

AP1310

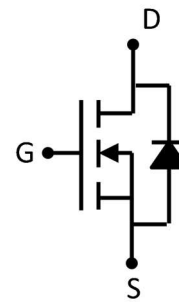
N-Channel Enhancement Mosfet

AIPOWER

DATA SHEET

Feature

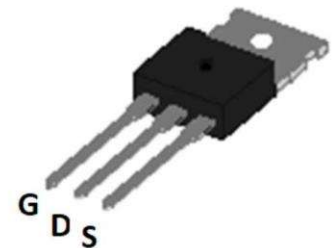
- 100V,50A
 $R_{DS(ON)} < 16m\Omega @ V_{GS}=10V$ (TYP:14m Ω)
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management



TO-220C

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
1310	AP1310	TO-220	13 inch	-	1000

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a=25^\circ\text{C}$)	I_D	50	A
Continuous Drain Current ($T_a=100^\circ\text{C}$)	I_D	32.5	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	200	A
Singel Pulsed Avalanche Energy ⁽²⁾	E_{AS}	32	mJ
Power Dissipation	P_D	70	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.8	2.5	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	14	16	m Ω
		$V_{GS} = 4.5V, I_D = 10A$	-	18.5	23	
Forward Threshold Voltage	g_{fs}	$V_{DS} = 5V, I_D = 20A$	-	13.5	-	S
Gate Resistance	R_g	$V_{DS} = V_{GS} = 0V, f = 1MHz$	-	1.44	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$	-	1130	-	pF
Output Capacitance	C_{oss}		-	496	-	
Reverse Transfer Capacitance	C_{rss}		-	60	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50V, I_D = 20A,$ $V_{GS} = 10V, R_G = 3\Omega$	-	46	-	ns
Turn-on rise time	t_r		-	55	-	
Turn-off delay time	$t_{d(off)}$		-	249	-	
Turn-off fall time	t_f		-	105	-	
Total Gate Charge	Q_g	$V_{DS} = 50V, I_D = 20A,$ $V_{GS} = 10V$	-	30	-	nC
Gate-Source Charge	Q_{gs}		-	6	-	
Gate-Drain Charge	Q_{gd}		-	8.2	-	
Reverse Recovery Charge	Q_{rr}	$I_F = 20A, di/dt = 100A/\mu s$		224		nC
Reverse Recovery Time	T_{rr}	$I_F = 20A, di/dt = 100A/\mu s$		70		ns
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V_{DS}	$V_{GS} = 0V, I_S = 20A$	-	-	1.2	V
Diode Forward current ⁽⁴⁾	I_S		-	-	50	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^\circ\text{C}, V_{DD} = 50V, R_G = 25\Omega, L = 0.5mH$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t \leq 10$ sec

