

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	7mΩ@10V	80A

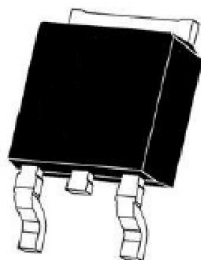
Feature

- High density cell design for ultra low $R_{DS(ON)}$
- 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

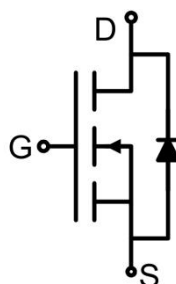
- PWM
- Load Switching

Package



TO-252AB

Circuit diagram



Marking



Absolute maximum ratings ($T_c=25^\circ\text{C}$ 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	80	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	56.5	A
Pulsed Drain Current ¹⁾	I_{DM}	320	A
Single Pulse Avalanche Energy ⁴⁾	E_{AS}	390	mJ
Maximum Power Dissipation	P_D	110	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.36	$^\circ\text{C}/\text{W}$
Operating Junction Temperature	T_J	$-55 \sim +175$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +175$	$^\circ\text{C}$

Electrical characteristics ($T_c=25^\circ\text{C}$, 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 _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	2.8	4	V
Drain-source on-resistance ³⁾	R _{DS(on)}	V _{GS} =10V, I _D =20A		6	7	mΩ
Dynamic characteristics ⁵⁾						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f =1MHz		4000		pF
Output Capacitance	C _{oss}			290		
Reverse Transfer Capacitance	C _{rss}			210		
Total Gate Charge	Q _g	V _{DS} =30V, V _{GS} =10V, I _D =20A		90		nC
Gate-Source Charge	Q _{gs}			9		
Gate-Drain Charge	Q _{gd}			18		
Turn-on delay time	t _{d(on)}	V _{DS} =30V, V _{GS} =10V, R _G =3Ω R _L =1Ω		8.5		nS
Turn-on rise time	t _r			7		
Turn-off delay time	t _{d(off)}			40		
Turn-off fall time	t _f			15		
Source-Drain Diode characteristics						
Diode Forward Current ²⁾	I _S				80	A
Diode Forward voltage ³⁾	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Reverse Recovery Time	T _{rr}	I _F =20A, di/dt =-100A/μs ³⁾		32		nS
Reverse Recovery Charge	Q _{rr}	T _J = 25°C		45		nC

Notes:

- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) Surface Mounted on FR4 Board, $t \leq 10$ sec.
- 3) Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- 4) EAS condition: $T_J=25^\circ\text{C}$, $V_{DS}=20V$, $V_G=10V$, $L=0.5mH$, $R_G=25\Omega$.
- 5) Guaranteed by design, not subject to production.

