

N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY

BV_{DSS}	30V
$R_{DS(on)(MAX.)}$	0.0028 Ω
I_D	150A

FEATURES

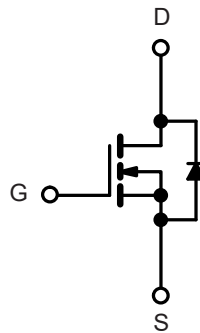
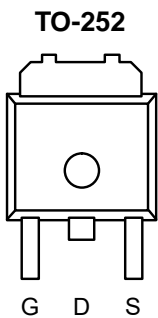
- TrenchFET[®] Power MOSFET
- 100 % R_g and UIS Tested
- Low Thermal Resistance Package



RoHS
COMPLIANT

APPLICATIONS

- OR-ing
- Server
- DC/DC



N-Channel MOSFET

Absolute Maximum Ratings ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current@10V	I_D	$T_C = 25\text{ }^\circ\text{C}$	150
		$T_C = 100\text{ }^\circ\text{C}$	80
Pulsed Drain Current	I_{DM}	450	A
Single Pulse Avalanche Energy	E_{AS}	580	mJ
Avalanche Current	I_{AS}	60	A
Total Power Dissipation	P_D	59.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	TYP.	MAX.	Unit
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	-	62	$^\circ\text{C} / \text{W}$
Thermal resistance, junction-to-case	$R_{\theta JC}$	-	2.1	

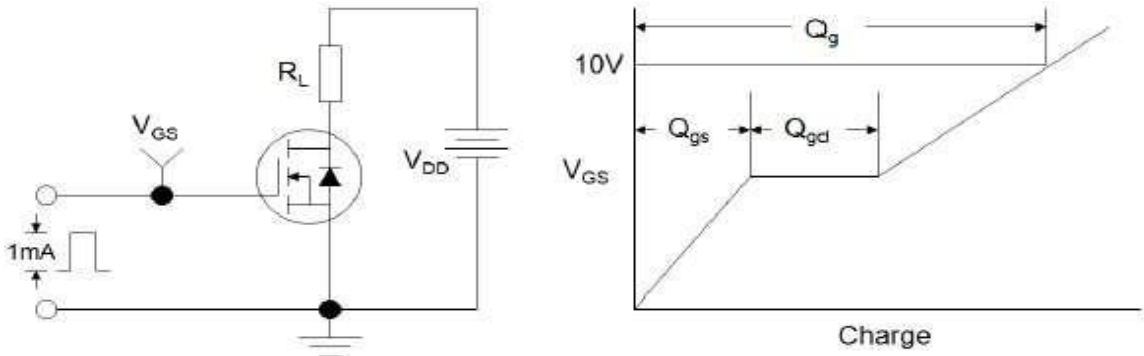
Electrical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	30	-	-	V
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 25\ ^\circ\text{C}$	-	-	1	μA
		$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\ ^\circ\text{C}$	-	-	50	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.0		3.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	-	0.0021	0.0028	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 30\text{ A}$	-	0.003	0.0036	
Forward Transconductance	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 30\text{ A}$	-	73	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	-	6279	-	μF
Output Capacitance	C_{oss}		-	1024	-	
Reverse Transfer Capacitance	C_{rss}		-	720	-	
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 24\text{ V}, V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	-	145	-	nC
Gate-Source Charge	Q_{gs}		-	19	-	
Gate-Drain Charge	Q_{gd}		-	45	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, I_D \cong 30\text{ A}, V_{GEN} = 10\text{ V}, R_G = 4.7\ \Omega$	-	22	-	nS
Rise Time	t_r		-	60	-	
Turn-Off Delay Time	$t_{d(off)}$		-	160	-	
Fall Time	t_f		-	79	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	V_{SD}	$I_S = 45\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.4	V
Continuous Source-Drain Diode Current	I_S	$T_J = 25\ ^\circ\text{C}$	-	-	110	A
Continuous Source Current	I_{SM}		-	-	440	A
Reverse Recovery Charge	Q_{rr}	$T_J = 25\ ^\circ\text{C}, I_F = 30\text{ A}, di/dt = 100$	-	12	-	nC
Reverse Recovery Time	t_{rr}	A/ μs	-	28	-	ns

