

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-60V	100mΩ@-10V	-12A
	125mΩ@-4.5V	

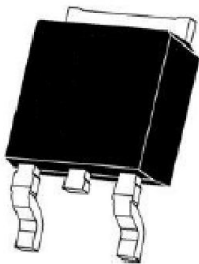
Feature

- 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

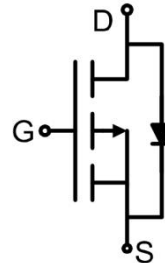
- High side switch for full bridge converter
- DC/DC converters for LCD display

Package

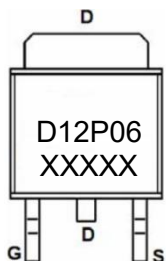


TO-252AB

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	-12	A
Continuous Drain Current(T _C =100°C)	I _D (100°C)	-8.5	A
Pulsed Drain Current	I _{DM}	-30	A
Power Dissipation	P _D	60	W
Avalanche energy ⁴⁾	E _{AS}	50	mJ
Thermal Resistance,Junction-to-Case ¹⁾	R _{θJC}	2.5	°C/W
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	-1.0	-1.5	-2.2	V
Drain-source on-resistance ²⁾	R _{DS(on)}	V _{GS} = -10V, I _D = -12A		84	100	mΩ
		V _{GS} = -4.5V, I _D = -8A		100	125	
Forward Transconductance ²⁾	g _{FS}	V _{GS} = -5V, I _D = -12A		10		S
Dynamic characteristics³⁾						
Input Capacitance	C _{iss}	V _{DS} = -30V, V _{GS} = 0V, f = 1MHz		1630.7		pF
Output Capacitance	C _{oss}			90.6		
Reverse Transfer Capacitance	C _{rss}			77.3		
Total Gate Charge	Q _g	V _{DS} = -30V, V _{GS} = -10V, I _D = -12A		37.6		nC
Gate-Source Charge	Q _{gs}			4.3		
Gate-Drain Charge	Q _{gd}			7.2		
Turn-on delay time	t _{d(on)}	V _{DD} = -30V, V _{GS} = -10V, R _L = 1.5Ω, R _G = 3Ω		11		nS
Turn-on rise time	t _r			14		
Turn-off delay time	t _{d(off)}			33		
Turn-off fall time	t _f			13		
Source-Drain Diode characteristics						
Diode Forward voltage ²⁾	V _{SD}	V _{GS} = 0V, I _S = -12A			-1.2	V
Diode Forward Current ¹⁾	I _S				-12	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = -12A, di/dt = -100A/μs ²⁾		35		nS
Reverse Recovery Charge	Q _{rr}			38		nC

Notes:

- 1) Surface Mounted on FR4 Board, t ≤ 10 sec.
- 2) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- 3) Guaranteed by design, not subject to production
- 4) EAS condition: T_J = 25°C, V_{DS} = -20V, V_{GS} = -10V, L = 1mH, R_G = 25Ω

