

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	13mΩ@10V	40A
	23mΩ@4.5V	

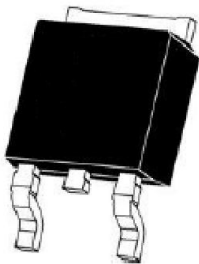
Feature

- 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

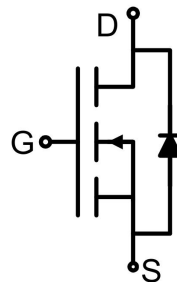
- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package

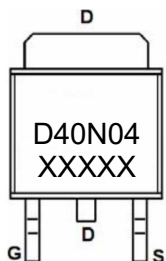


TO-252AB

Circuit diagram



Marking



Absolute maximum ratings (Ta=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	40	A
Pulsed Drain Current	I _{DM}	140	A
Power Dissipation	P _D	34	W
Thermal Resistance, Junction-to-Case	R _{θJC}	4.4	°C/W
Single pulse avalanche energy	E _{AS}	80	mJ
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-55 ~ +150	°C

Electrical characteristics (TA=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 _{GS} = ±20V, V _{DS} = 0V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0		2.5	V
Drain-source on-resistance ¹⁾	R _{DS(on)}	V _{GS} = 10V, I _D = 20A			13	mΩ
		V _{GS} = 4.5V, I _D = 10A			23	
Dynamic characteristics²⁾						
Input Capacitance	C _{iss}	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz		917		pF
Output Capacitance	C _{oss}			128		
Reverse Transfer Capacitance	C _{rss}			108		
Total Gate Charge	Q _g	V _{DS} = 20V, V _{GS} = 10V, I _D = 20A		23.6		nC
Gate-Source Charge	Q _{gs}			4.4		
Gate-Drain Charge	Q _{gd}			6.3		
Turn-on delay time	t _{d(on)}	V _{DD} = 20V, V _{GS} = 10V, I _D = 2A R _L = 1Ω, R _{GEN} = 3Ω		10		nS
Turn-on rise time	t _r			56		
Turn-off delay time	t _{d(off)}			27		
Turn-off fall time	t _f			72		
Source-Drain Diode characteristics						
Diode Forward Current ¹⁾	I _S				40	A
Diode Forward voltage	V _{DS}	V _{GS} = 0V, I _S = 20A			1.2	V
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 20A		7		nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs ¹⁾		0.4		nC

Notes:

- 1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤ 2%.
- 2) Guaranteed by design, not subject to production testing.

