

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-60V	48mΩ@-10V	-28A
	55mΩ@-4.5V	

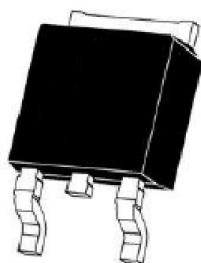
Feature

- Advanced trench technology
- 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

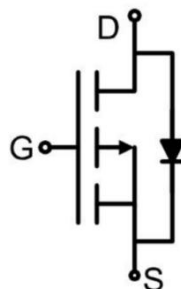
- High side switch for full bridge converter
- DC/DC converter for LCD display

Package

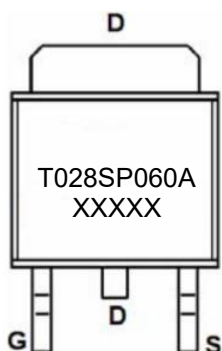


TO-252AB

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	-28	A
Continuous Drain Current (T _c =100°C)	I _D (100°C)	-19.8	A
Pulsed Drain Current	I _{DM}	-112	A
Single Pulse Avalanche Energy ¹⁾	E _{AS}	100	mJ
Power Dissipation	P _D	80	W
Thermal Resistance Junction to Case	R _{θJC}	1.88	°C/W
Operating Junction Temperature	T _J	-55 ~ +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 _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.5	-2	V
Drain-source on-resistance ²⁾	R _{DS(on)}	V _{GS} =-10V, I _D =-20A		40	48	mΩ
		V _{GS} =-4.5V, I _D =-20A		48	55	
Dynamic characteristics ³⁾						
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 =-20A		30		nC
Gate-Source Charge	Q _{gs}			3.4		
Gate-Drain Charge	Q _{gd}			6.7		
Turn-on delay time	t _{d(on)}	V _{DS} =-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 Current	I _S				-28	A
Diode Forward Voltage ²⁾	V _{SD}	V _{GS} =0V, I _S =-20A			-1.2	V
Reverse Recovery Time	T _{rr}	I _F =-20A, di/dt =-100A/μs ²⁾		34		nS
Reverse Recovery Charge	Q _{rr}	T _J =25°C		37		nC

Notes:

- 1) EAS condition: T_J = 25°C, V_{DD} = -30V, V_G = -10V, L = 0.5mH, R_g = 25Ω.
- 2) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- 3) Guaranteed by design, not subject to production testing.

