

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	380mΩ@10V	12A

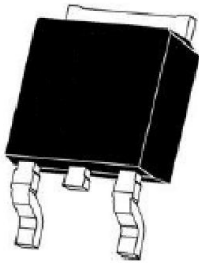
Feature

- Super Junction High Voltage MOSFET technology
- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Suffix "-Q1" for AEC-Q101

Application

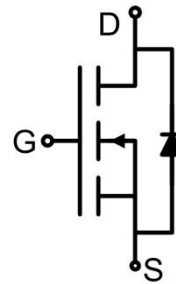
- Server power
- Charger
- PD Adapter

Package

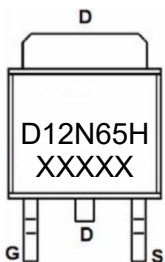


TO-252AB

Circuit diagram



Marking



Absolute maximum ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current($T_C = 25^\circ\text{C}$)	I_D	12	A
Continuous Drain Current($T_C = 100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	7.5	A
Pulsed Drain Current ¹⁾	I_{DM}	28	A
Power Dissipation ³⁾ ($T_C = 25^\circ\text{C}$)	P_D	83	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.5	$^\circ\text{C}/\text{W}$
Single pulse avalanche energy ²⁾	E_{AS}	93	mJ
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	650			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.5	3.8	5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 6A$		280	380	m Ω
Dynamic characteristics⁴⁾						
Input Capacitance	C_{iss}	$V_{DS} = 325V, V_{GS} = 0V, f = 1\text{MHz}$		1020		pF
Output Capacitance	C_{oss}			30		
Reverse Transfer Capacitance	C_{rss}			4		
Total Gate Charge	Q_g	$V_{DS} = 325V, V_{GS} = 10V, I_D = 6A$		25		nC
Gate-Source Charge	Q_{gs}			6		
Gate-Drain Charge	Q_{gd}			11		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 325V, V_{GS} = 10V, I_D = 6A, R_{GEN} = 2.2\Omega$		12		nS
Turn-on rise time	t_r			100		
Turn-off delay time	$t_{d(off)}$			20		
Turn-off fall time	t_f			7		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				12	A
Diode Forward voltage	V_{SD}	$V_{GS} = 0V, I_S = 6A$			1.2	V

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2) $T_J = 25^\circ\text{C}$, $V_{DD} = 100V$, $V_G = 10V$, $R_G = 25\Omega$, $L = 30\text{mH}$, $I_{AS} = 2.5A$.
- 3) P_D is based on max. junction temperature, using junction-case thermal resistance.
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