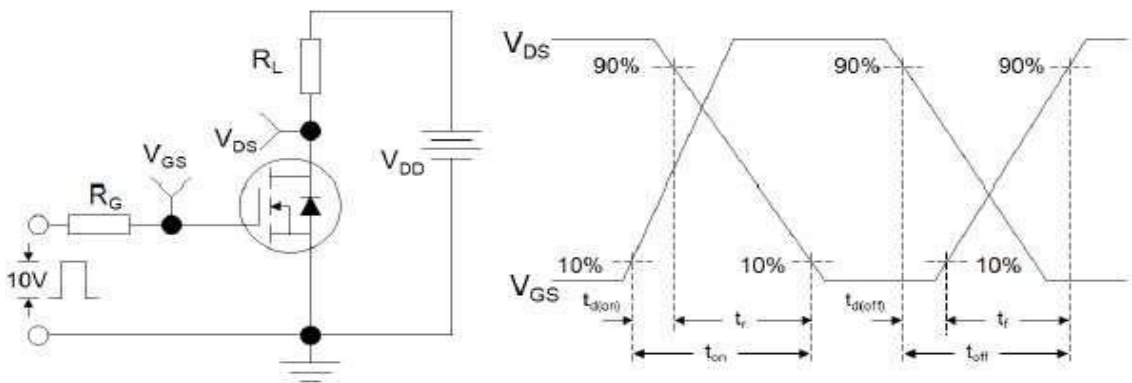
Notes

- Repetitive rating : pulse width limited by junction temperature.
- $L = 0.5\text{ mH}, I_{AS} = 48\text{ A}, V_{DD} = 30\text{ V}, R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
- $I_{SD} \leq 30\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
- Pulse Test : Pulse Width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

