

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-40V	6.2mΩ@-10V	-80A
	9.1mΩ@-4.5V	

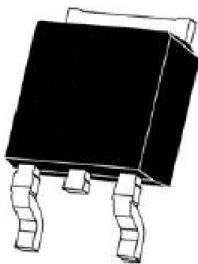
Feature

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Suffix "-Q1" for AEC-Q101

Application

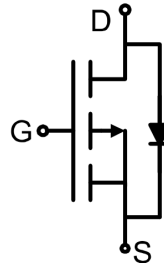
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

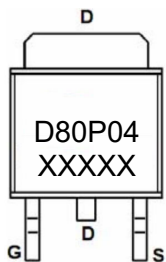


TO-252AB

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	-80	A
Continuous Drain Current($T_C = 100^\circ\text{C}$)	$I_D (100^\circ\text{C})$	-56.5	A
Pulsed Drain Current	I_{DM}	-320	A
Power Dissipation	P_D	150	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.0	$^\circ\text{C}/\text{W}$
Single pulse avalanche energy	E_{AS}	500	mJ
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$	-40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -40\text{V}, V_{GS} = 0\text{V}$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$			±100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-0.8		-1.8	V
Drain-source on-resistance ¹⁾	$R_{DS(on)}$	$V_{GS} = -10\text{V}, I_D = -20\text{A}$		5.6	6.2	m Ω
		$V_{GS} = -4.5\text{V}, I_D = -20\text{A}$		7.6	9.1	
Forward transconductance ¹⁾	g_{FS}	$V_{DS} = -5\text{V}, I_D = -20\text{A}$		30		S
Dynamic characteristics²⁾						
Input Capacitance	C_{iss}	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$		3738		pF
Output Capacitance	C_{oss}			882		
Reverse Transfer Capacitance	C_{rss}			22		
Total Gate Charge	Q_g	$V_{DS} = -20\text{V}, V_{GS} = -10\text{V}, I_D = -20\text{A}$		57.2		nC
Gate-Source Charge	Q_{gs}			9.8		
Gate-Drain Charge	Q_{gd}			7.3		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -20\text{V}, V_{GS} = -10\text{V}, I_D = -20\text{A}, R_{GEN} = 1.6\Omega$		10.5		nS
Turn-on rise time	t_r			4		
Turn-off delay time	$t_{d(off)}$			35		
Turn-off fall time	t_f			5		
Source-Drain Diode characteristics						
Diode Forward Current ¹⁾	I_S				-80	A
Diode Forward voltage	V_{DS}	$V_{GS} = 0\text{V}, I_S = -20\text{A}$			-1.2	V
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = -20\text{A}$			24	nS
Reverse Recovery Charge	Q_{rr}	$di/dt = -100\text{A}/\mu\text{s}$ ¹⁾			68	nC

Notes:

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

Typical Characteristics

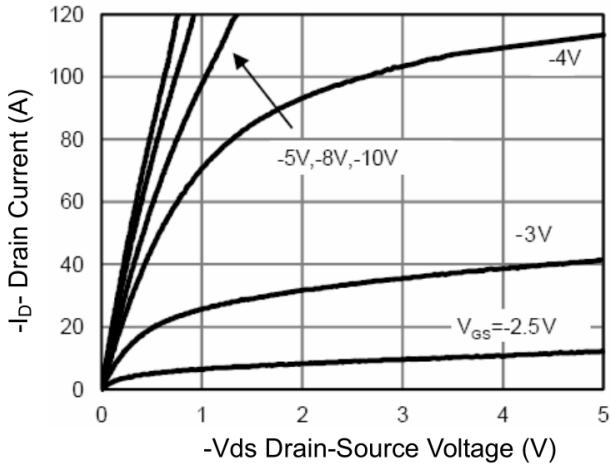


Figure 1 Output Characteristics

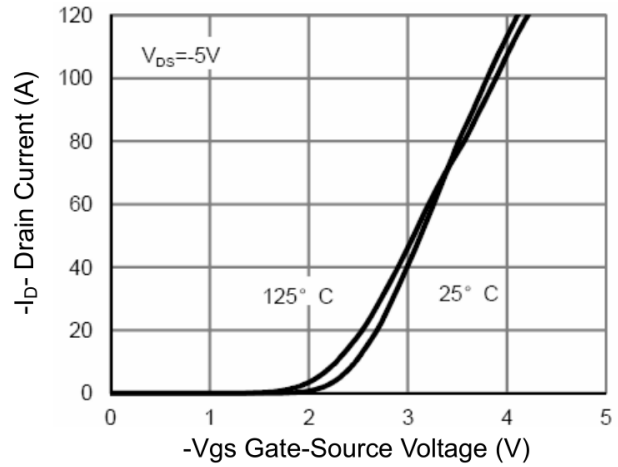


Figure 2 Transfer Characteristics

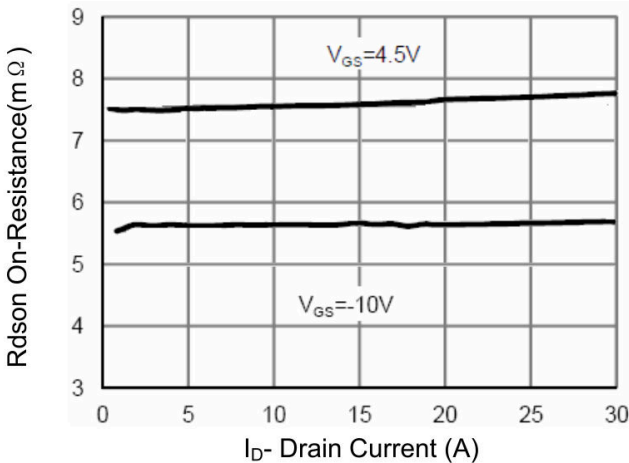


Figure 3 Rdson- Drain Current

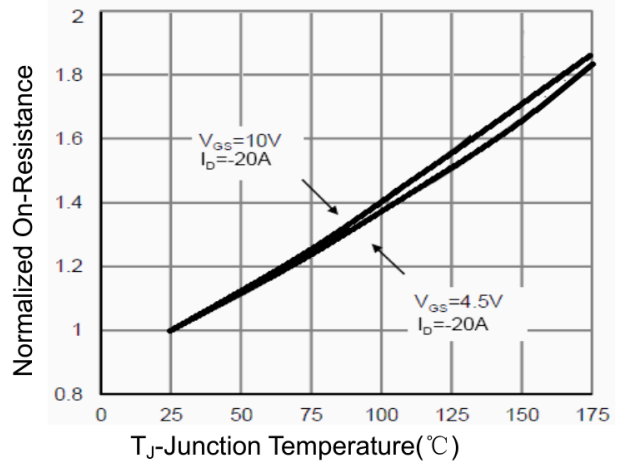


Figure 4 Rdson-Junction Temperature

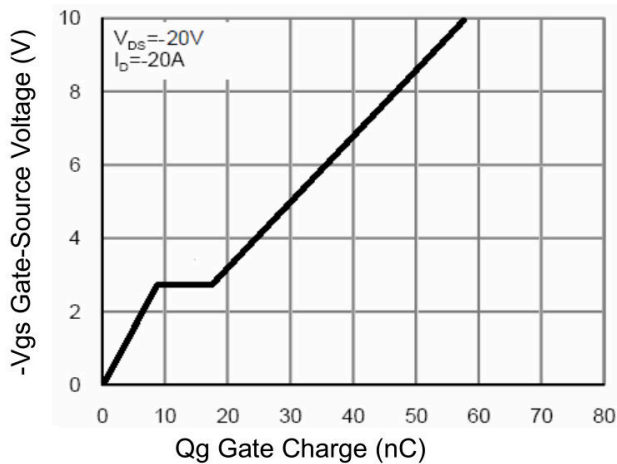