Typical Characteristics

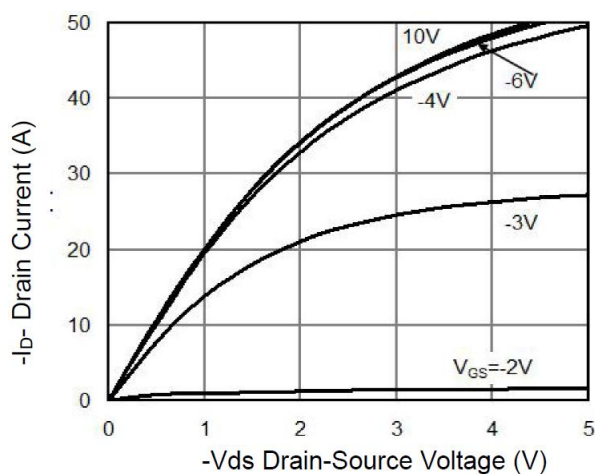


Figure 1 Output Characteristics

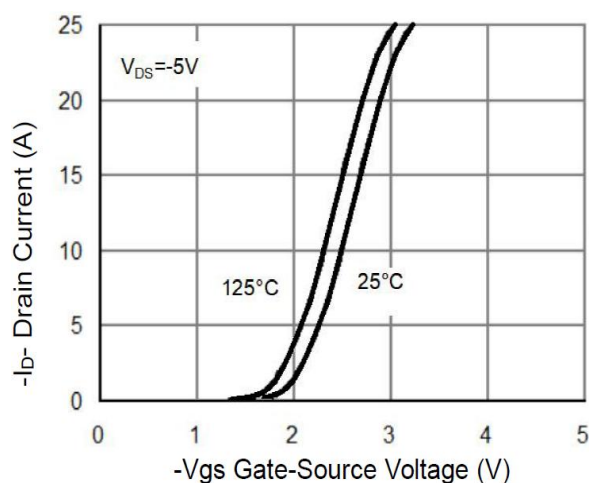


Figure 2 Transfer Characteristics

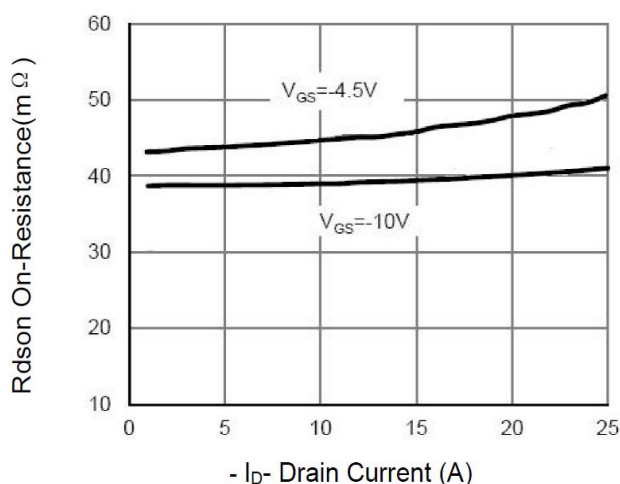


Figure 3 $R_{DS(on)}$ - Drain Current

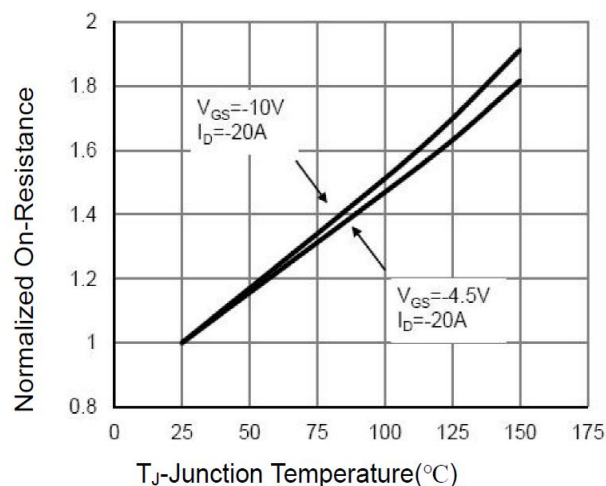


Figure 4 $R_{DS(on)}$ -Junction Temperature

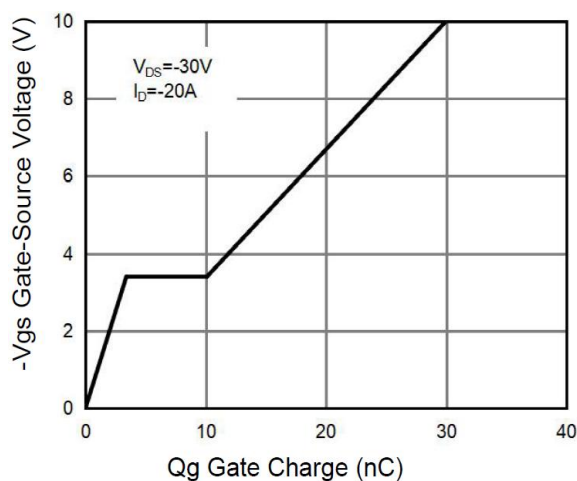


Figure 5 Gate Charge

