

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	3.1mΩ@10V	120A
	7mΩ@4.5V	

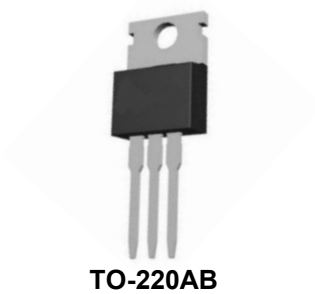
Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Suffix "-Q1" for AEC-Q101

Application

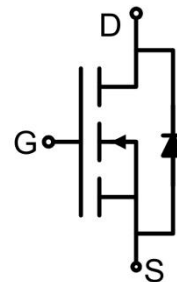
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package



TO-220AB

Circuit diagram



Marking



Absolute maximum ratings (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _D	120	A
Continuous Drain Current(T _C =100°C)	I _D (100°C)	85	A
Pulsed Drain Current	I _{DM}	480	A
Single Pulse Avalanche Energy ¹⁾	E _{AS}	1080	mJ
Power Dissipation	P _D	130	W
Thermal Resistance Junction to Case ²⁾	R _{θJC}	1.15	°C/W
Operating Junction Temperature	T _J	-55 ~ +175	°C
Storage Temperature	T _{STG}	-55 ~ +175	°C

Electrical characteristics (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V, V _{GS} =0V			1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage ²⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.9	2.5	V
Drain-source on-resistance ²⁾	R _{DS(on)}	V _{GS} =10V, I _D =20A		2.6	3.1	mΩ
		V _{GS} =4.5V, I _D =10A		5.5	7.0	
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1MHz		5000		pF
Output Capacitance	C _{oss}			898		
Reverse Transfer Capacitance	C _{rss}			351		
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =20A		90		nC
Gate-Source Charge	Q _{gs}			14		
Gate-Drain Charge	Q _{gd}			22		
Turn-on delay time	t _{d(on)}	V _{DS} =20V, V _{GS} =10V, I _D =2A R _L =1Ω, R _G =3Ω		15		nS
Turn-on rise time	t _r			18		
Turn-off delay time	t _{d(off)}			52		
Turn-off fall time	t _f			23		
Source-Drain Diode characteristics						
Diode Continuous Current ²⁾	I _S				120	A
Diode Forward voltage ³⁾	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Reverse recover time	T _{rr}	I _F =20A, di/dt =100A/us		42		nS
Reverse recovery charge	Q _{rr}	T _J =25℃		45		nC

Notes:

- 1) E_{AS} condition : T_J=25°C, V_{DD}=20V, V_G=10V, L=1mH, R_g=25Ω.
- 2) Surface Mounted on FR4 Board, t ≤ 10 sec.
- 3) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- 4) Guaranteed by design, not subject to production testing.