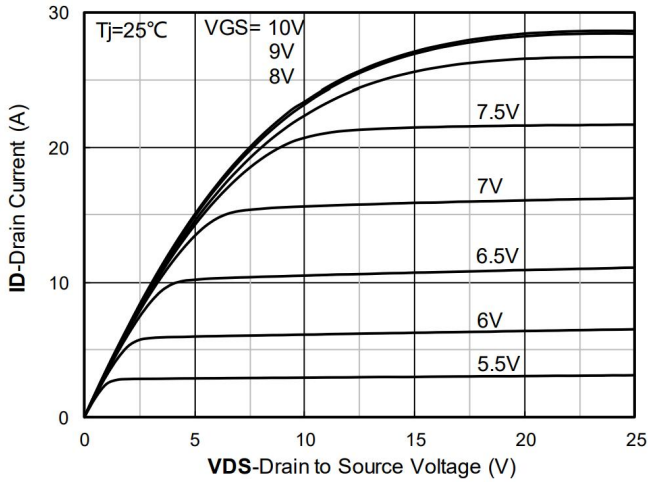


Figure 1. Output Characteristics

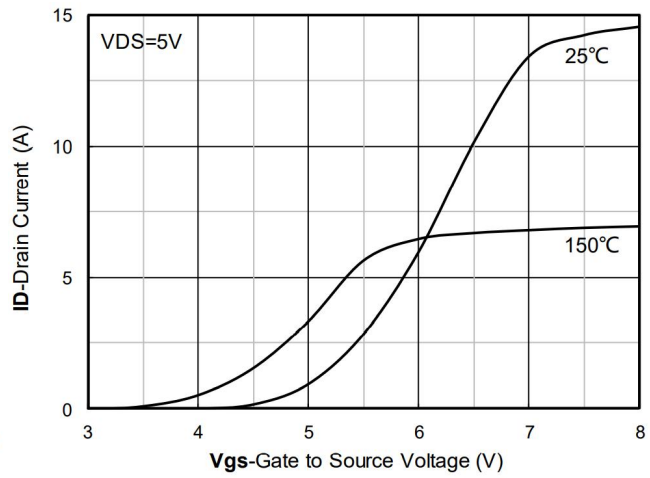


Figure 2. Transfer Characteristics

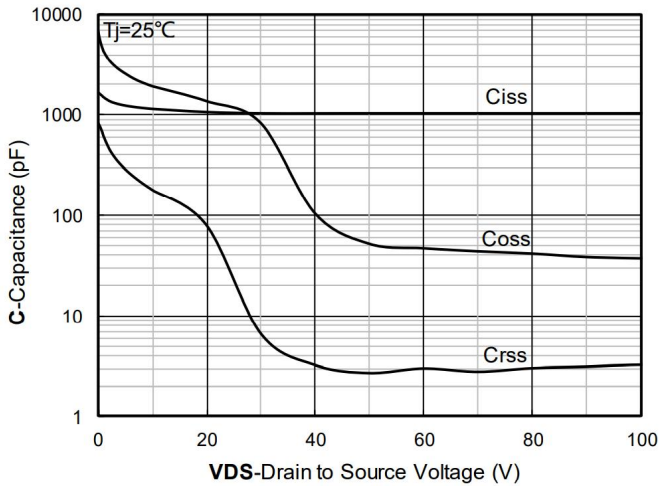


Figure 3. Capacitance Characteristics

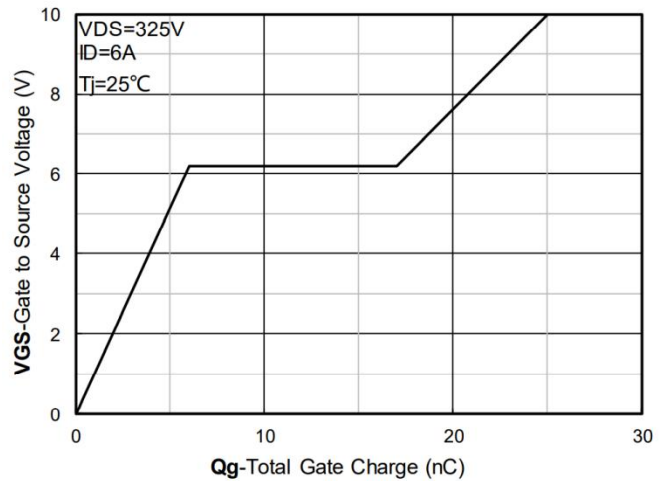


Figure 4. Gate Charge

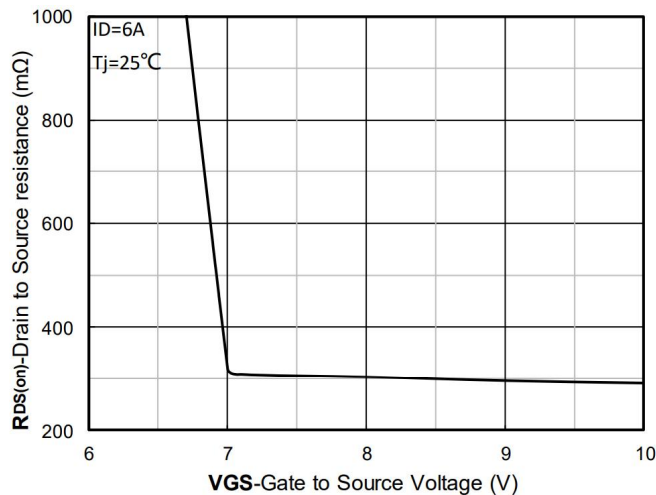


Figure 5. On-Resistance vs Gate to Source Voltage