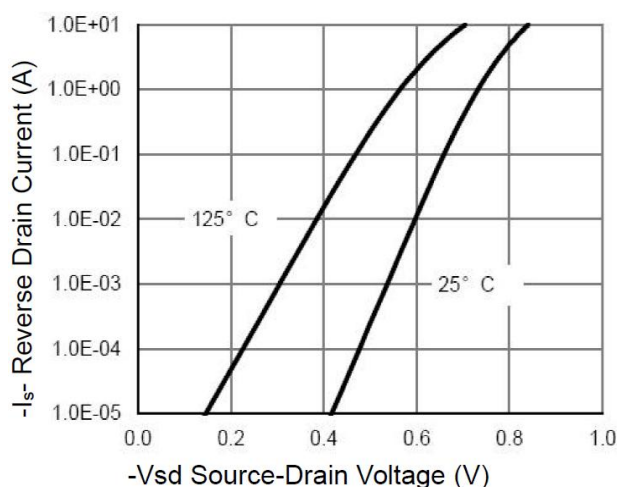


Figure 6 Source- Drain Diode Forward

Typical Characteristics

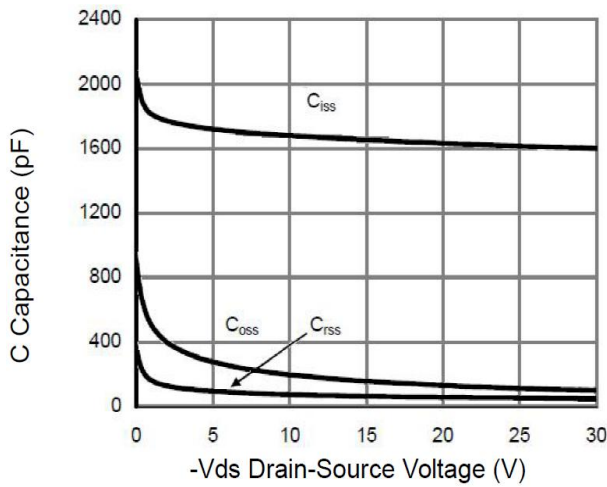


Figure 7 Capacitance vs Vds

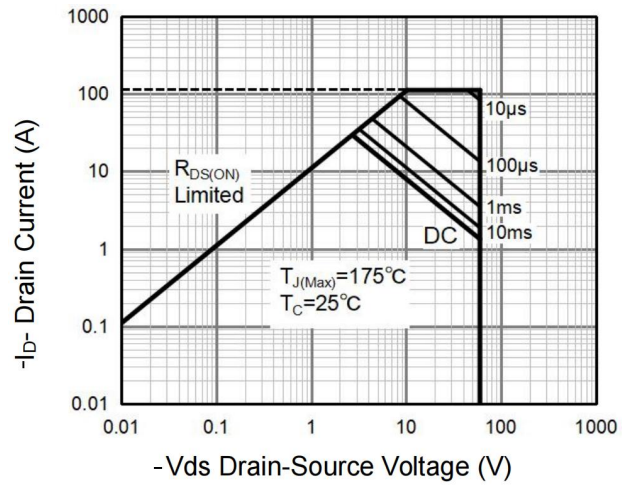


Figure 8 Safe Operation Area

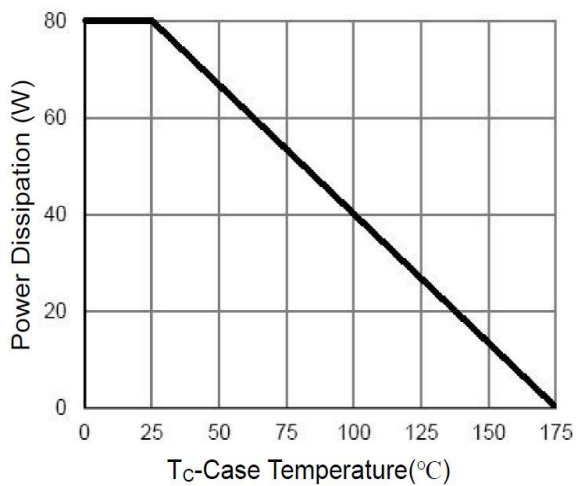


Figure 9 Power De-rating

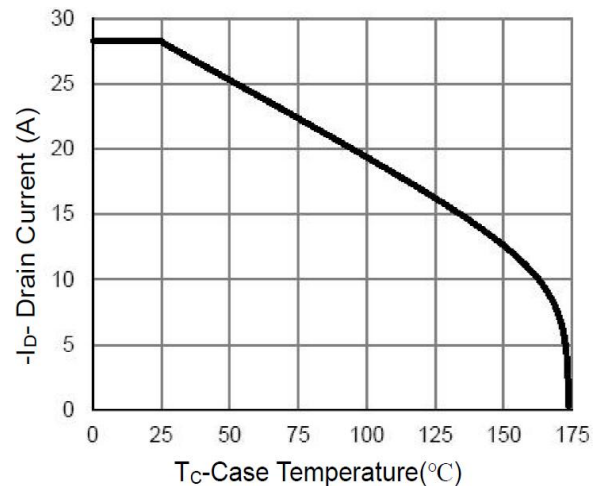


Figure 10 ID Current De-rating

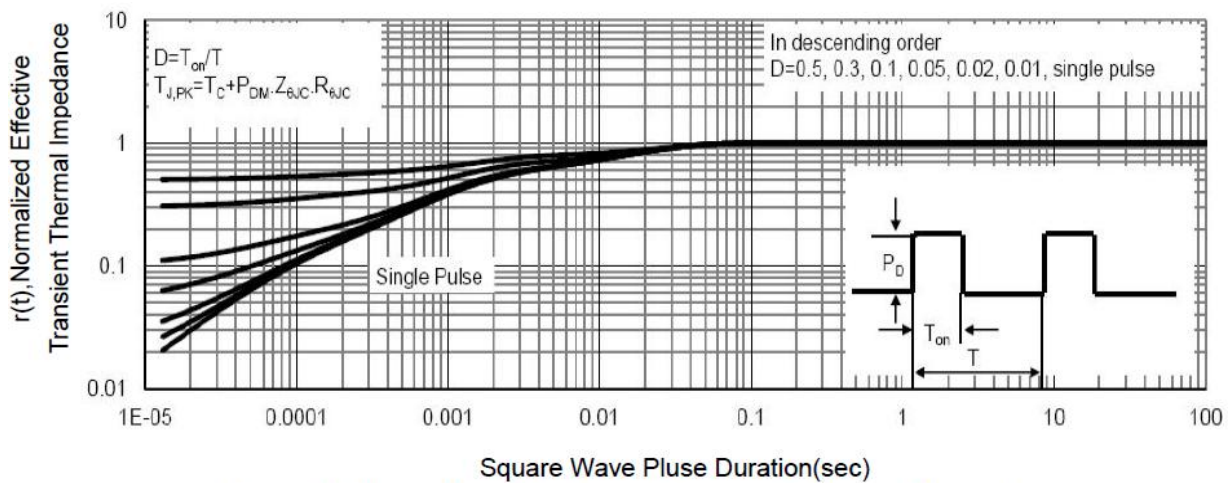


