

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	13.8mΩ@10V	50A
	19.2mΩ@4.5V	

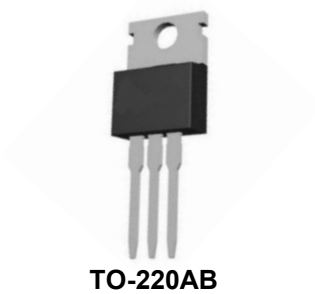
Feature

- 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

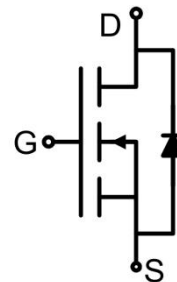
Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package



Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	60	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _D	50	A
Continuous Drain Current(T _C =100°C)	I _D (100°C)	35.4	A
Pulsed Drain Current	I _{DM}	200	A
Power Dissipation	P _D	85	W
Thermal Resistance,Junction-to-Case	R _{θJC}	3.3	°C/W
Single pulse avalanche energy ³⁾	E _{AS}	245	mJ
Junction Temperature	T _J	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	60			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =60V,V _{GS} =0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Gate threshold voltage ²⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.15	1.6	2.5	V
Drain-source on-resistance ²⁾	R _{DS(on)}	V _{GS} =10V, I _D =20A		12	13.8	mΩ
		V _{GS} =4.5V, I _D =20A		16	19.2	
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f =1MHz		1630		pF
Output Capacitance	C _{oss}			113		
Reverse Transfer Capacitance	C _{rss}			97		
Total Gate Charge	Q _g	V _{DS} =30V, V _{GS} =10V, I _D =20A		39		nC
Gate-Source Charge	Q _{gs}			7		
Gate-Drain Charge	Q _{gd}			8.5		
Turn-on delay time	t _{d(on)}	V _{DD} =30V, V _{GS} =10V R _L =6.7Ω, R _G =3Ω		7.4		nS
Turn-on rise time	t _r			5.1		
Turn-off delay time	t _{d(off)}			28.2		
Turn-off fall time	t _f			5.5		
Source-Drain Diode characteristics						
Diode Continuous Current ¹⁾	I _S				50	A
Diode Forward voltage ²⁾	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Reverse recover time	T _{rr}	I _F =20A, di/dt =100A/us ²⁾ , T _J =25°C		28		nS
Reverse recovery charge	Q _{rr}			40		nC

Notes:

- 1) Surface Mounted on FR4 Board, t ≤10 sec.
- 2) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤2%.
- 3) E_{AS} condition : T_J =25°C, V_{DD} =30V, V_G =10V, L =0.5mH, R_G =25Ω.
- 4) Guaranteed by design, not subject to production testing.