Typical Performance Characteristics

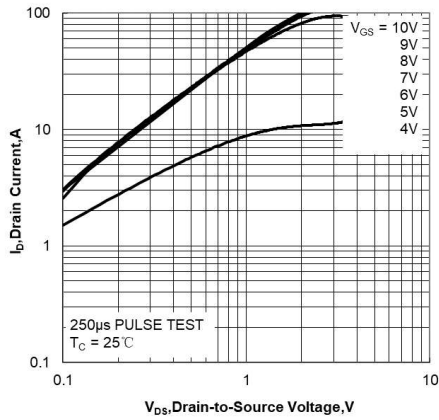


Figure 1. Output Characteristics

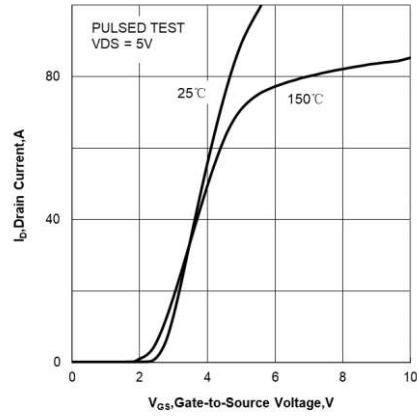


Figure 2. Transfer Characteristics

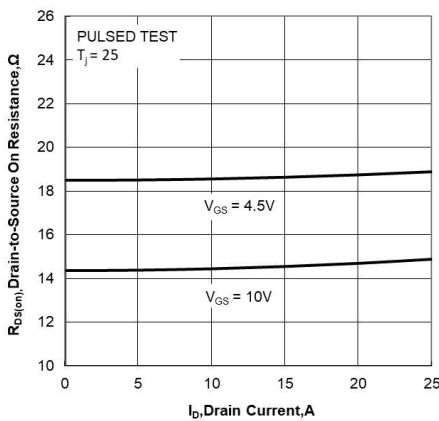


Figure 3. Drain-to-Source On Resistance vs Drain Current

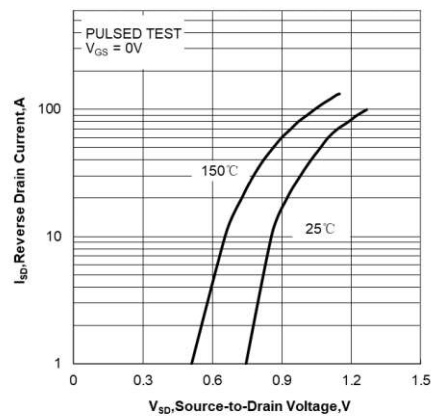


Figure 4. Body Diode Forward Voltage vs Source Current and Temperature

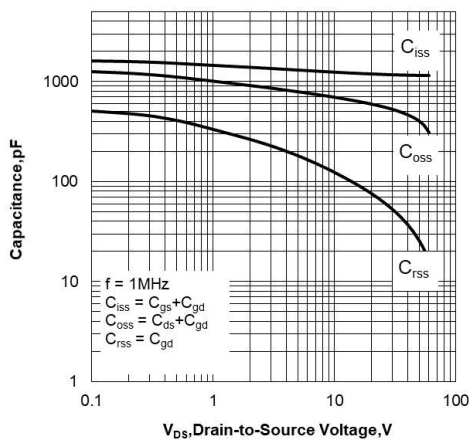


Figure 5. Capacitance Characteristics

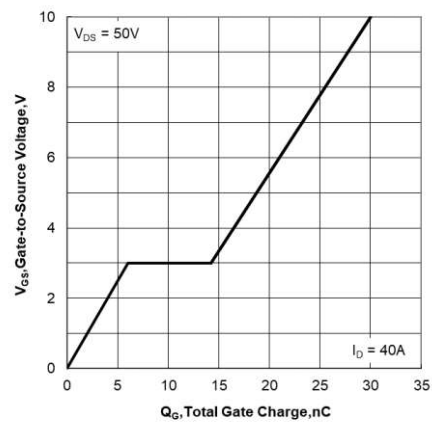


Figure 6. Gate Charge Characteristics

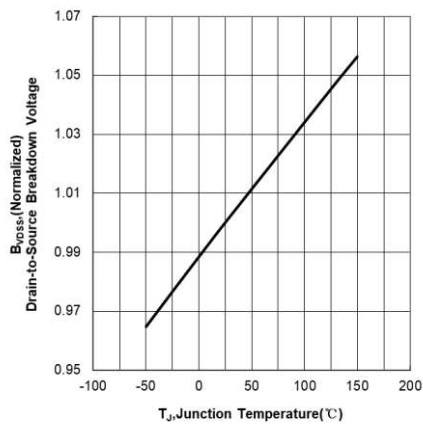


Figure 7. Normalized Breakdown Voltage vs Junction Temperature

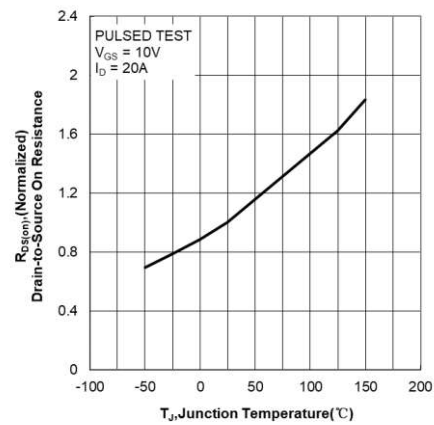


Figure 8. Normalized On Resistance vs Junction Temperature

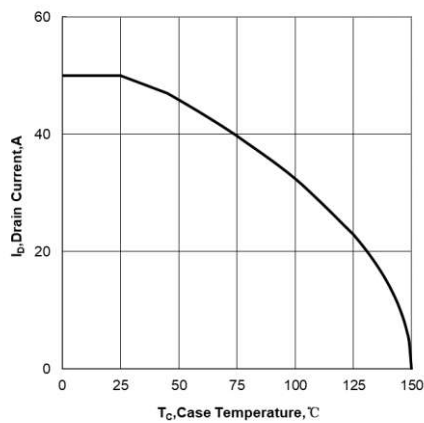