Figure 11 Normalized Maximum Transient Thermal Impedance

Typical Characteristics

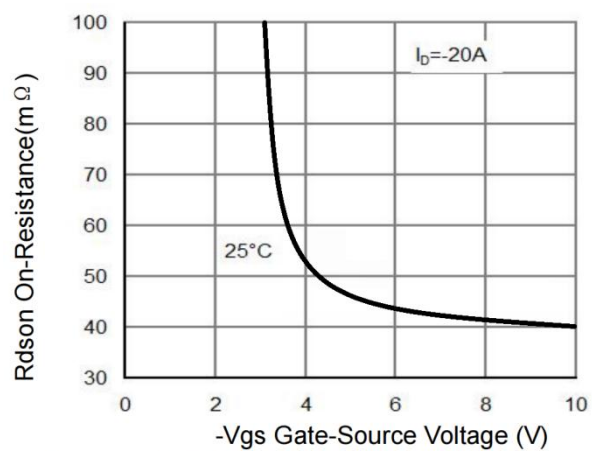
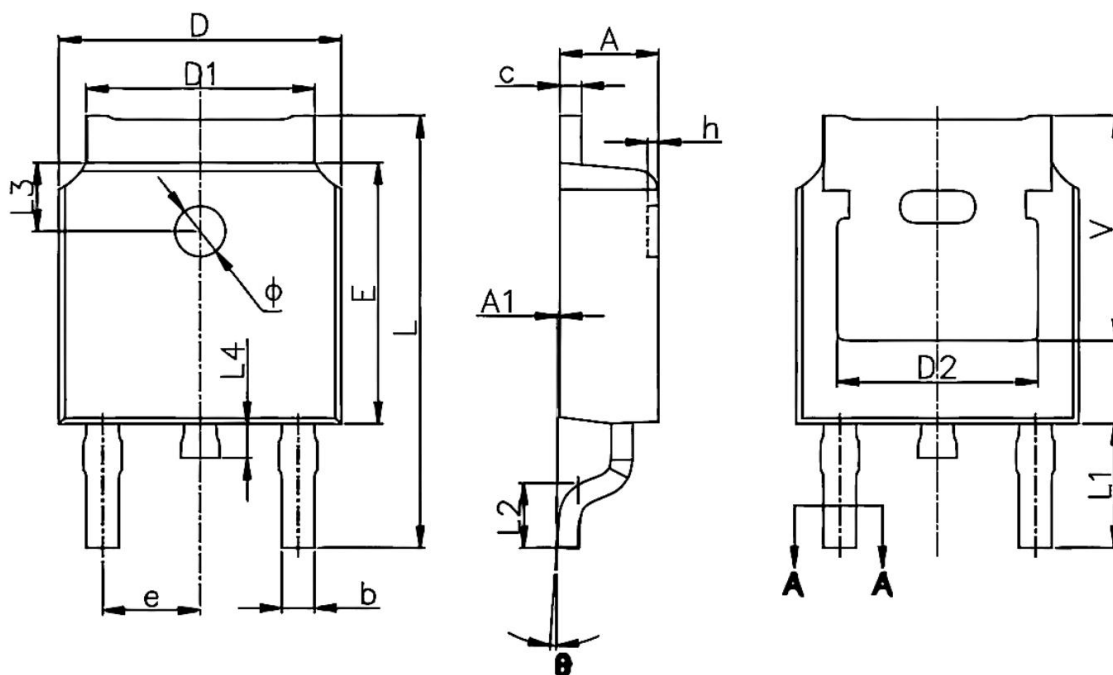


Figure12 Rdson- Gate-Source Voltage

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	5.460	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	0.055	0.067
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°
V	5.350 REF.		0.211 REF.	