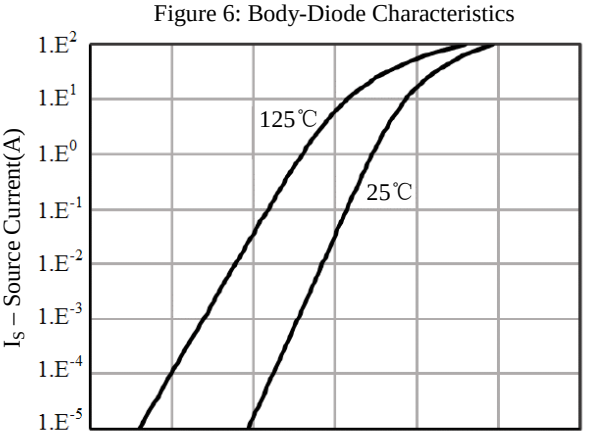


Figure 6: Body-Diode Characteristics



Typical Performance Characteristics

Figure 7 Gate-Charge Characteristics

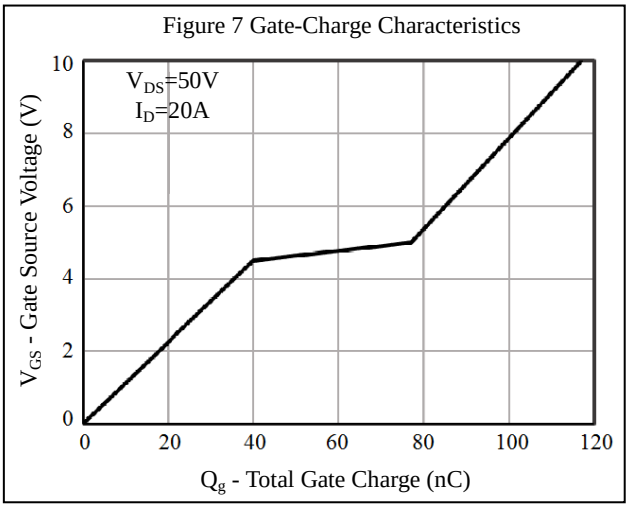


Figure 8: Capacitance Characteristics

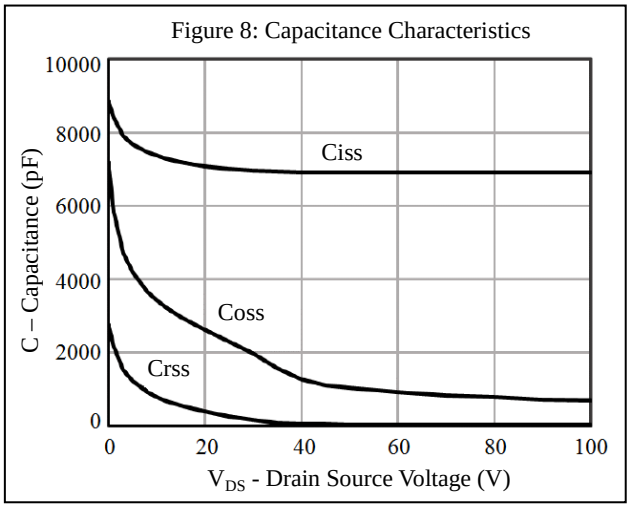
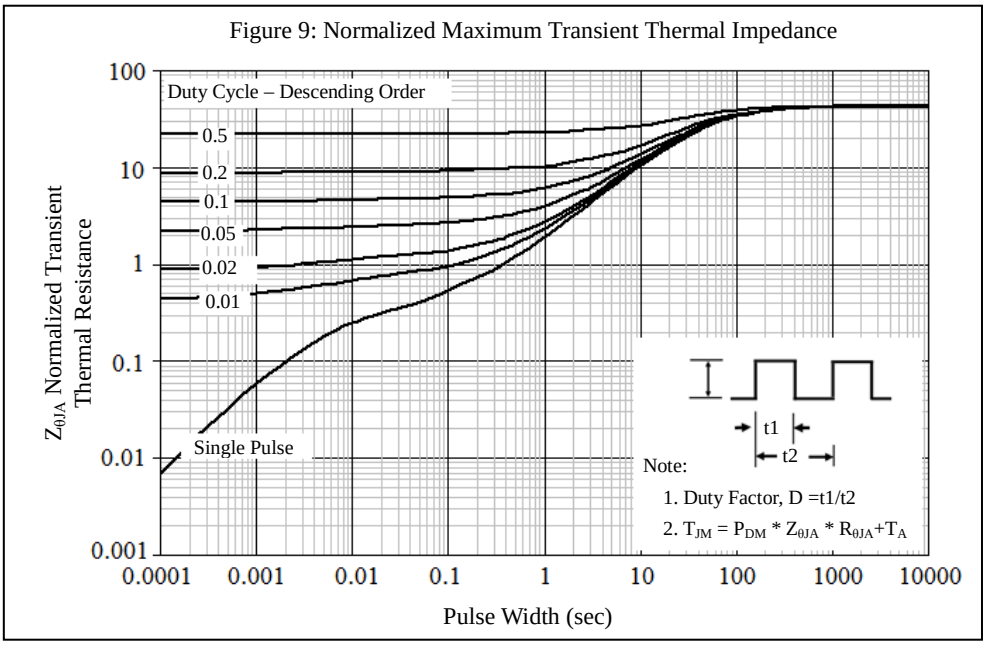
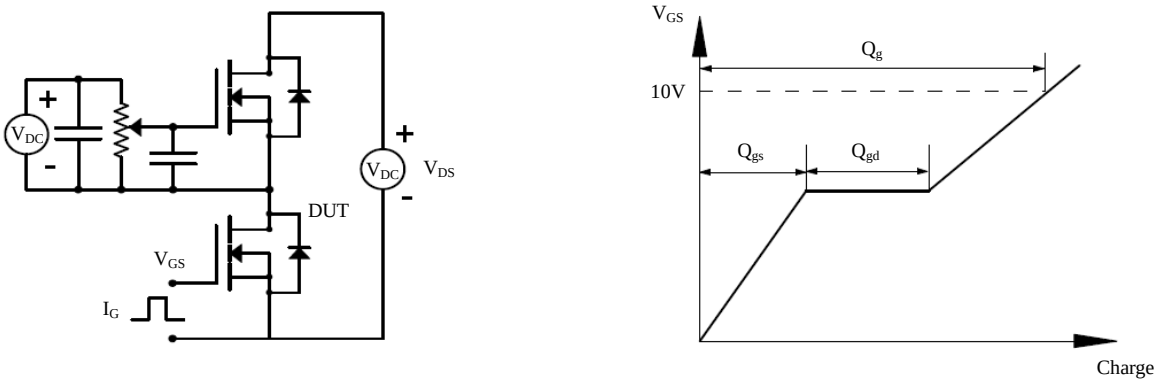