Figure 5 Gate Charge

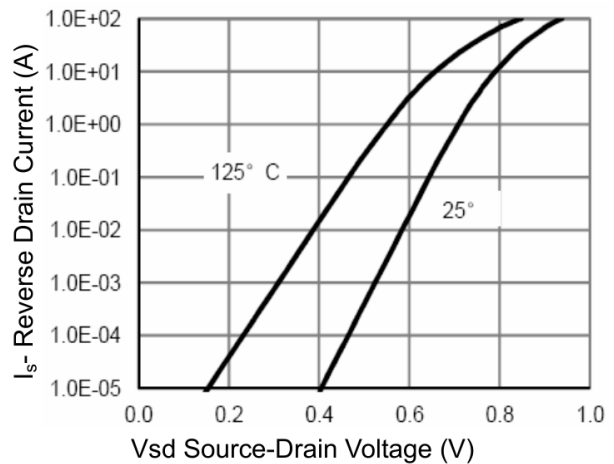


Figure 6 Source- Drain Diode Forward

Typical Characteristics

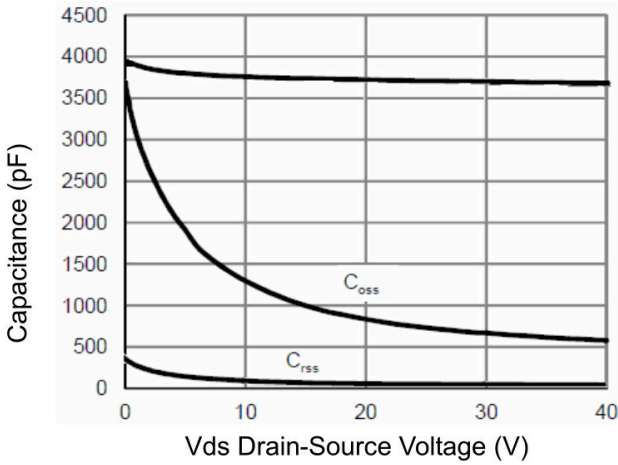


Figure 7 Capacitance vs Vds

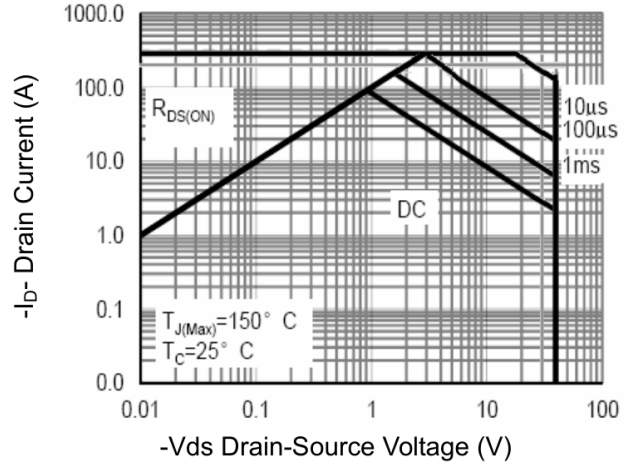


Figure 8 Safe Operation Area

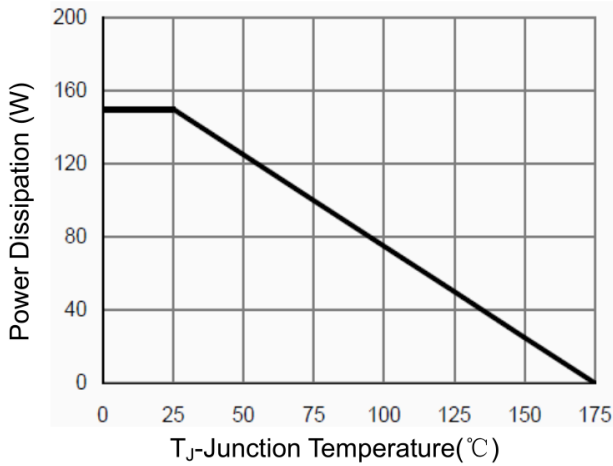


Figure 9 Power De-rating

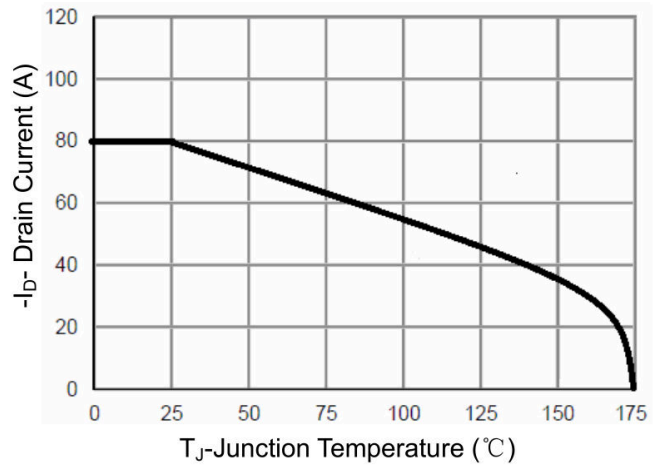


Figure 10 Current De-rating