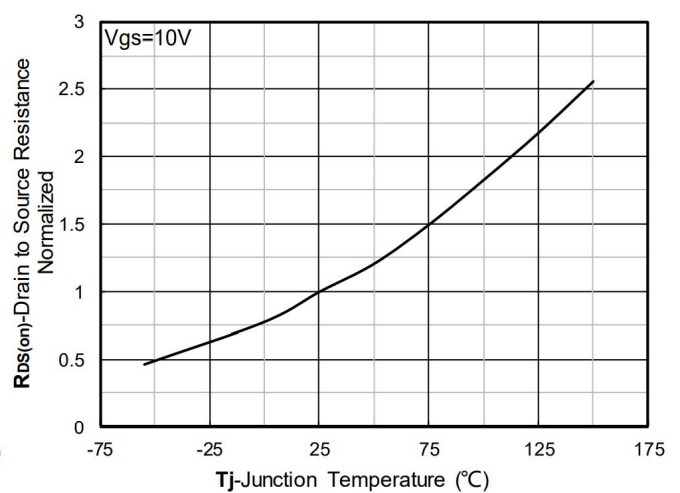


Figure 6. Normalized On-Resistance

Typical Characteristics

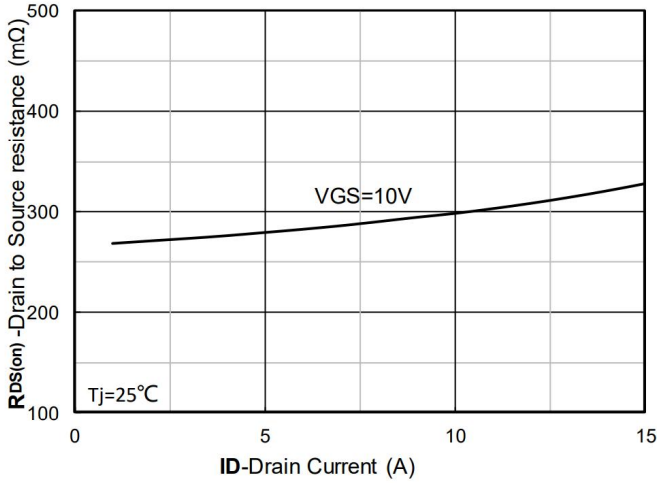


Figure 7. $R_{DS(on)}$ VS Drain Current

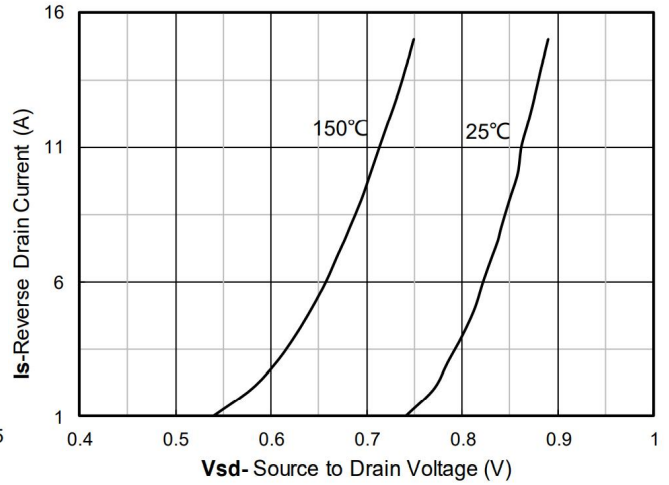


Figure 8. Forward characteristics of reverse diode

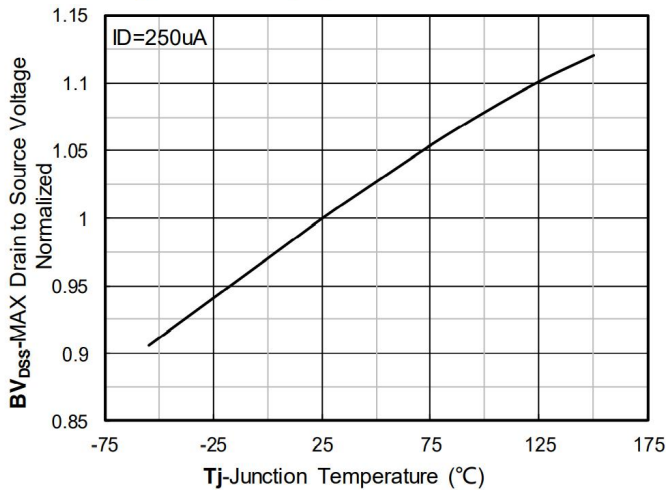


Figure 9. Normalized breakdown voltage

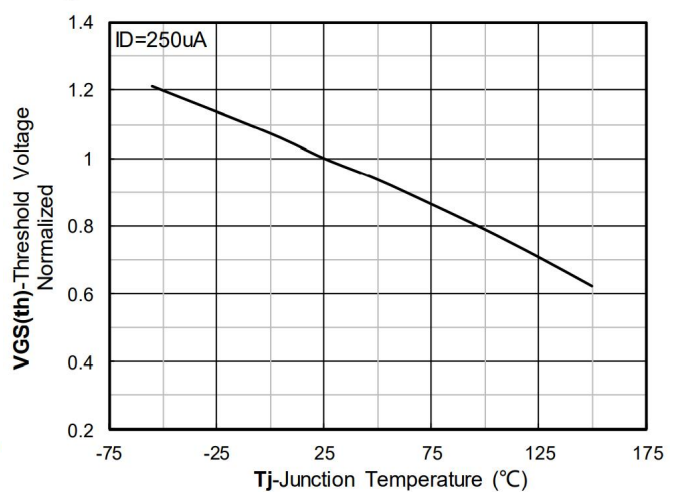