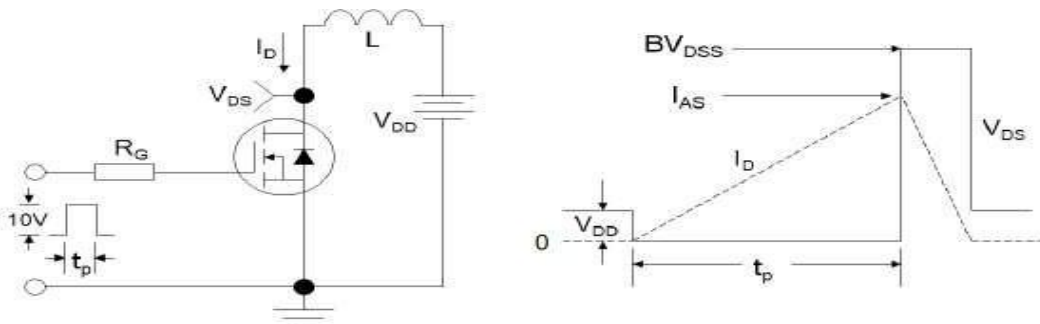
Test circuit and Waveform



Gate Charge Test Circuit & Waveform

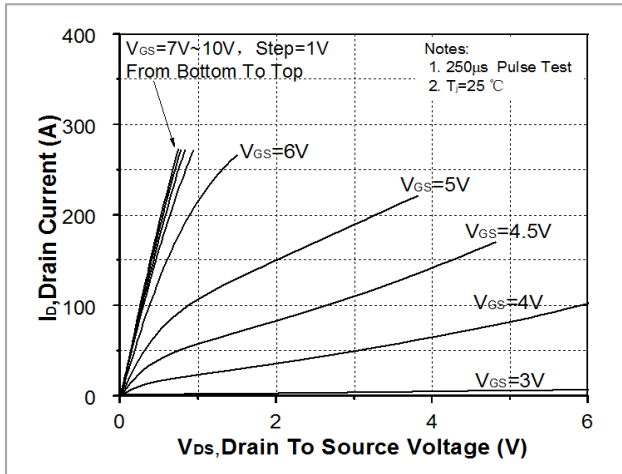


Resistive Switching Test Circuit & Waveforms

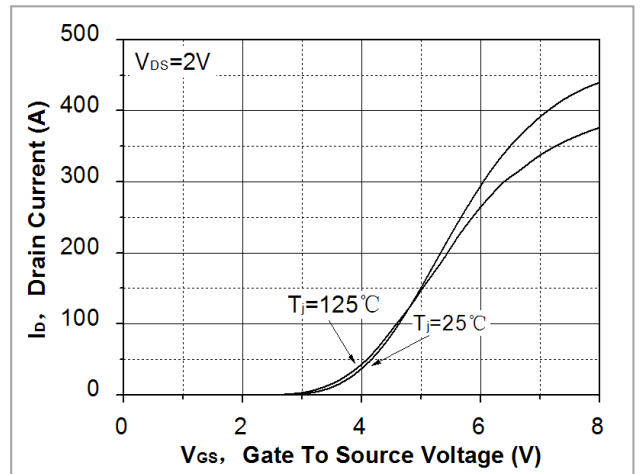


Unclamped Inductive Switching Test Circuit & Waveforms

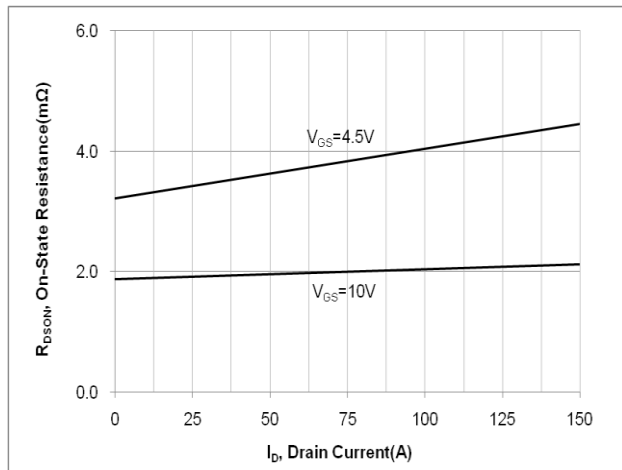
TYPICAL CHARACTERISTICS (25 °C unless noted)



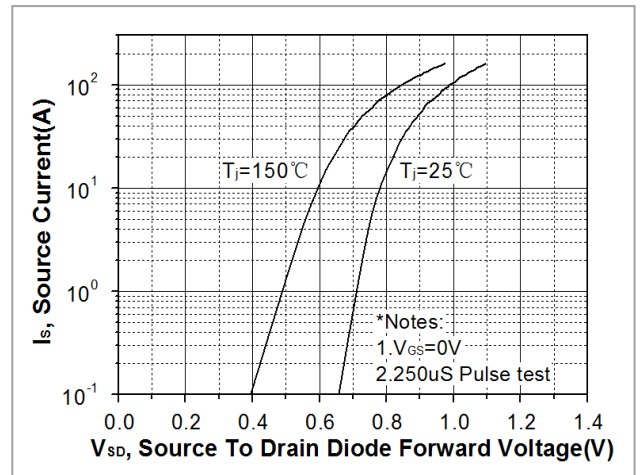
On-state characteristics



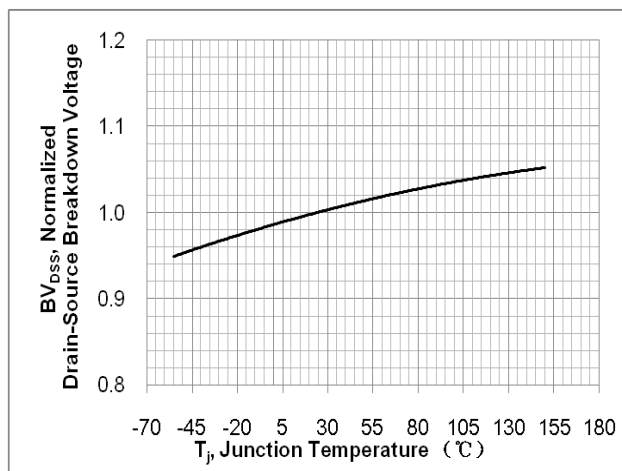
Transfer Characteristics



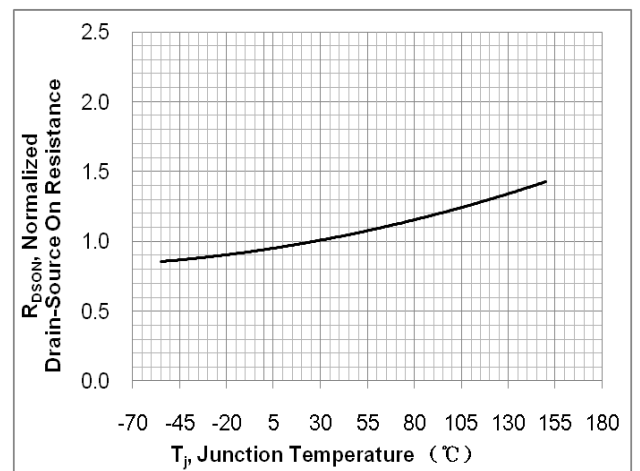
On-resistance variation vs. drain current and gate voltage