Typical Characteristics

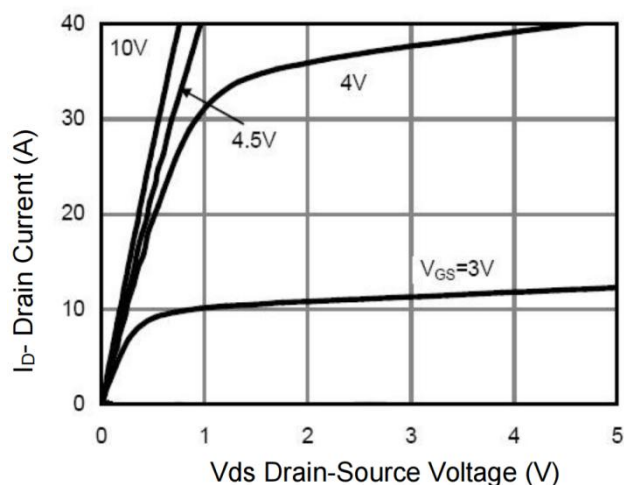


Figure 1 Output Characteristics

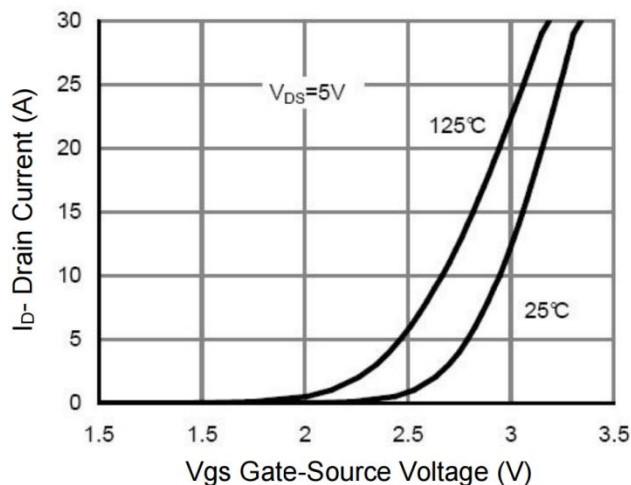


Figure 2 Transfer Characteristics

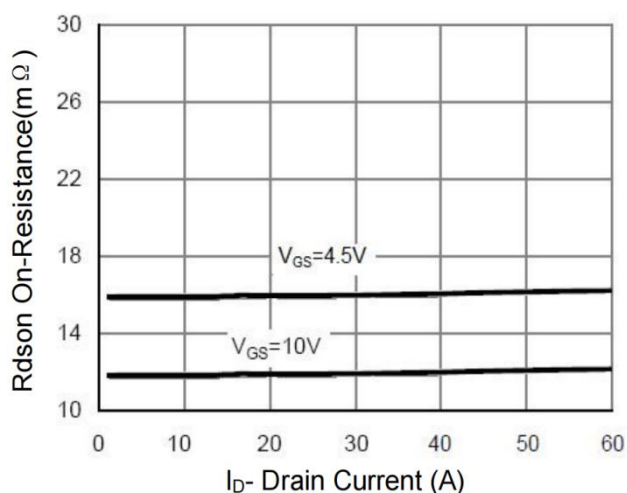


Figure 3 Rdson- Drain Current

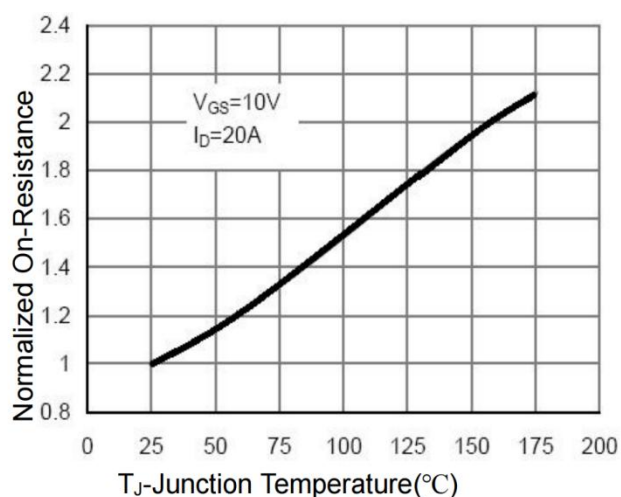


Figure 4 Rdson-Junction Temperature

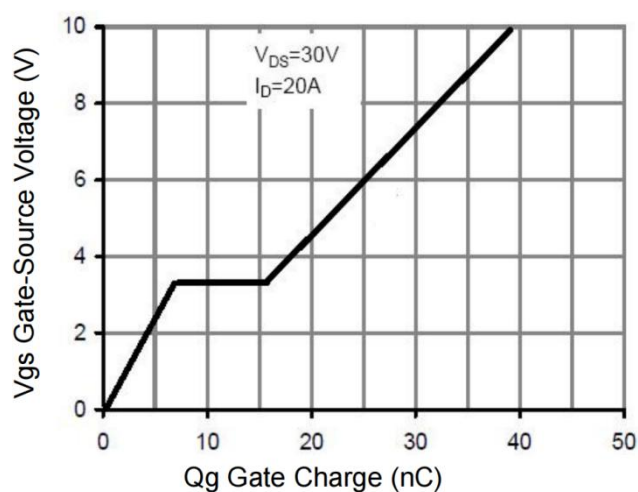


Figure 5 Gate Charge

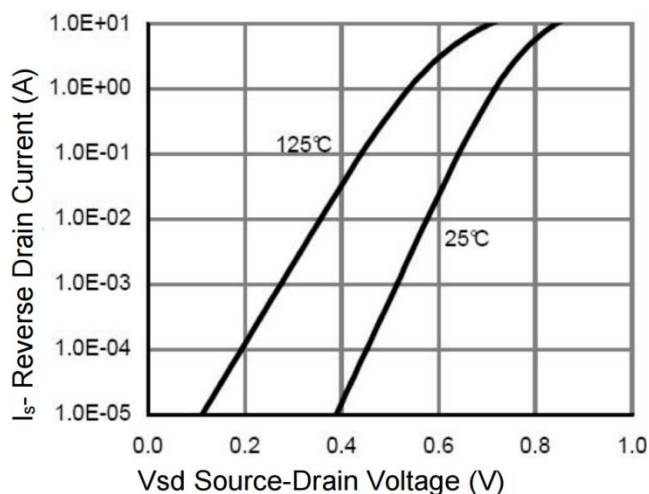