Figure 9: Normalized Maximum Transient Thermal Impedance

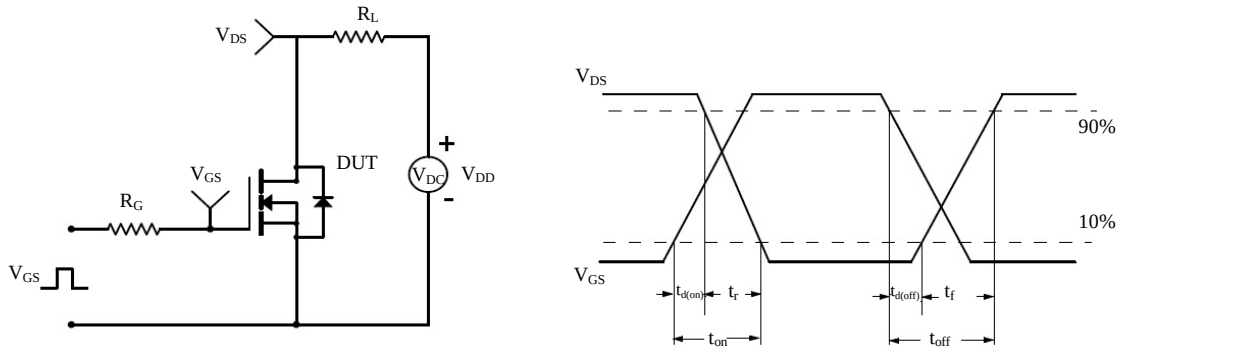


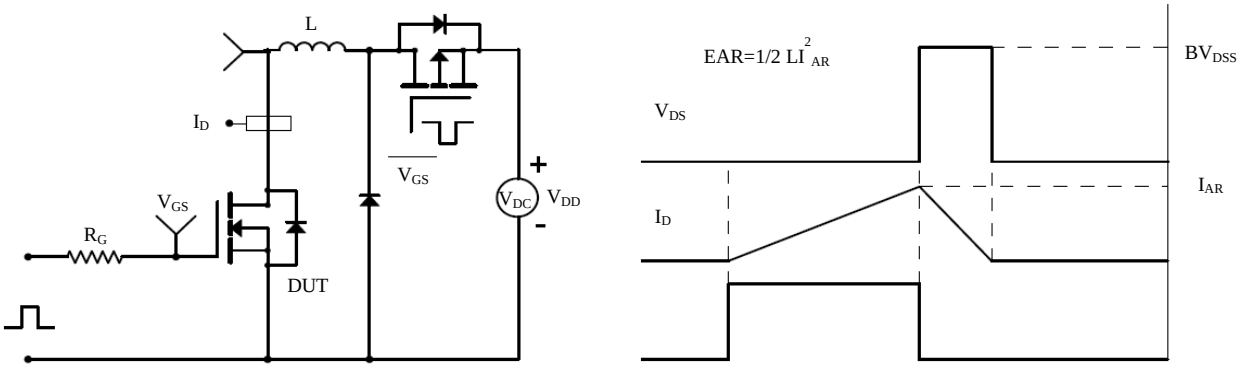
Test Circuit & Waveform

Gate Charge Test Circuit & Waveform

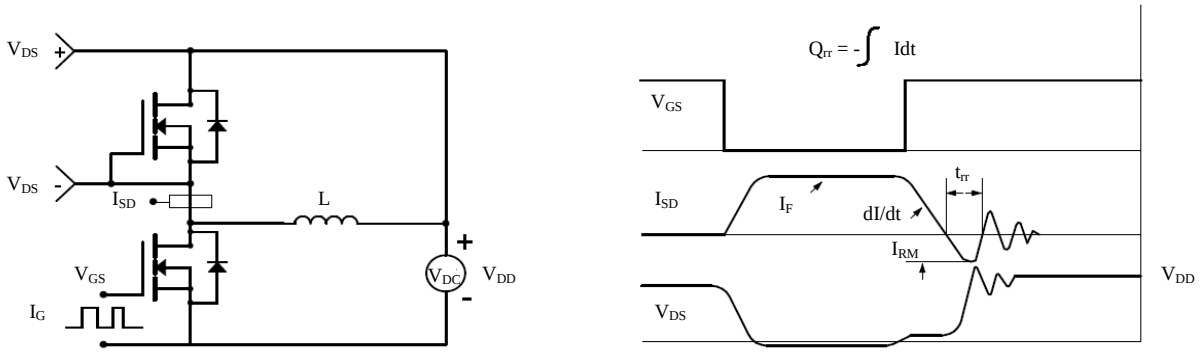