Typical Characteristics

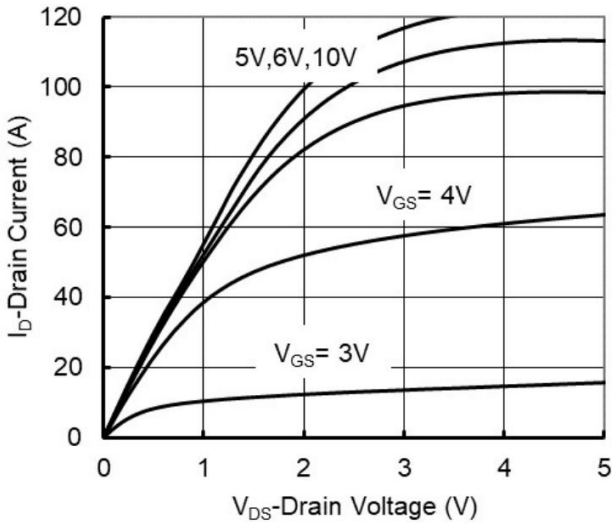


Figure 1. Output Characteristics

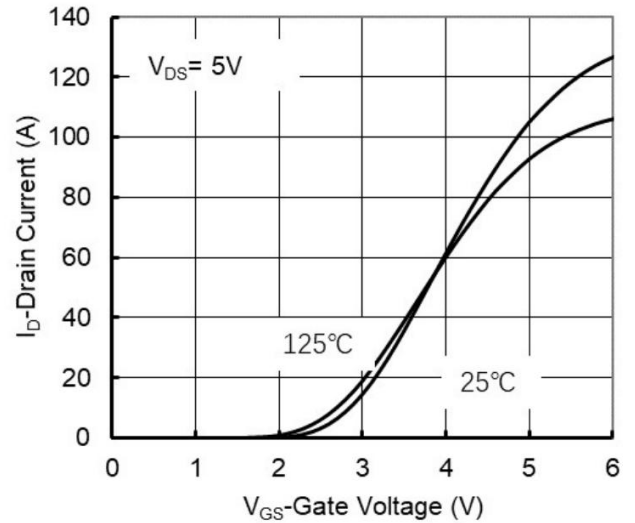


Figure 2. Transfer Characteristics

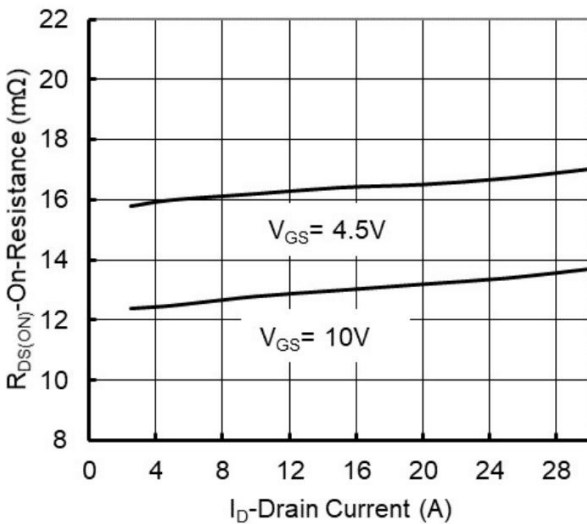


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

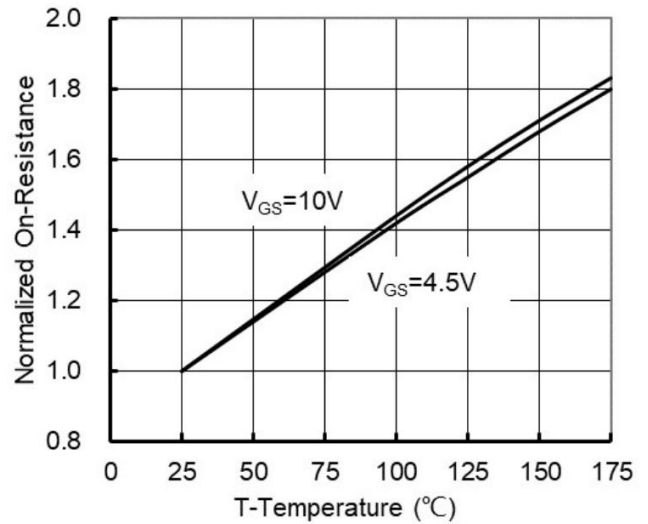


Figure 4. On-Resistance vs. Junction Temperature