Figure 6 Source- Drain Diode Forward

Typical Characteristics

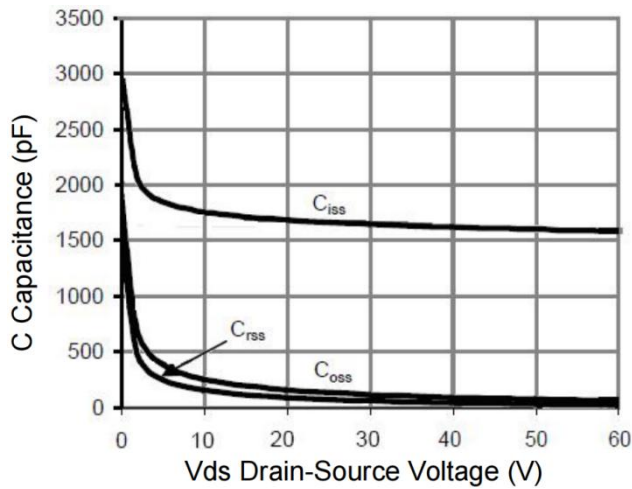


Figure 7 Capacitance vs Vds

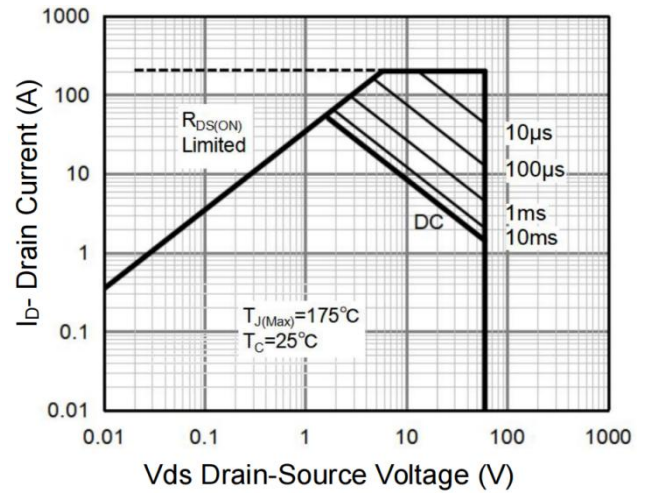


Figure 8 Safe Operation Area

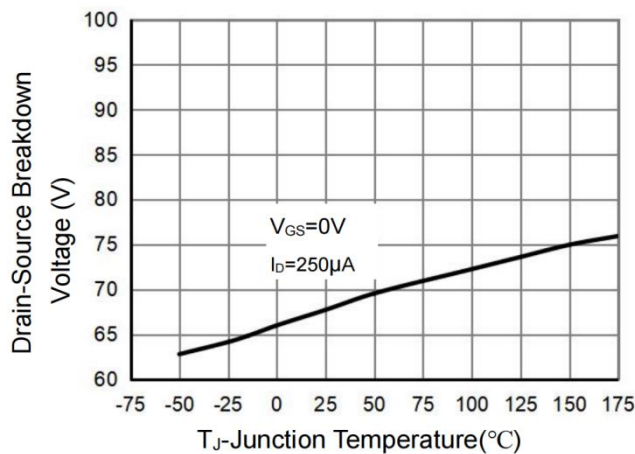


Figure 9 BV_{DS} vs Junction Temperature

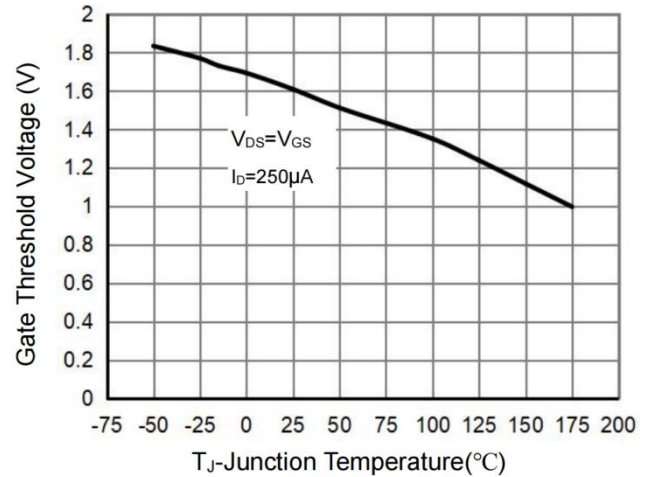


Figure 10 $V_{GS(th)}$ vs Junction Temperature

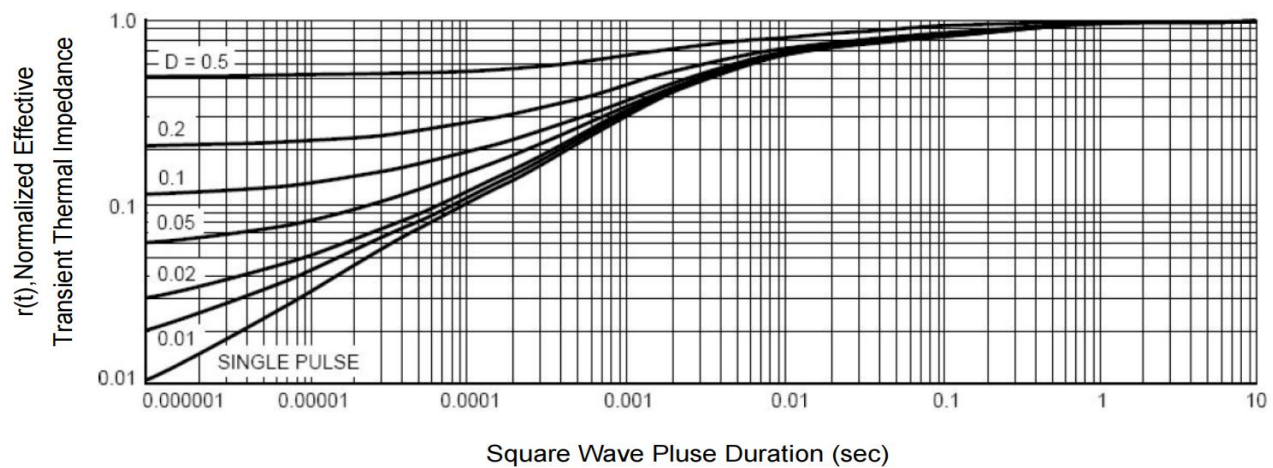
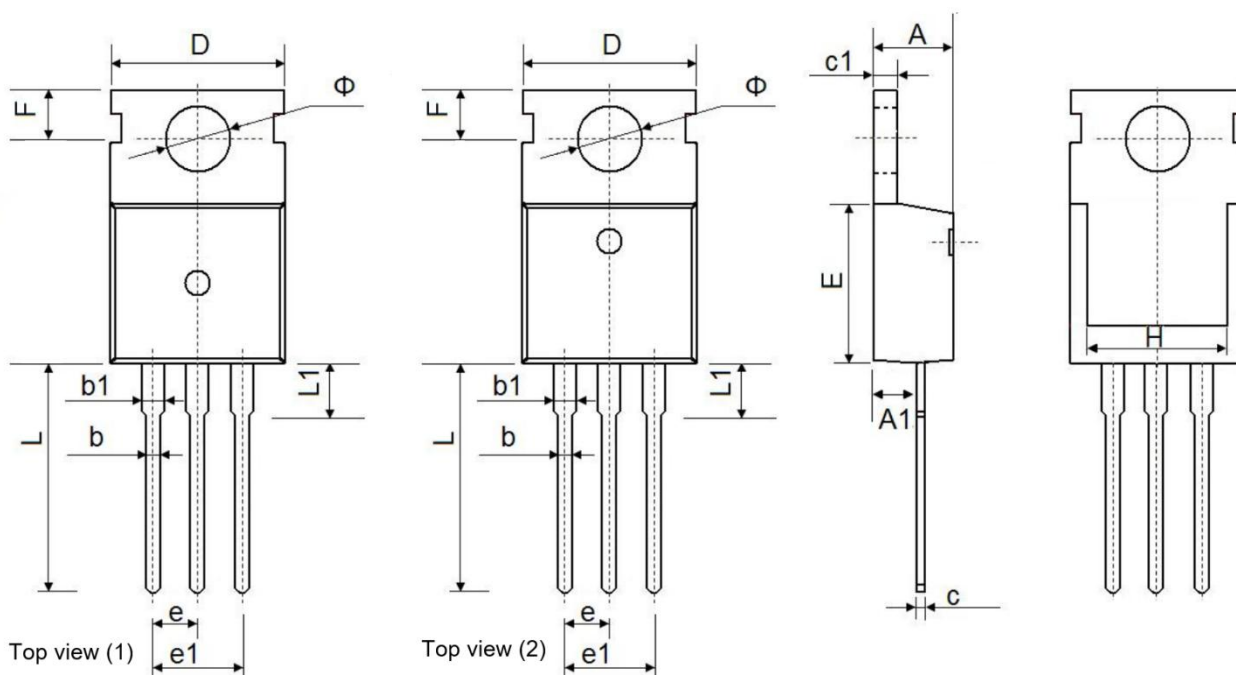


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.200	4.630	0.165	0.182
A1	2.200	2.600	0.087	0.102
b	0.700	0.900	0.028	0.035
b1	1.170	1.400	0.046	0.055
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.700	10.250	0.382	0.404
E	9.100	10.040	0.358	0.395
e	2.540 TYP.		0.100 TYP.	
e1	5.080 TYP.		0.200 TYP.	
F	2.650	2.950	0.104	0.116
H	7.800	8.500	0.307	0.335
L	12.780	13.400	0.503	0.528
L1	2.500	3.500	0.098	0.138
φ	3.400	3.800	0.134	0.150