

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	460mΩ@10V	9A

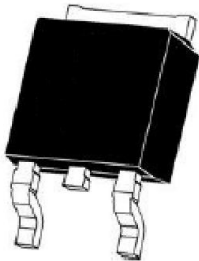
Feature

- New technology for high voltage device
- Low on-resistance and low conduction losses
- Ultra Low Gate Charge cause lower driving requirements
- ESD protected
- Suffix "-Q1" for AEC-Q101

Application

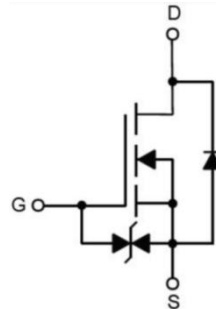
- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)

Package



TO-252AB

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage,AC (f>1 Hz)	V _{GS}	±30	V
Gate-Source Voltage,DC	V _{GS}	±20	V
Continuous Drain Current	I _D	9	A
Continuous Drain Current(T _C =100°C)	I _D (100°C)	6.3	A
Pulsed Drain Current ¹⁾	I _{DM}	27	A
Power Dissipation	P _D	100	W
Thermal Resistance,Junction-to-Case	R _{θJC}	1.5	°C/W
Single pulse avalanche current ²⁾	I _{AS}	2.5	A
Junction Temperature	T _J	175	°C
Storage Temperature Range	T _{STG}	-55 ~ +175	°C

Electrical characteristics (T_A=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	650			V
Zero gate voltage drain current(T _C =25°C)	I _{DSS}	V _{DS} =650V,V _{GS} = 0V			1	μA
Zero gate voltage drain current(T _C =125°C)	I _{DSS}	V _{DS} =650V,V _{GS} = 0V			100	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} = 0V			±200	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	3.0	3.5	4.0	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =4.5A		410	460	mΩ
Dynamic characteristics³⁾						
Input Capacitance	C _{iss}	V _{DS} =50V,V _{GS} =0V, f =1MHz		530		pF
Output Capacitance	C _{oss}			25		
Reverse Transfer Capacitance	C _{rss}			5.6		
Total Gate Charge	Q _g	V _{DS} =380V,V _{GS} =10V, I _D =4.5A		12		nC
Gate-Source Charge	Q _{gs}			5.7		
Gate-Drain Charge	Q _{gd}			1.4		
Gate Plateau Voltage	V _{gp}			5.6		
Gate Resistance	R _g	f =1MHz,D-S short		40		Ω
Turn-on delay time	t _{d(on)}	V _{DD} =400V,V _{GS} =10V, I _D =4.5A,R _G =4Ω		9		nS
Turn-on rise time	t _r			6		
Turn-off delay time	t _{d(off)}			52		
Turn-off fall time	t _f			8		
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _{SD} =9A, T _J =25°C			1.2	V
Diode Forward Current	I _{SD}	T _C =25°C			9	A
Pulsed-Source-drain current	I _{SDM}				27	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 4.5A di/dt = 100A/μs		195		nS
Reverse Recovery Charge	Q _{rr}			1.36		uC
Peak reverse recovery current	I _{rrm}			14		A

Notes:

- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) T_J=25°C, V_{DD}=50V, V_G=10V, R_G=25Ω.
- 3) Guaranteed by design, not subject to production.