Typical Characteristics

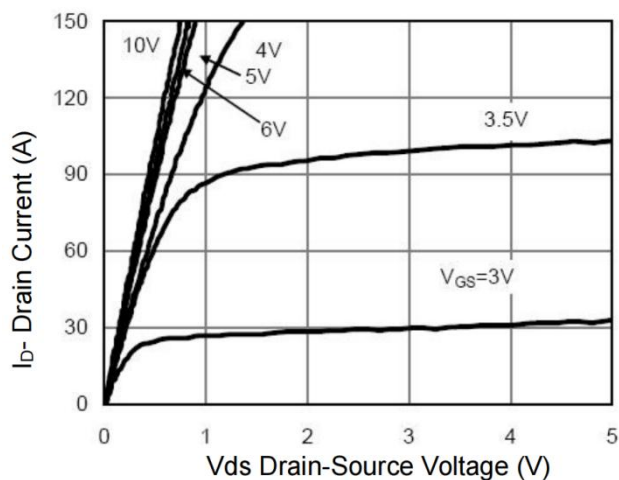


Figure 1 Output Characteristics

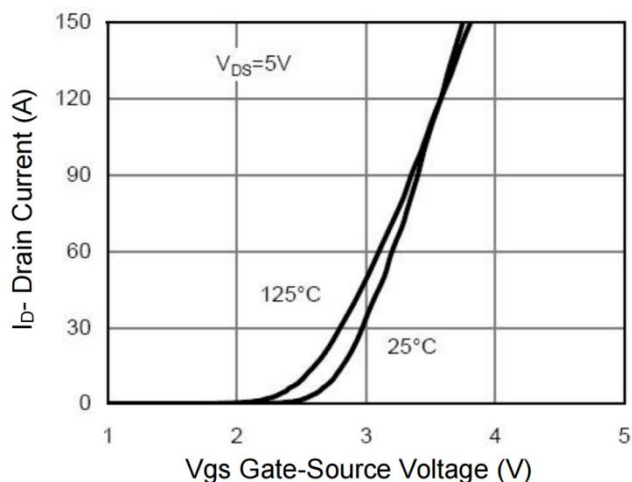


Figure 2 Transfer Characteristics

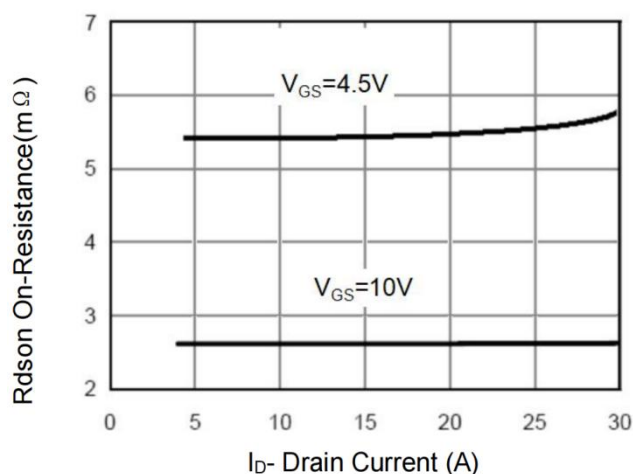


Figure 3 Rdson- Drain Current

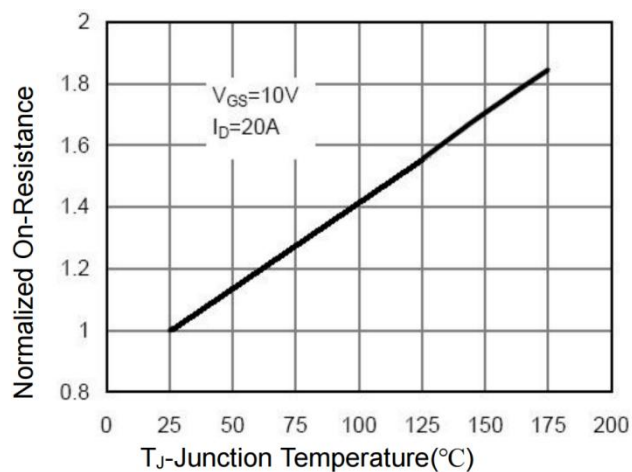


Figure 4 Rdson-Junction Temperature