On-state current vs. diode forward voltage

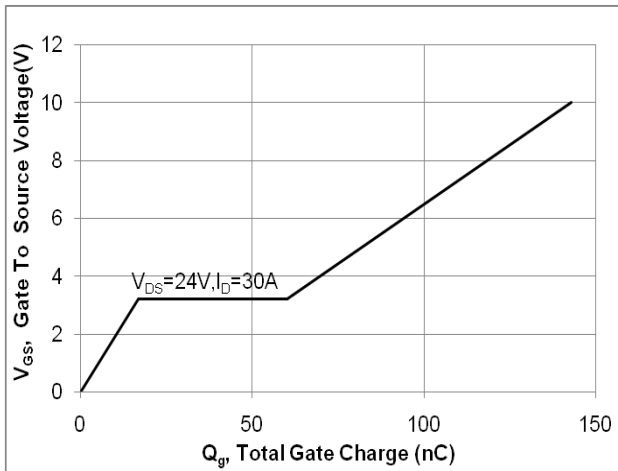


Breakdown voltage variations vs. junction temperature

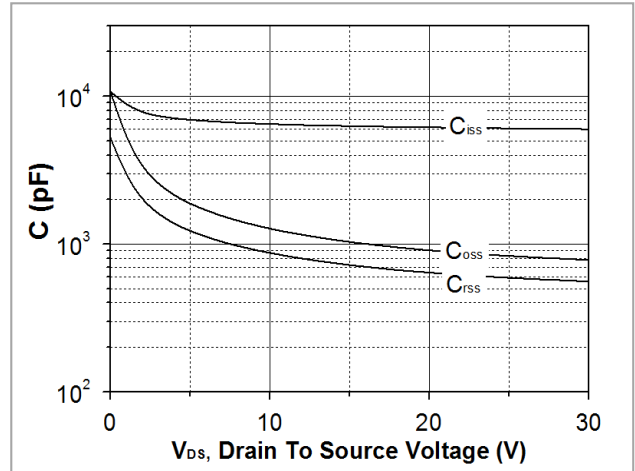


On-resistance variations vs. junction temperature

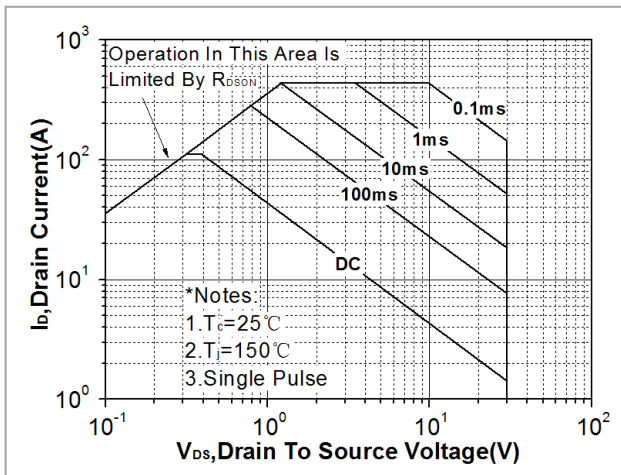
TYPICAL CHARACTERISTICS (25 °C unless noted)