Typical Characteristics

Figure1. Output characteristics

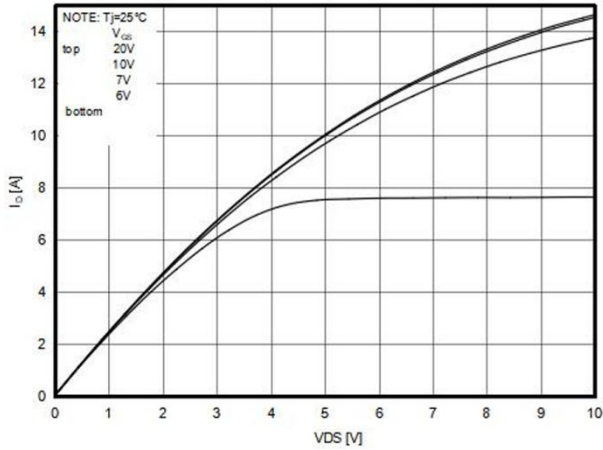


Figure2. Transfer characteristics

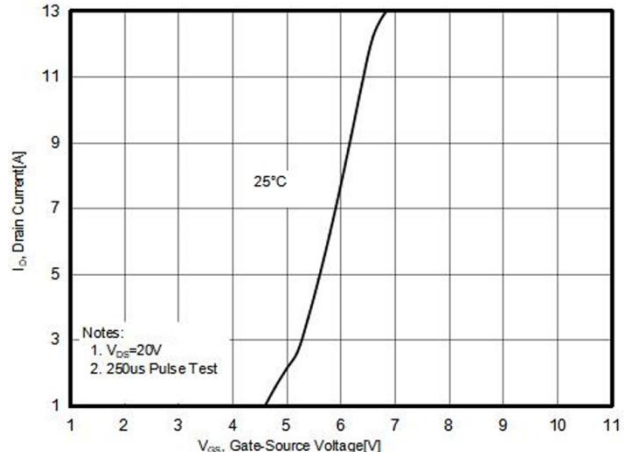


Figure3. $R_{DS(ON)}$ vs Junction Temperature

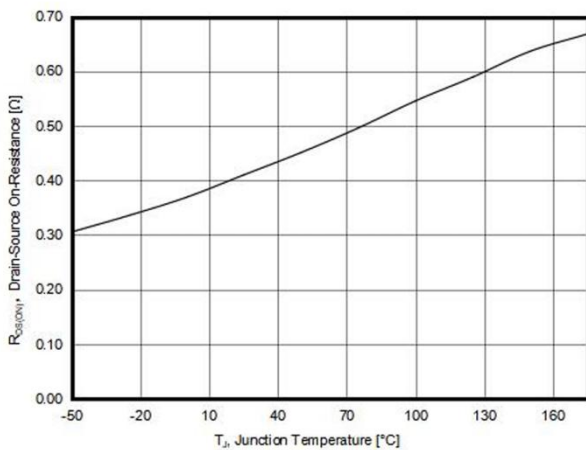


Figure4. BV_{DSS} vs Junction Temperature

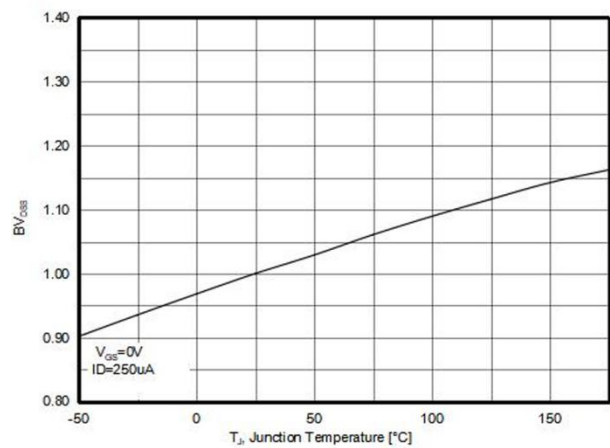


Figure5. Maximum I_D vs Junction Temperature

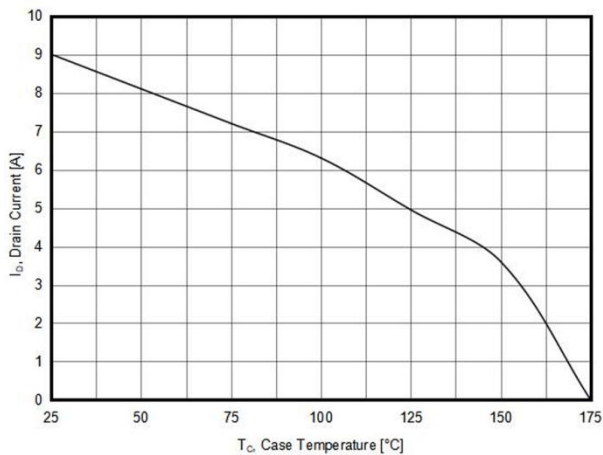
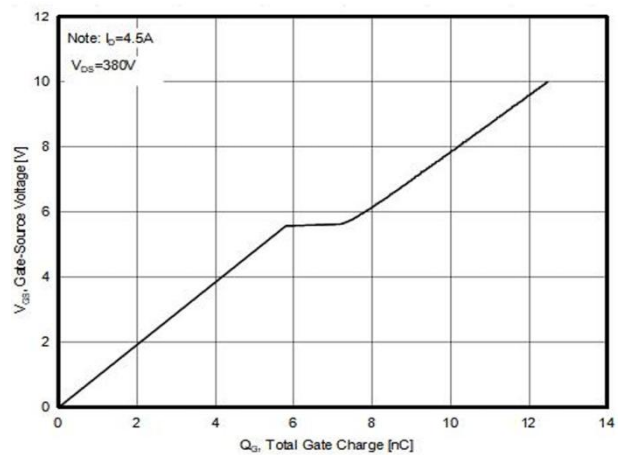