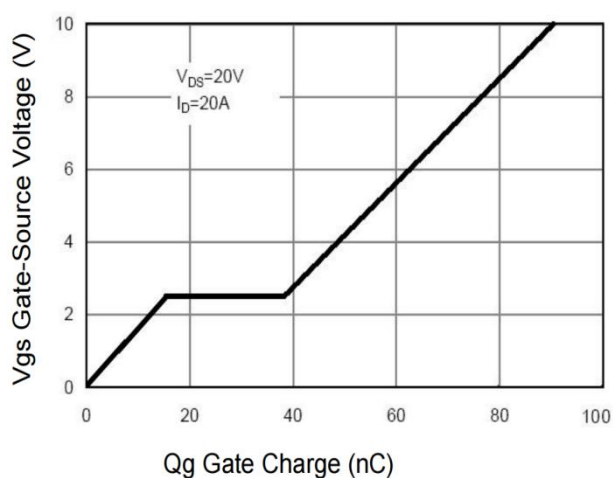


Figure 5 Gate Charge

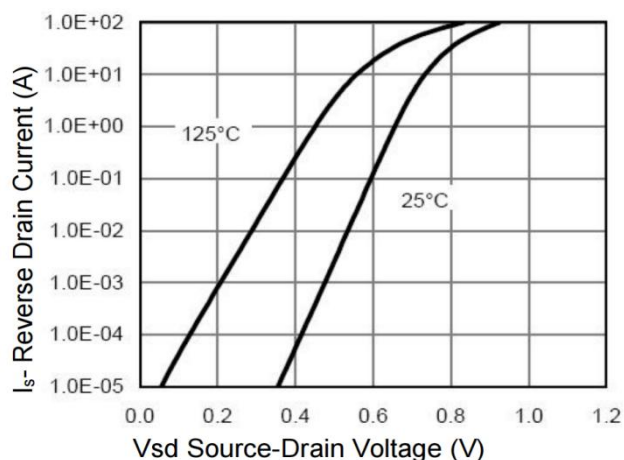


Figure 6 Source- Drain Diode Forward

Typical Characteristics

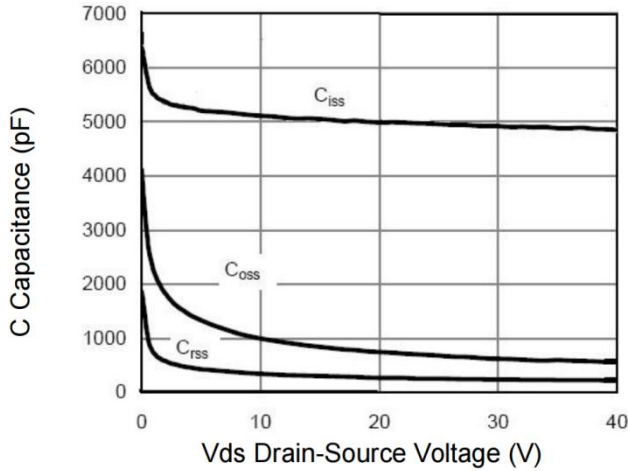


Figure 7 Capacitance vs Vds

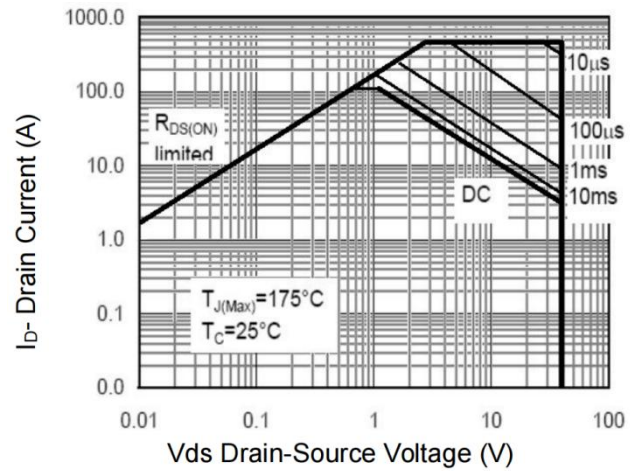


Figure 8 Safe Operation Area

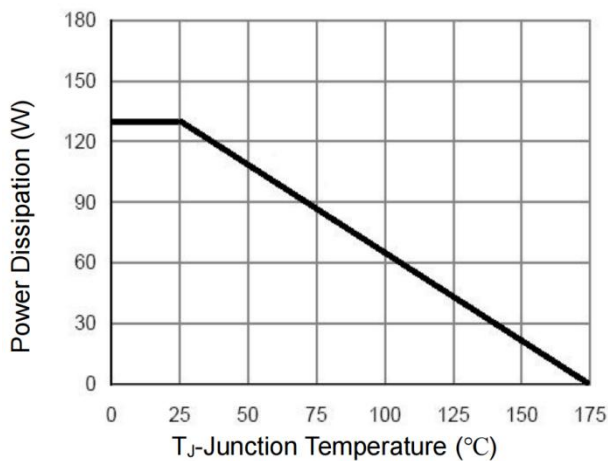


Figure 9 Power De-rating