Typical Characteristics

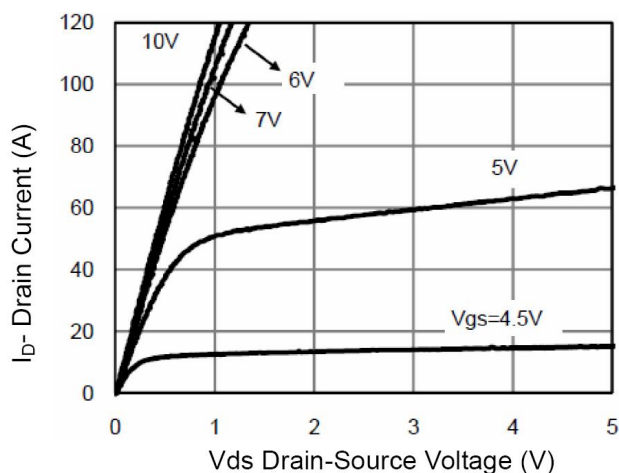


Figure 1 Output Characteristics

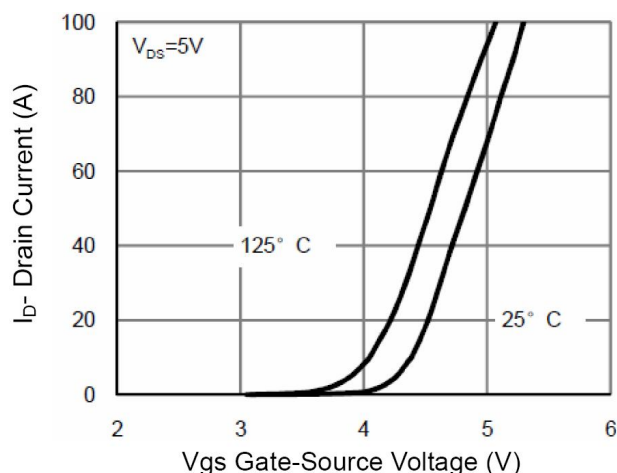


Figure 2 Transfer Characteristics

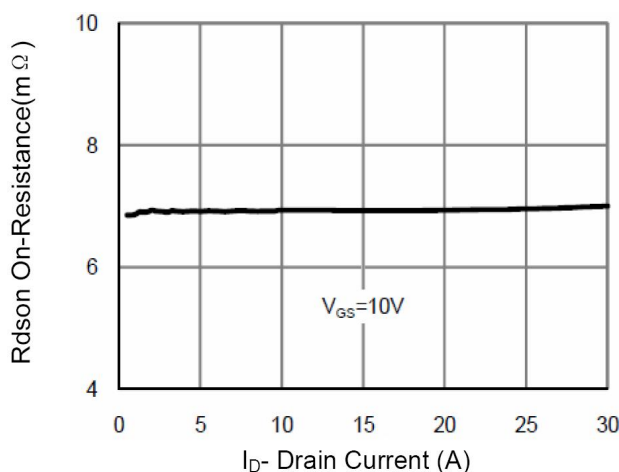


Figure 3 $R_{DS(on)}$ - Drain Current

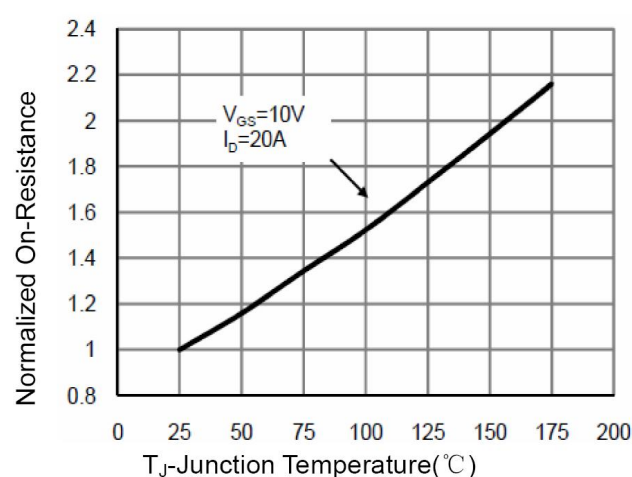


Figure 4 $R_{DS(on)}$ -Junction Temperature

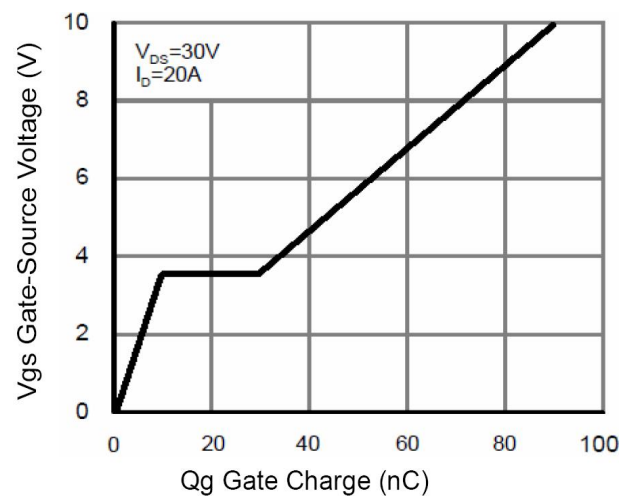


Figure 5 Gate Charge

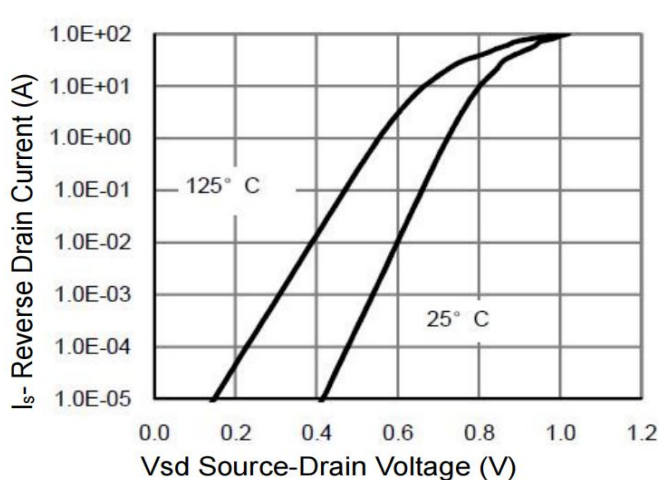