Figure6. Gate charge waveforms



Typical Characteristics

Figure7. Static drain-source on resistance

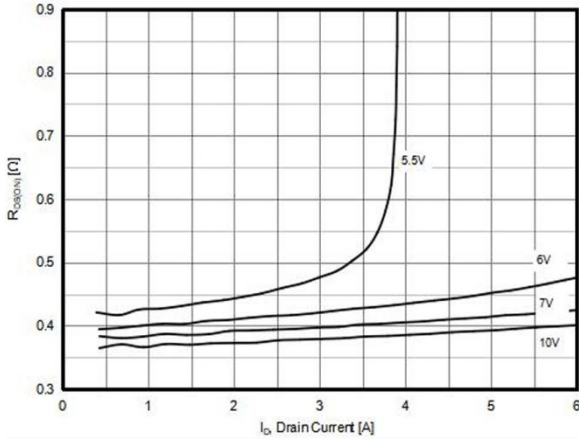


Figure8. Source-Drain Diode Forward Voltage

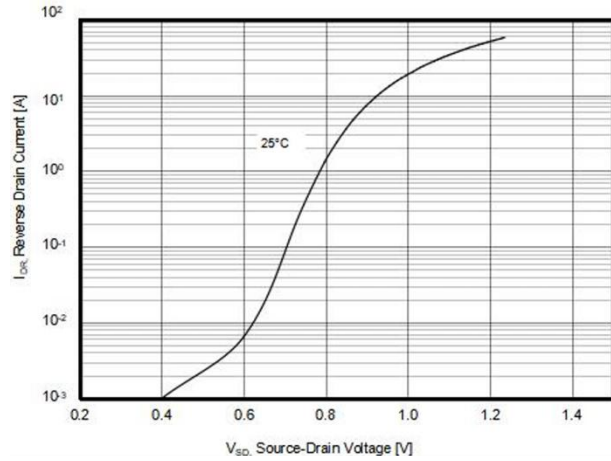


Figure9. Capacitance

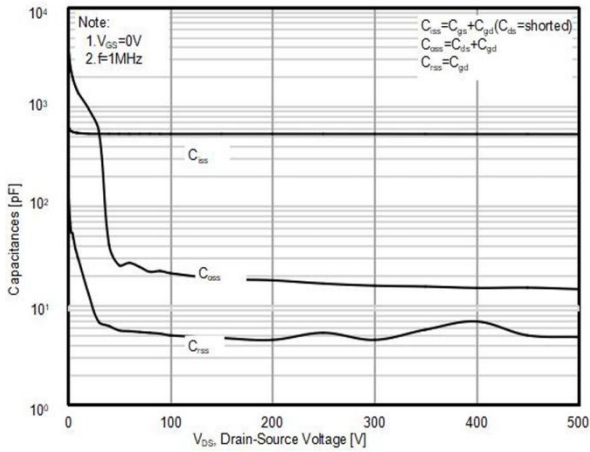
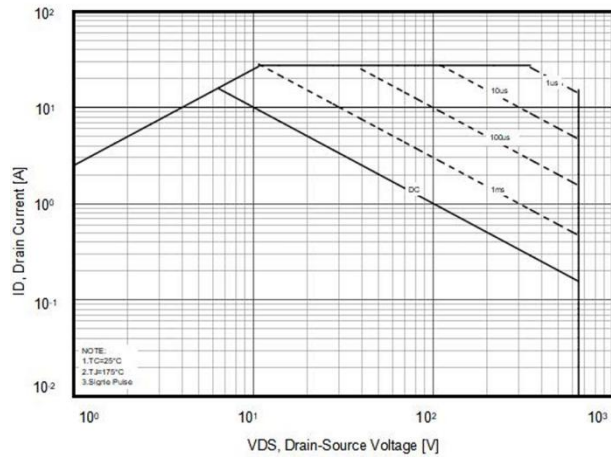
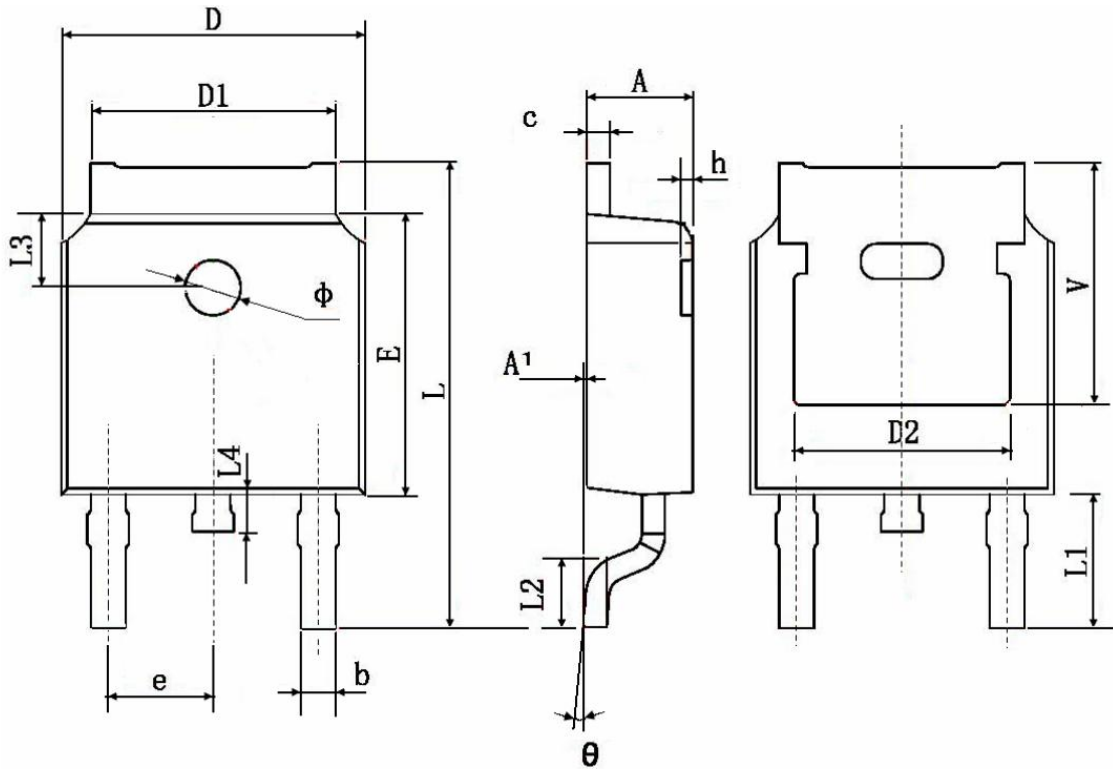


Figure10. Safe operating area



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
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.500	0.201	0.217
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.390	0.086	0.094
L	9.800	10.500	0.386	0.413
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.800	0.055	0.070
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012