Figure 9. Maximum Continuous Drain Current vs Case Temperature

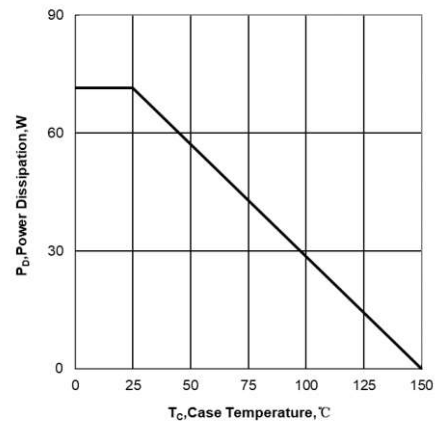


Figure 10. Maximum Power Dissipation vs Case Temperature

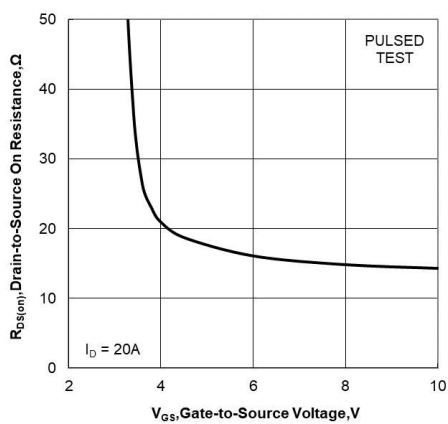


Figure 11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

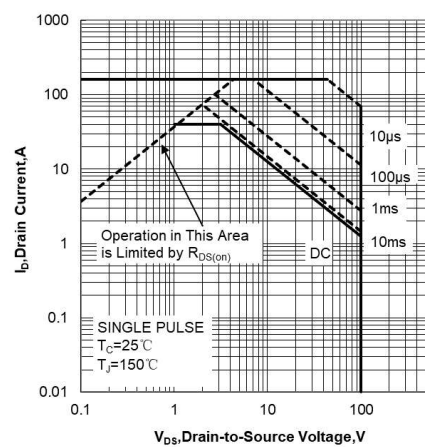


Figure 12. Maximum Safe Operating Area

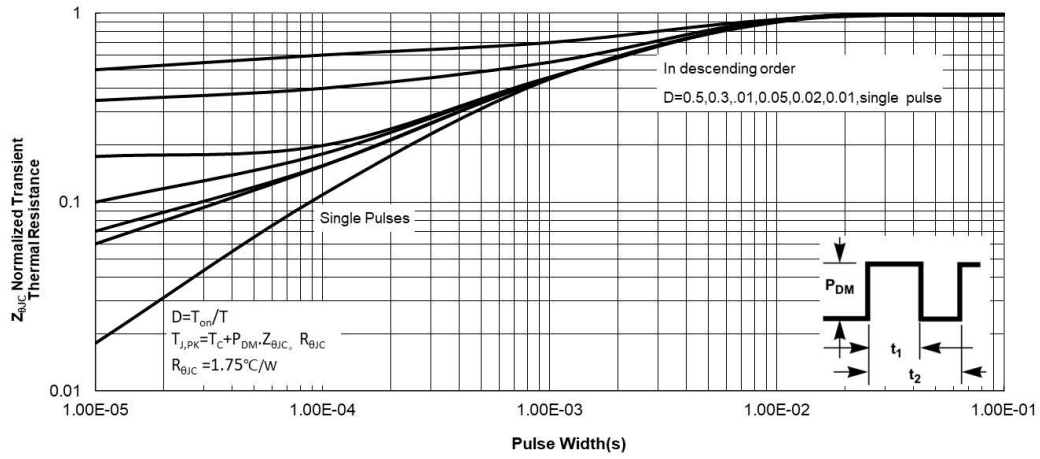
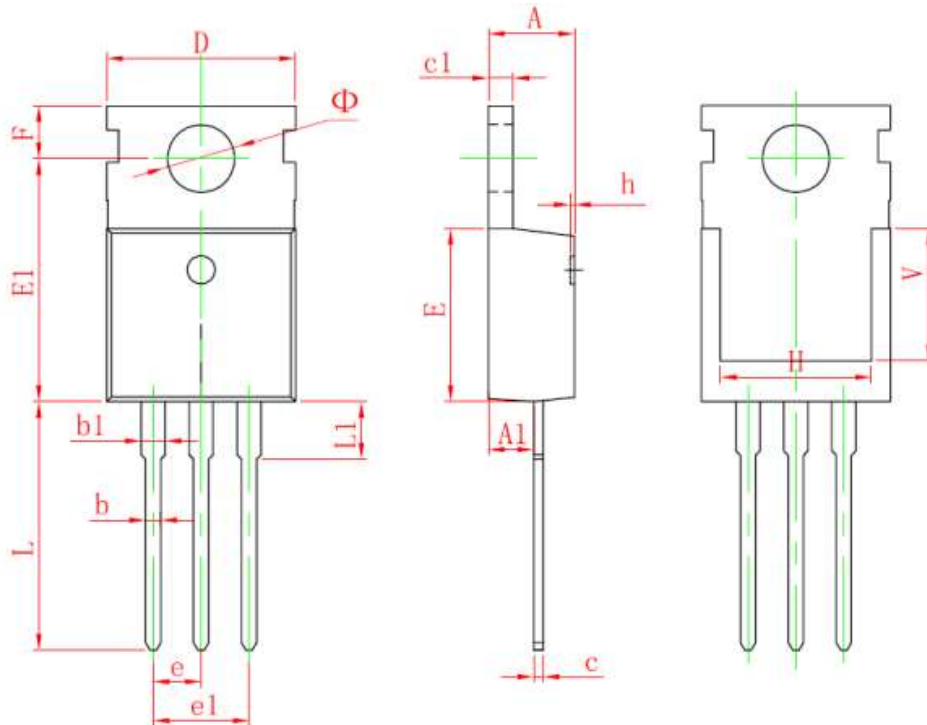


Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case

AP1310

N-Channel Enhancement Mosfet

TO220C Package Information



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	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
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	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

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