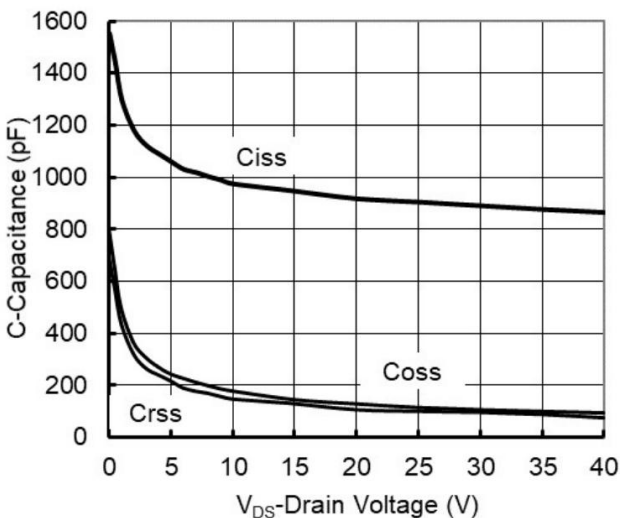


Figure 5. Capacitance Characteristics

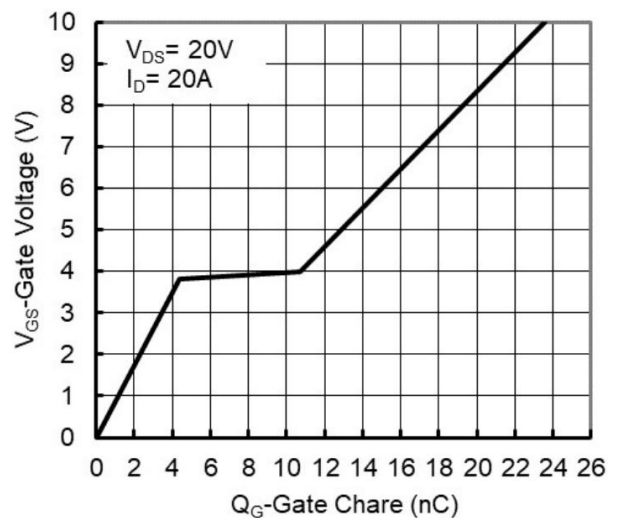


Figure 6. Gate Charge

Typical Characteristics

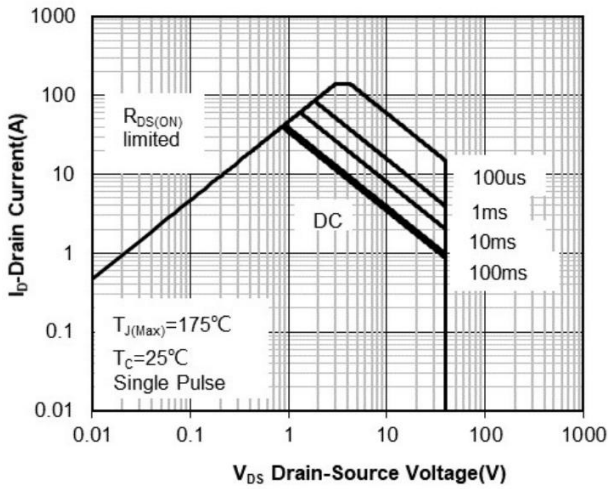


Figure 7. Safe Operation Area

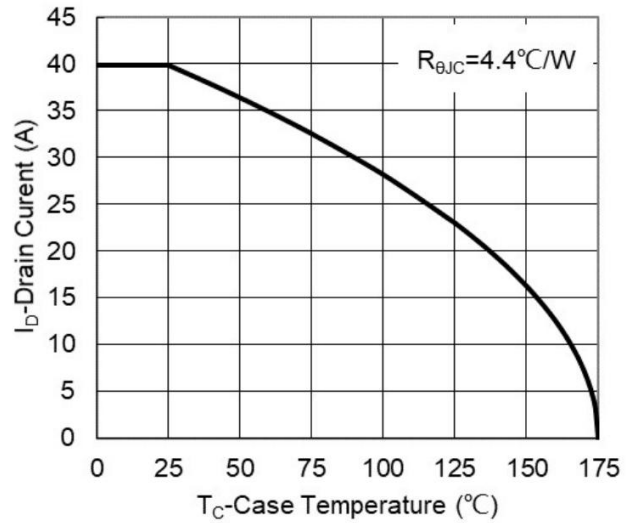


Figure 8. Maximum Continuous Drain Current vs Case Temperature

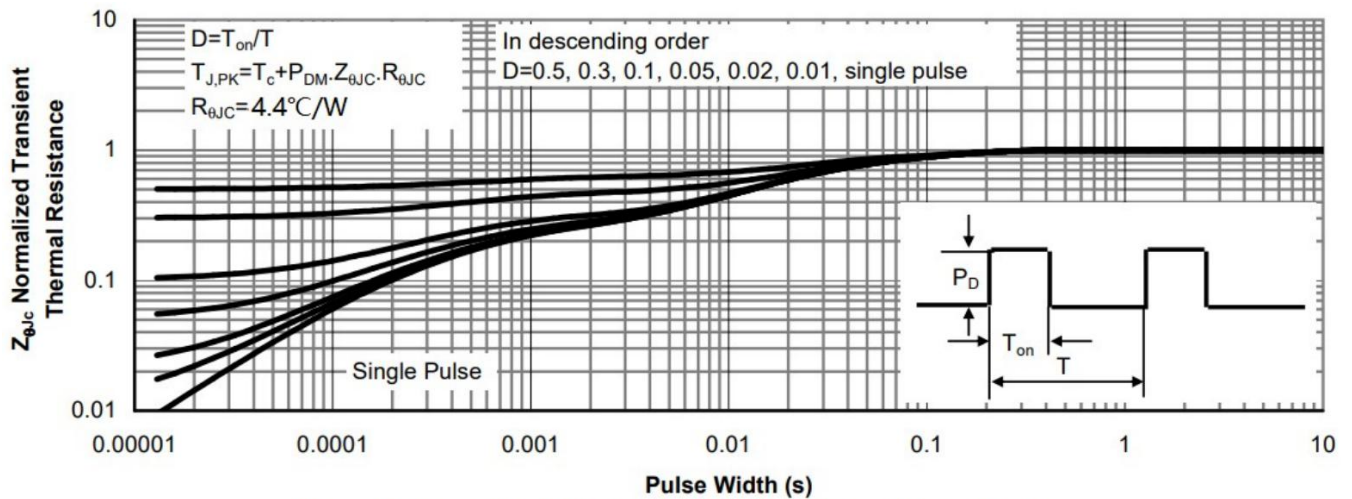