Typical Characteristics

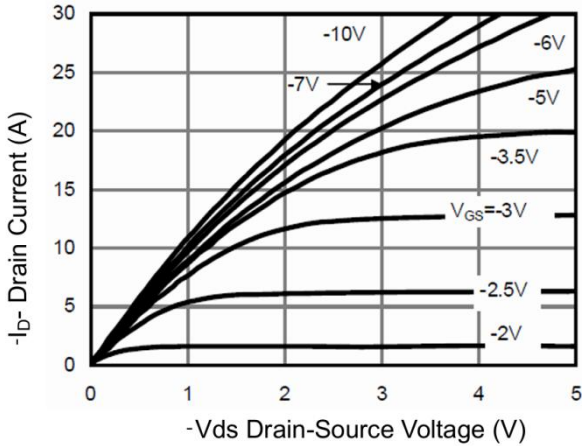


Figure 1 Output Characteristics

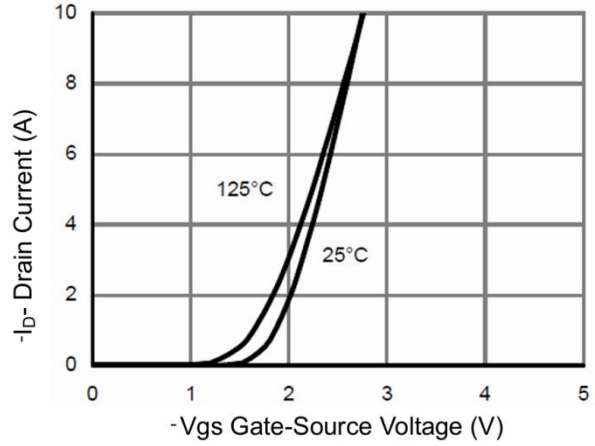


Figure 2 Transfer Characteristics

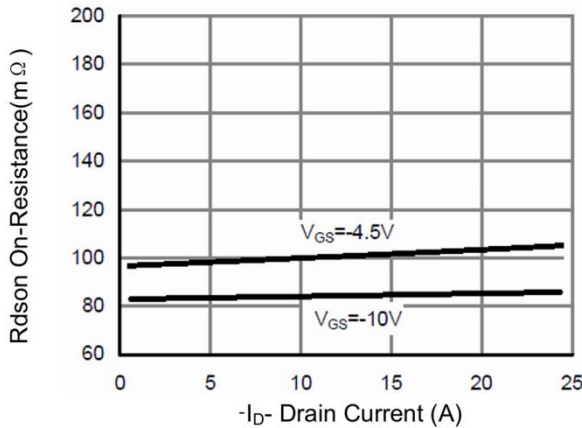


Figure 3 Rdson- Drain Current

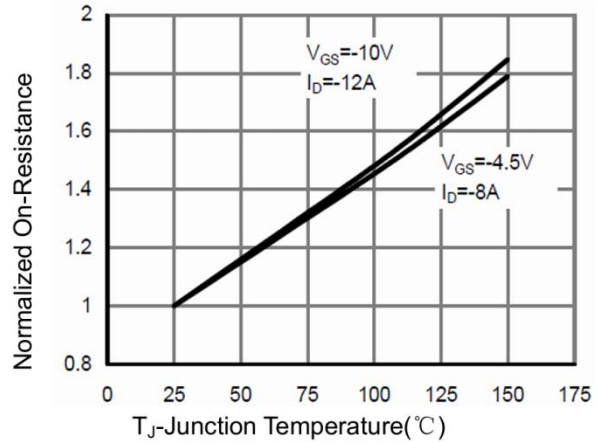


Figure 4 Rdson-Junction Temperature

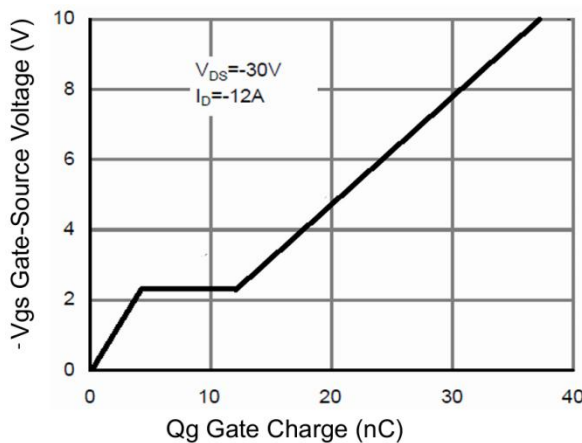


Figure 5 Gate Charge

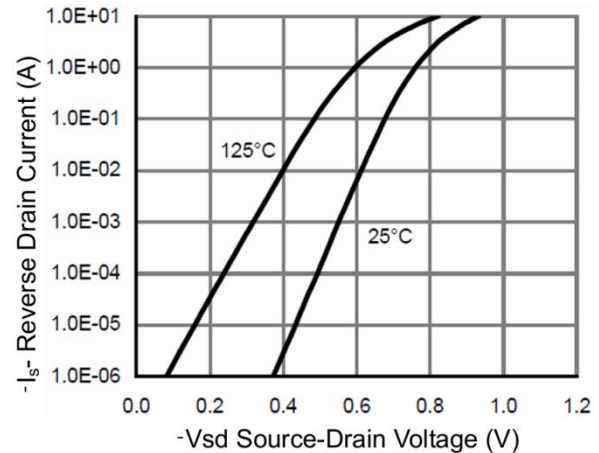