Figure 10. Normalized Threshold voltage

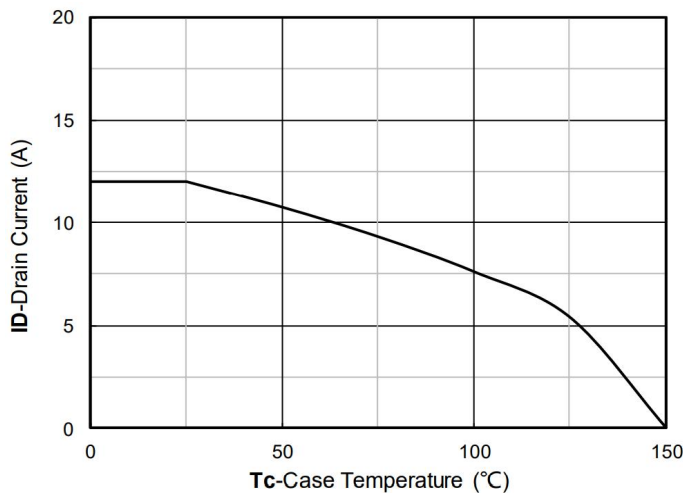


Figure 11. Current dissipation

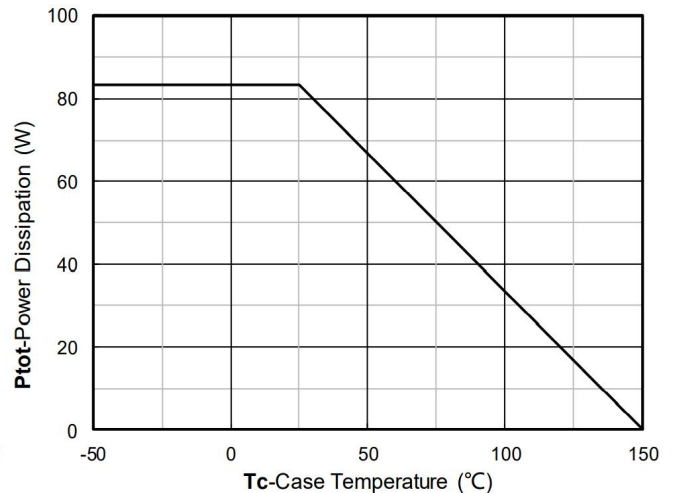


Figure 12. Power dissipation

Typical Characteristics

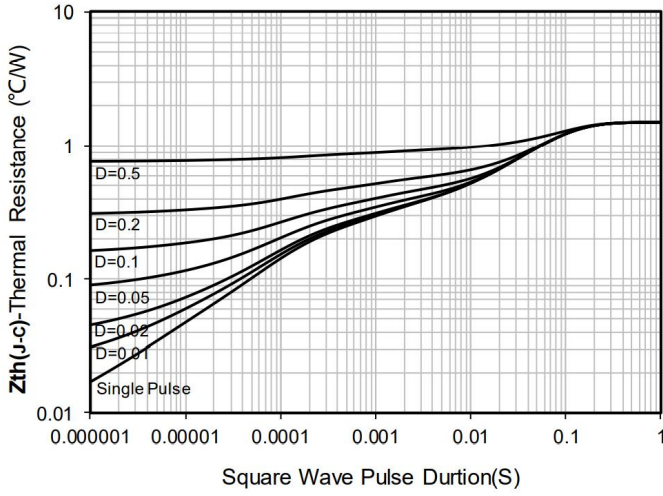


Figure 13. Maximum Transient Thermal Impedance

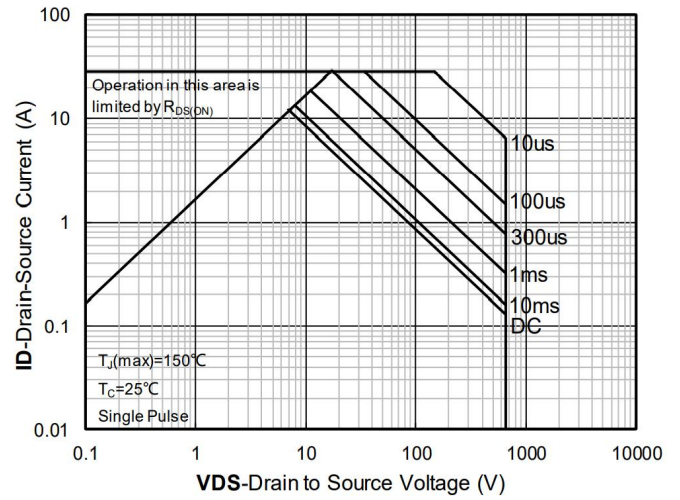
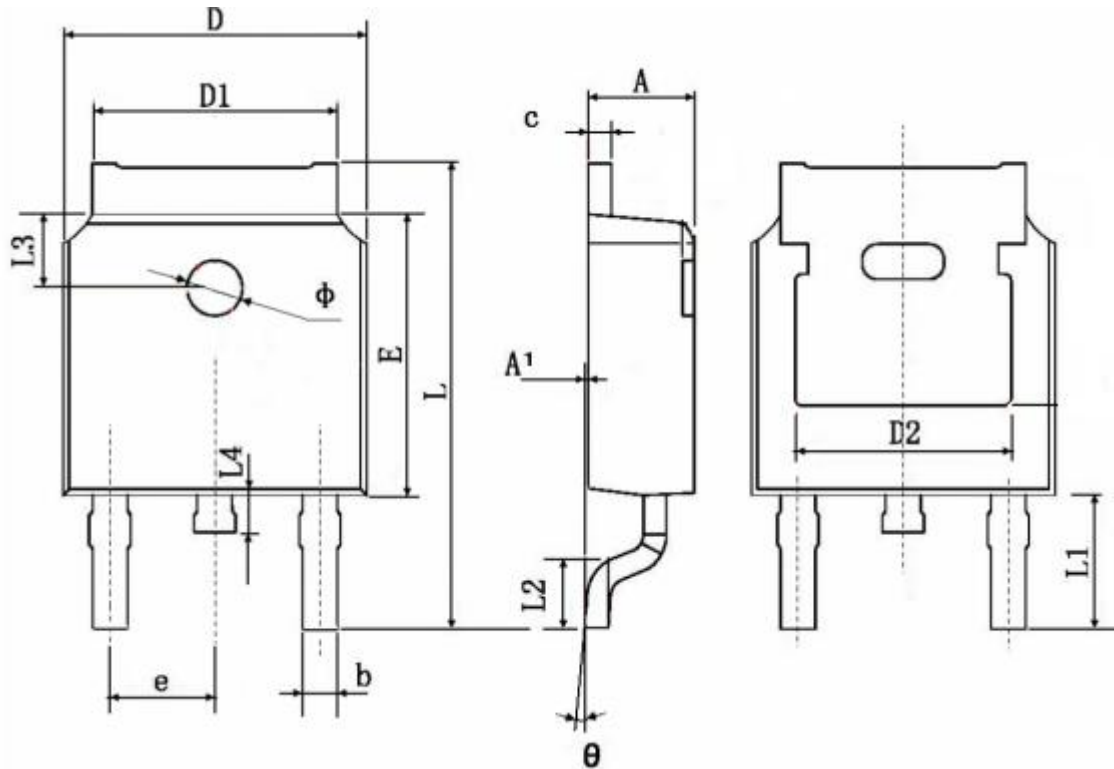


Figure 14. Safe Operation Area

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	0.200	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	5.500	0.201	0.217
D2	4.830 REF		0.190 REF	
E	6.000	6.200	0.236	0.244
e	2.286 BSC		0.090 BSC	
L	9.800	10.500	0.386	0.413
L1	2.900 REF		0.114 REF	
L2	1.250	1.800	0.049	0.070
L3	1.400	1.900	0.055	0.075
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	10°	0°	10°