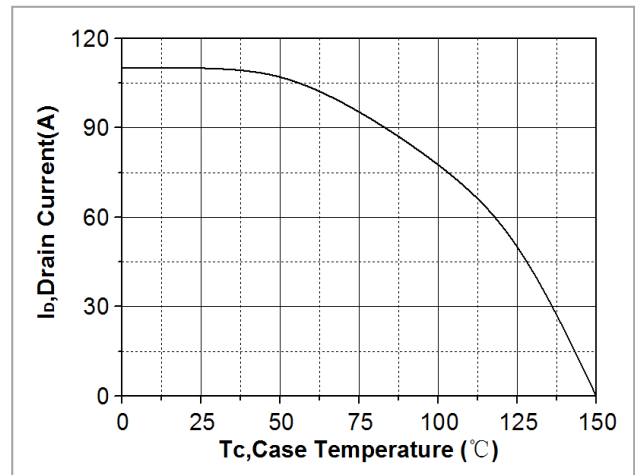
Gate charge characteristics



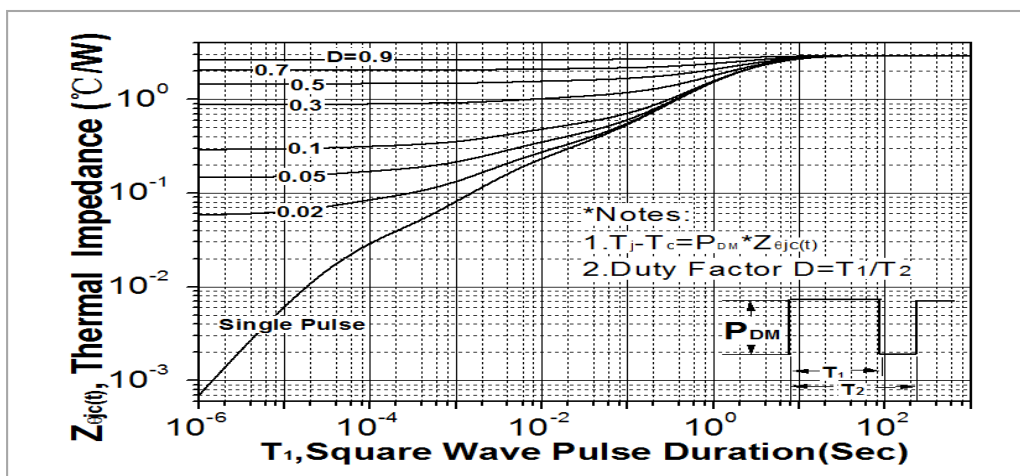
Capacitance Characteristics



Maximum safe operating area



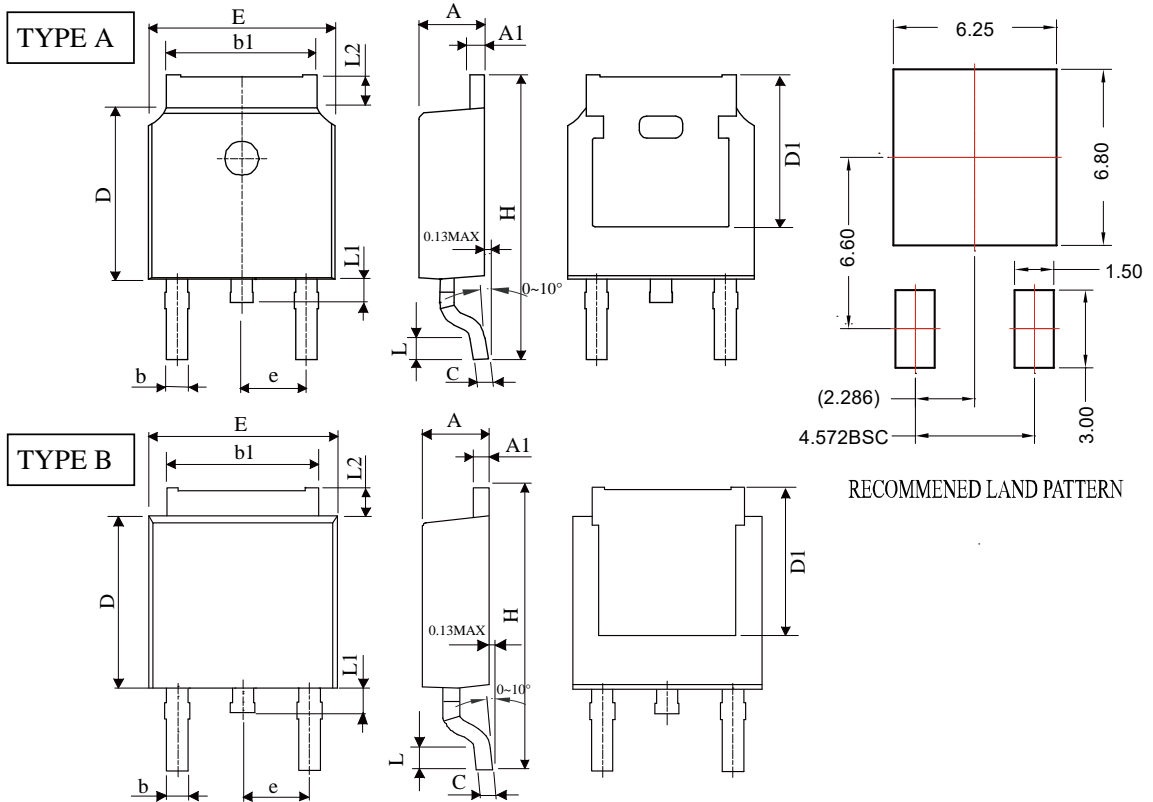
Maximum drain current vs. case temperature



Transient thermal response curve

TO-252

Unit: mm



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.20	2.40	0.087	0.094
A1	0.45	0.89	0.018	0.035
b	0.50	0.90	0.019	0.035
b1	4.95	5.59	0.195	0.220
C	0.40	0.61	0.016	0.024
D	5.40	6.63	0.213	0.261
E	6.05	7.10	0.238	0.280
e	1.98	2.59	0.078	0.102
H	8.80	10.6	0.346	0.417
L	0.25	1.350	0.010	0.053
L1	0.50	1.20	0.020	0.047
L2	0.70	1.78	0.028	0.070
D1	5.00	5.60	0.197	0.220