Figure 6 Source- Drain Diode Forward

Typical Characteristics

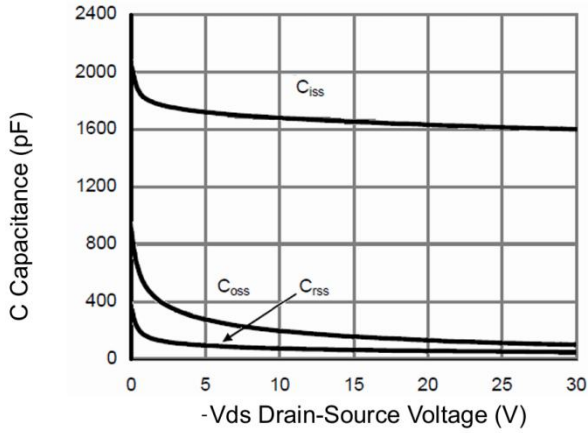


Figure 7 Capacitance vs Vds

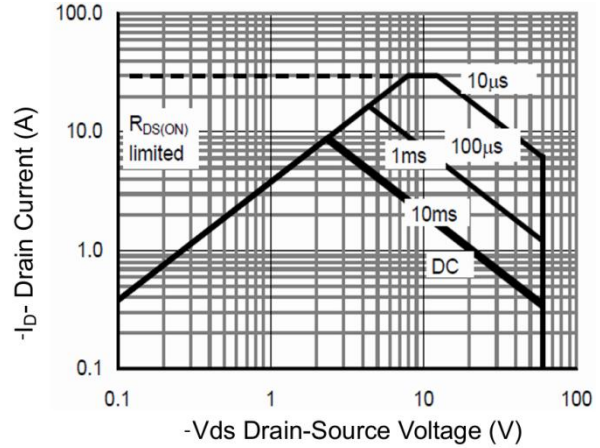


Figure 8 Safe Operation Area

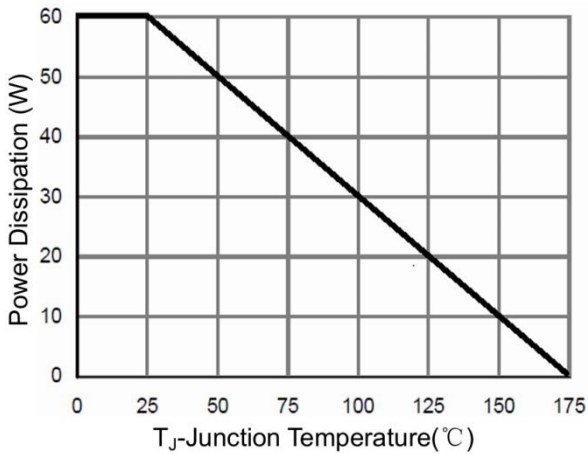


Figure 9 Power De-rating

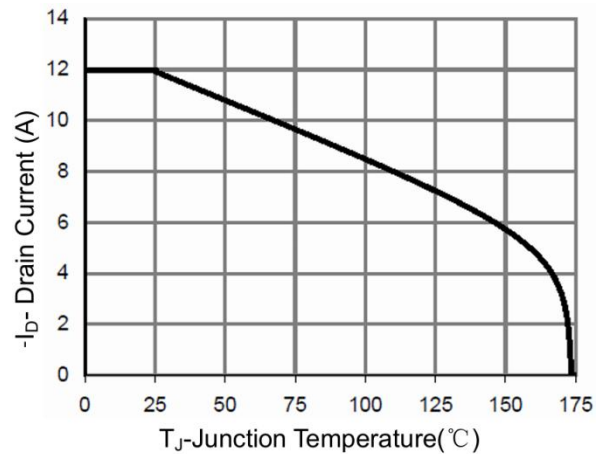


Figure 10 ID Current De-rating

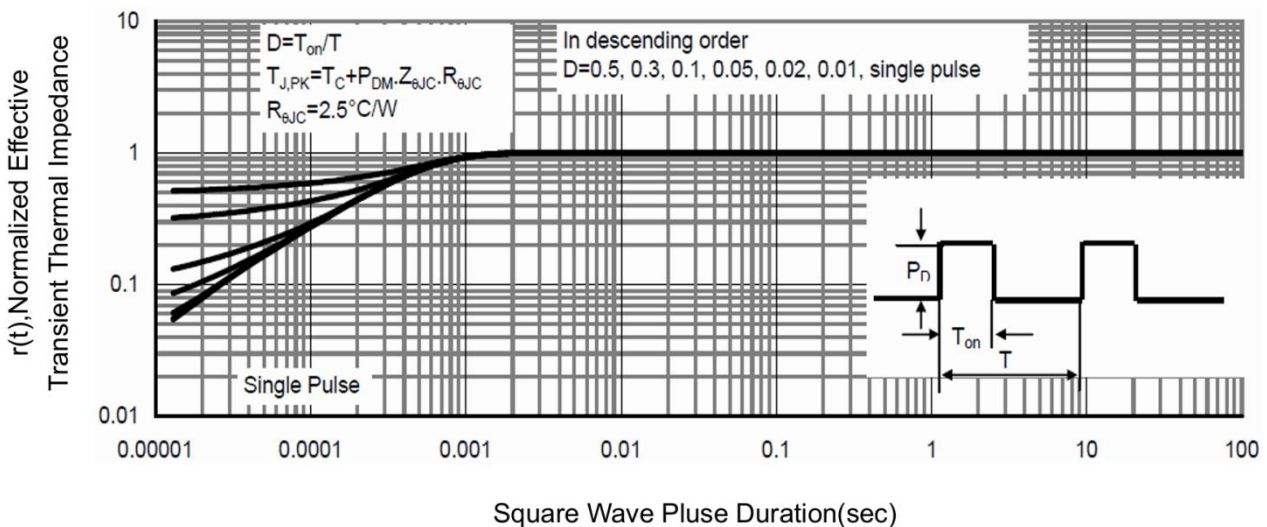
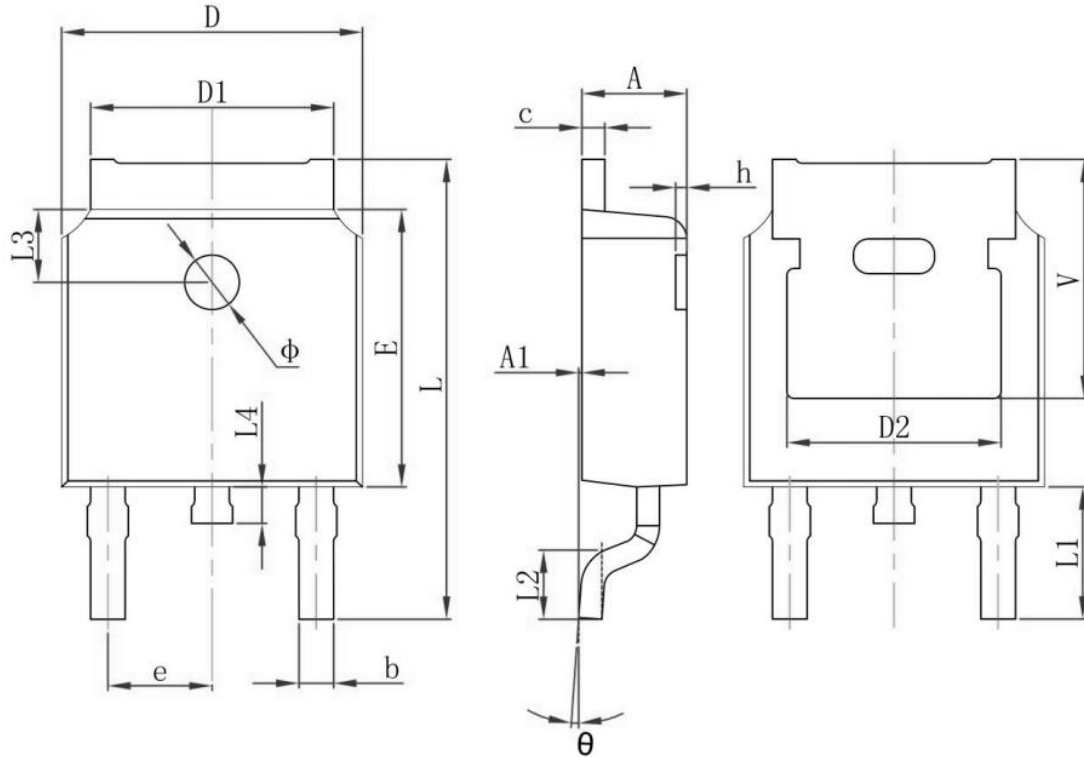


Figure 11 Normalized Maximum Transient Thermal Impedance

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
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
h	0.000	0.300	0.000	0.012
L	9.800	10.500	0.386	0.413
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.800	0.055	0.071
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
V	5.350 REF.		0.211 REF.	
ϕ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°