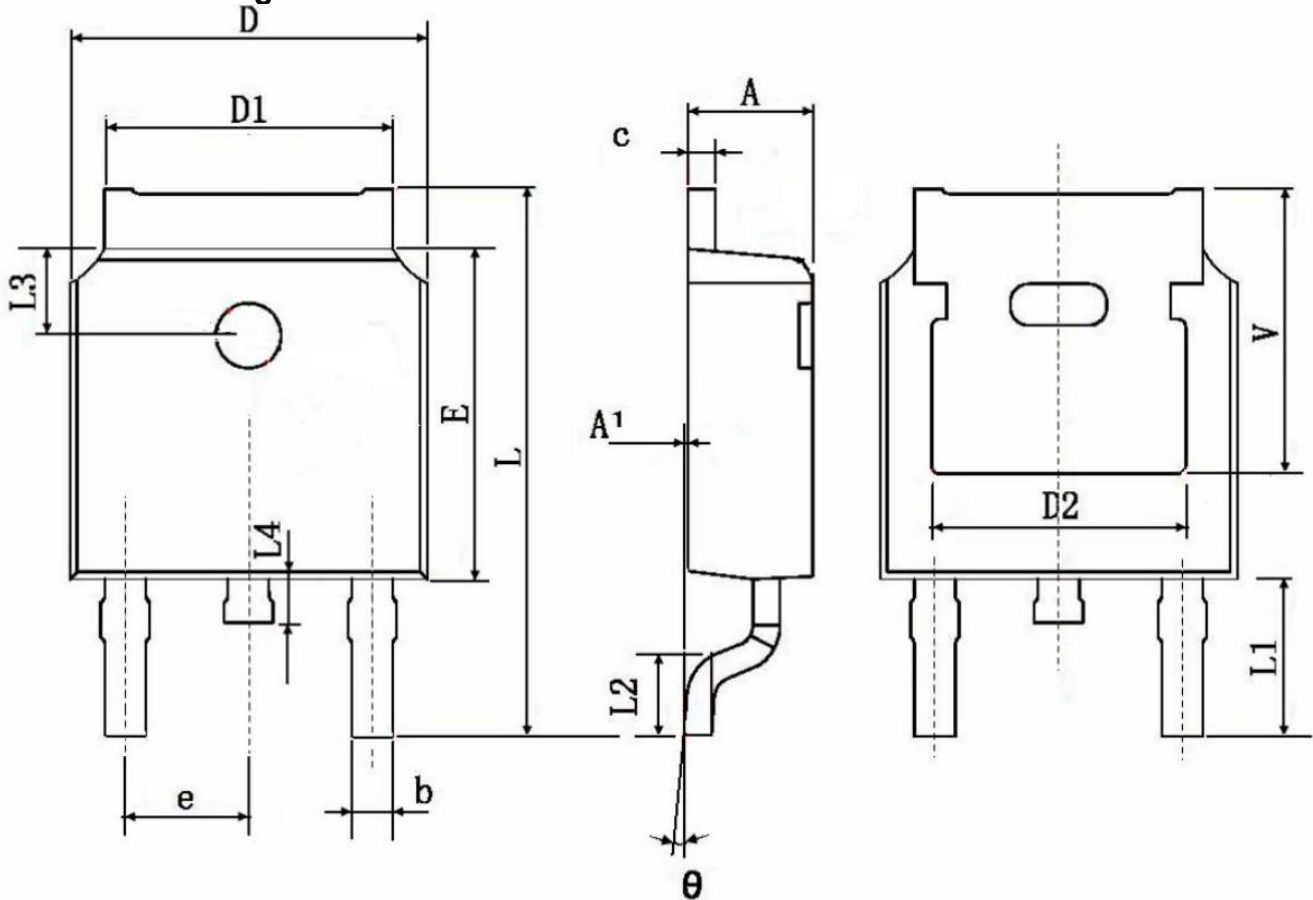


Figure 9. Normalized Maximum Transient Thermal Impedance

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	0.200	0.000	0.008
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	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.250	1.750	0.049	0.069
L3	1.650 TYP.		0.065 TYP.	
L4	0.600	1.000	0.024	0.039
theta	0°	10°	0°	10°
V	5.350 TYP.		0.211 TYP.	