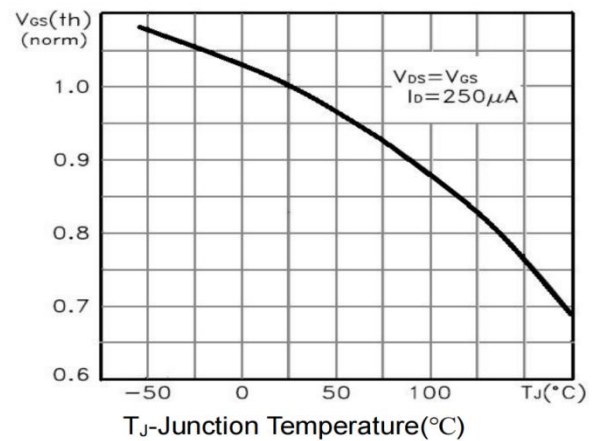


Figure 10 $V_{GS(th)}$ vs Junction Temperature

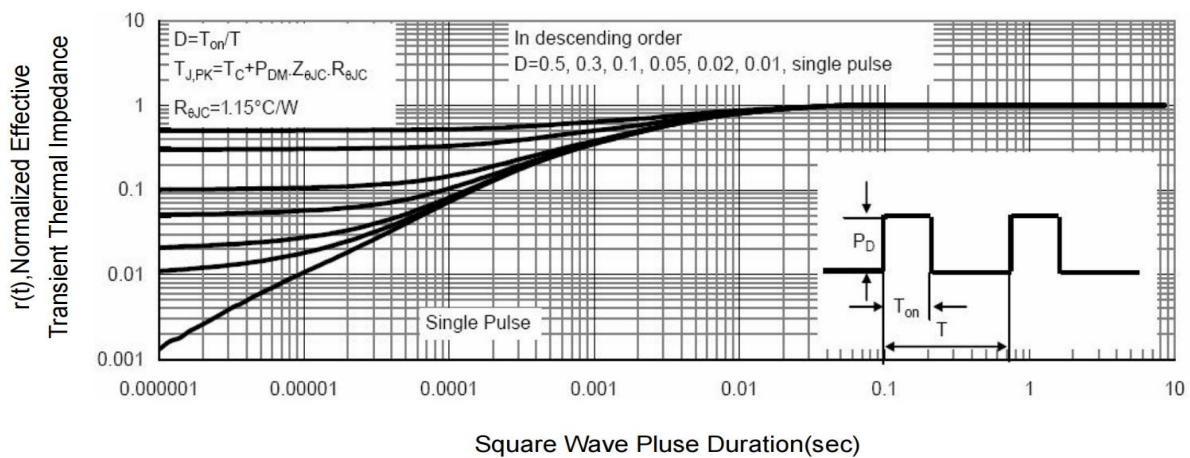
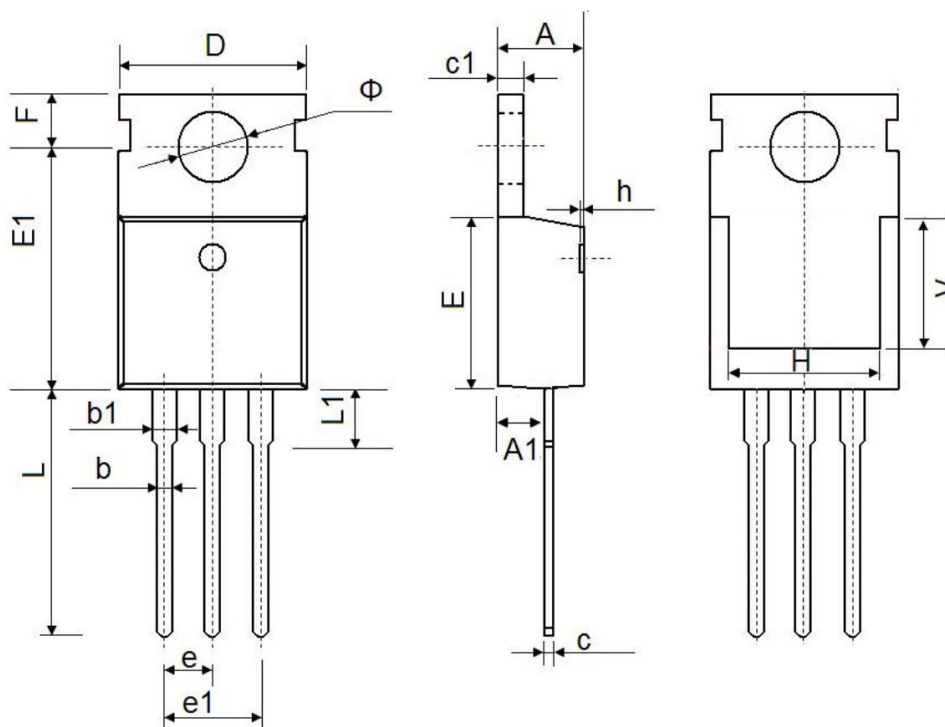


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220AB 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	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