Figure 6 Source- Drain Diode Forward

Typical Characteristics

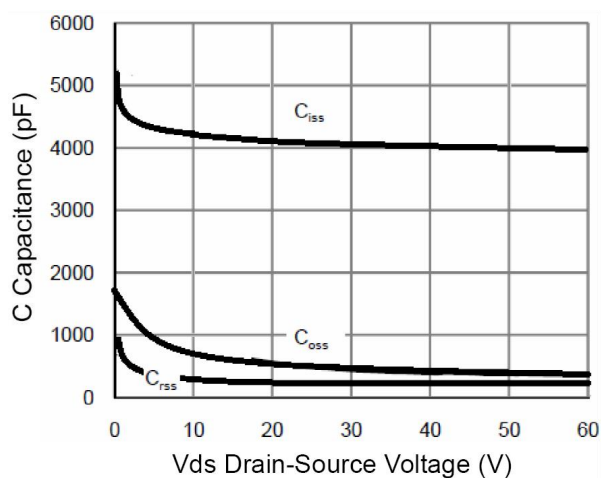


Figure 7 Capacitance vs Vds

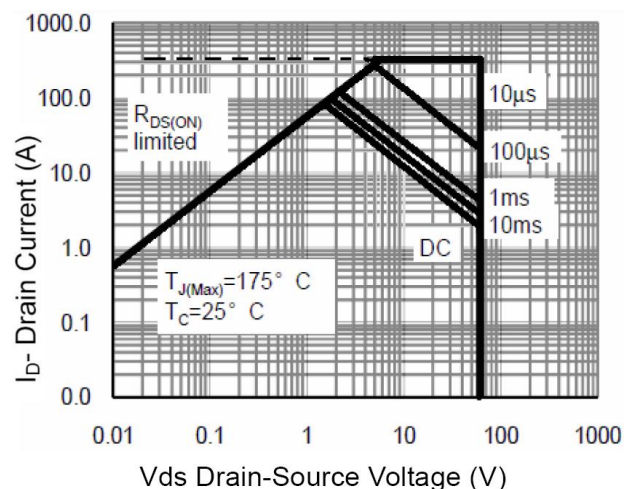


Figure 8 Safe Operation Area

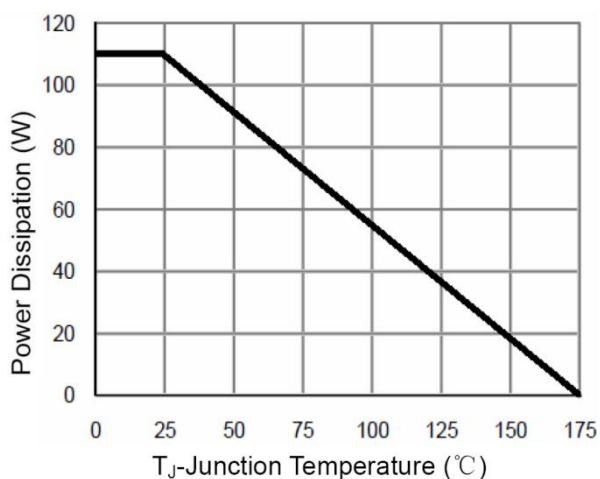


Figure 9 Power De-rating

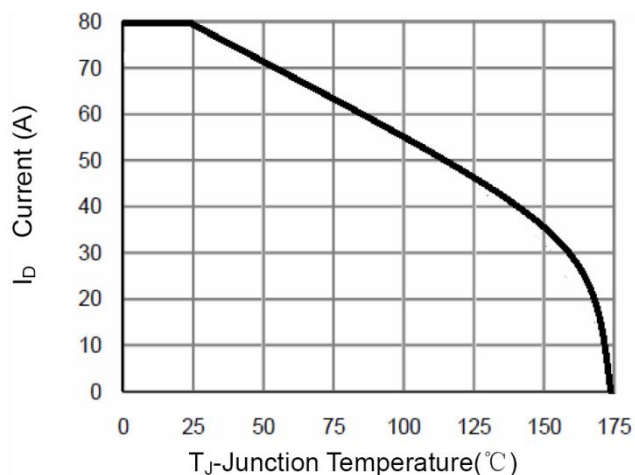


Figure 10 Id Current- Junction Temperature

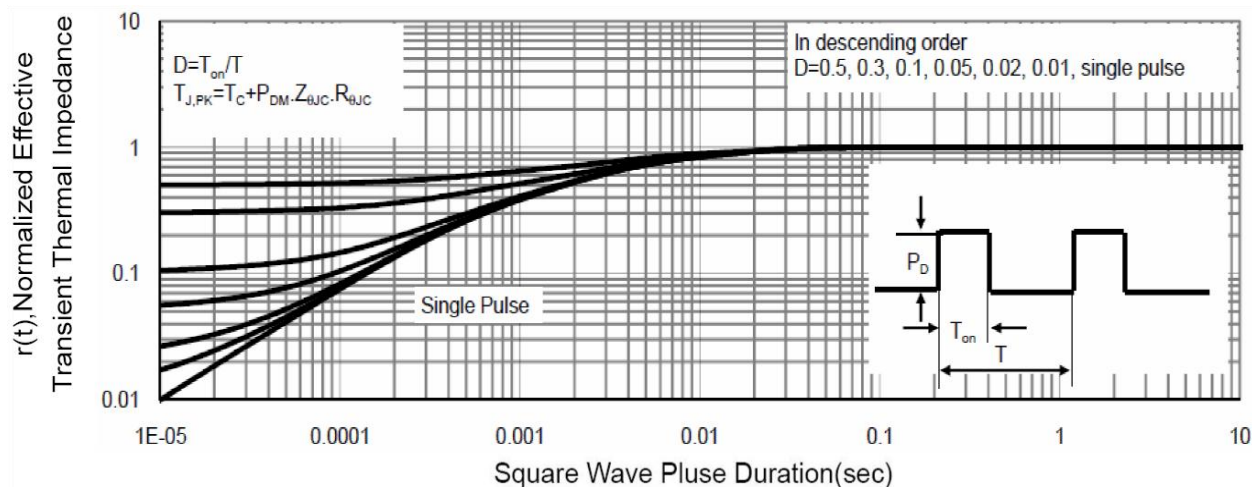
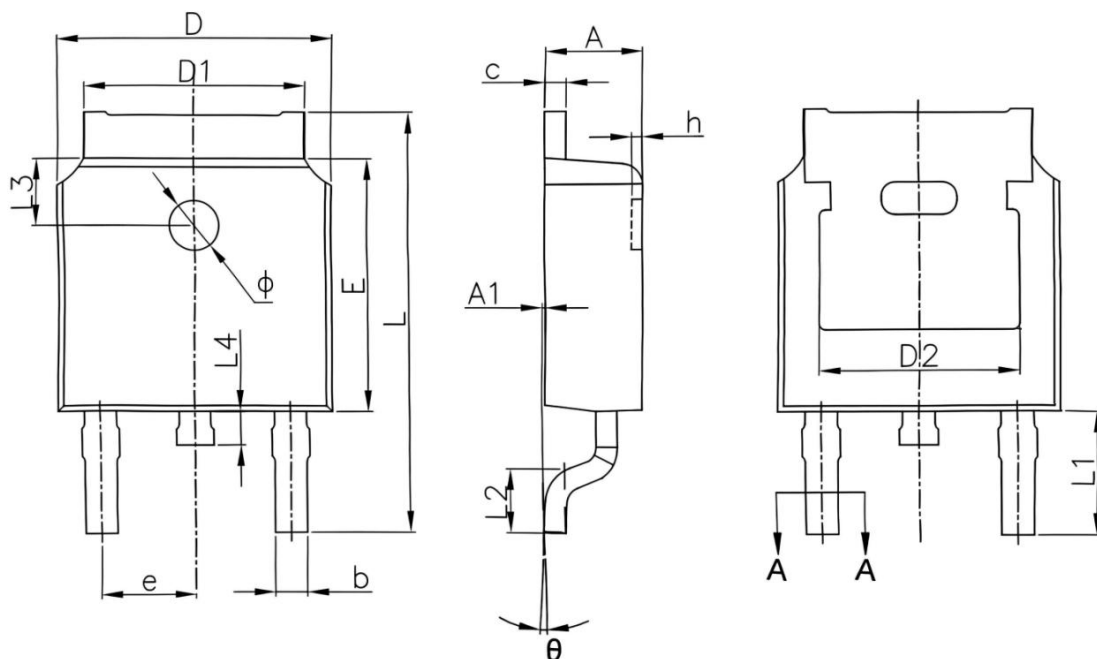


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.130	0.000	0.005
b	0.660	0.860	0.026	0.034
b1	0.730	0.790	0.029	0.031
c	0.460	0.580	0.018	0.023
c1	0.500	0.520	0.020	0.020
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.190	2.390	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.067	0.055
L3	1.600 BSC.		0.063 BSC.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
h	0.000	0.300	0.000	0.012
θ	0°	8°	0°	8°