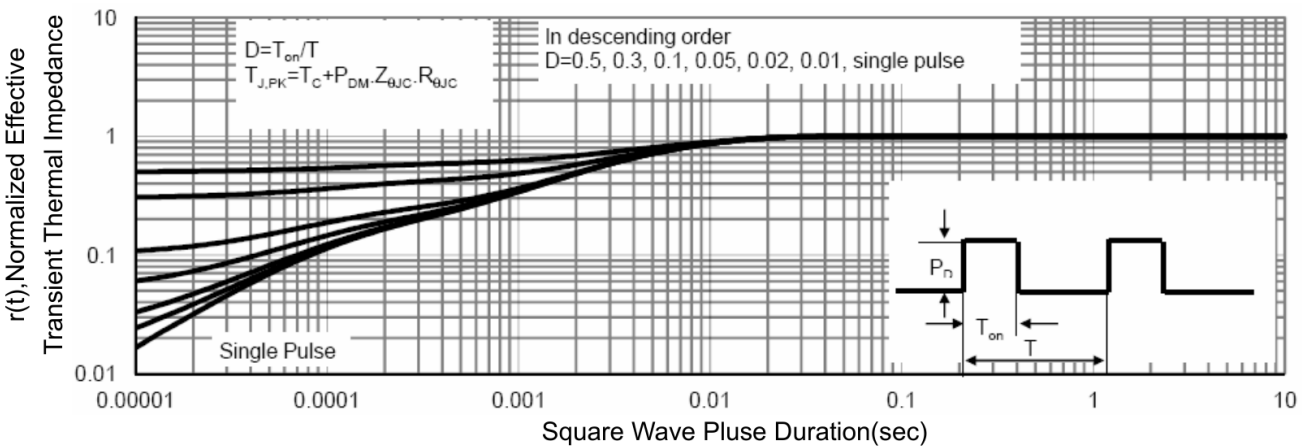
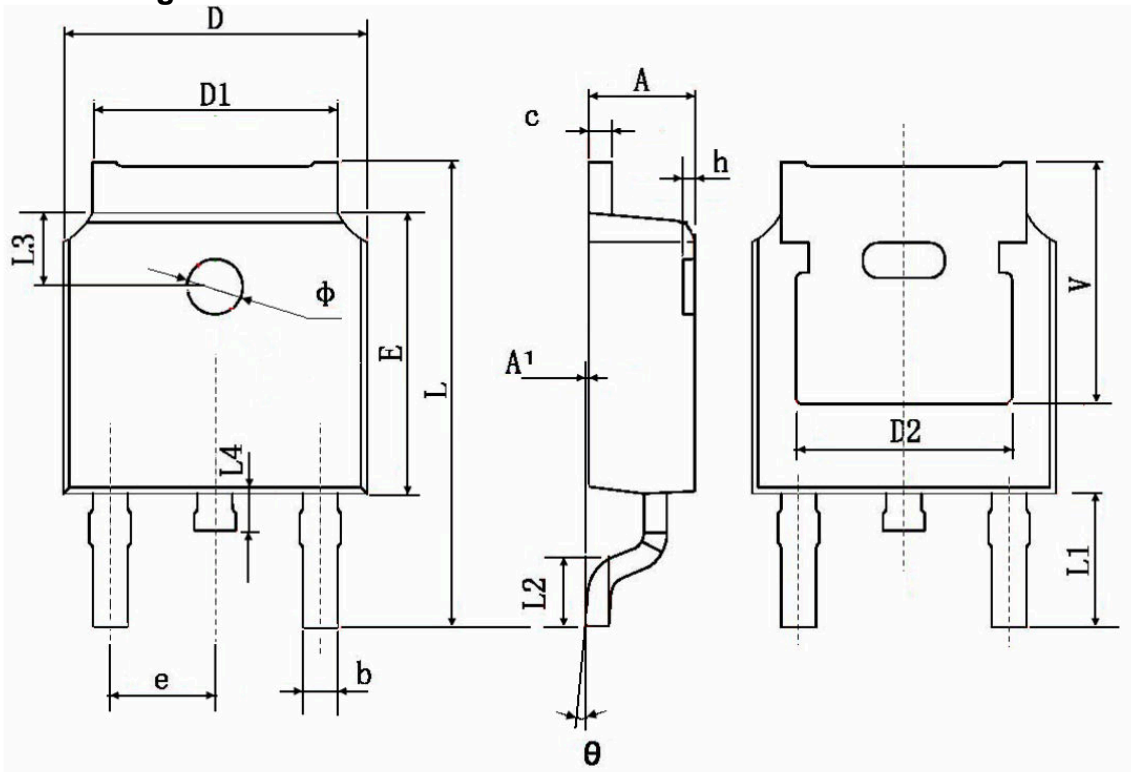


Figure 11 Normalized Maximum Transient Thermal Impedance

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	0.127	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 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	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
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
V	5.350 TYP.		0.211 TYP.	