Resistive Switching Test Circuit & Waveforms

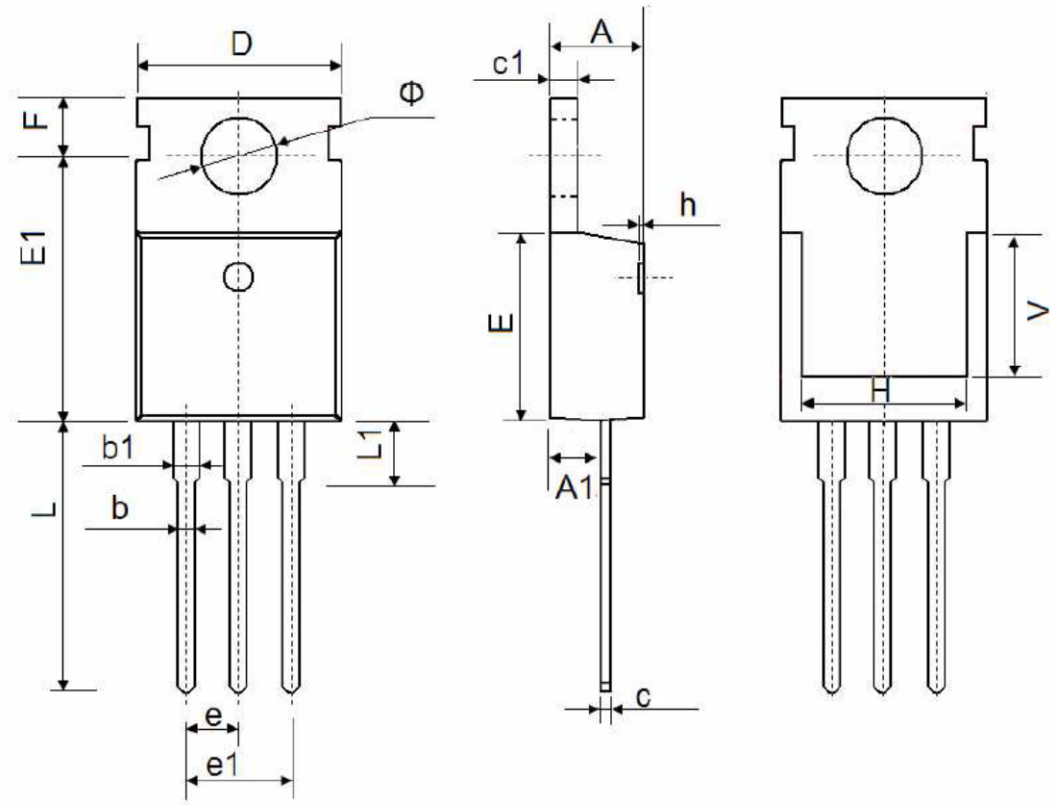




Diode Recovery Test Circuit & Waveforms



Package Outline: TO-220-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF		0.295 REF	
Φ	3.400	3.800	0.134	0.150