

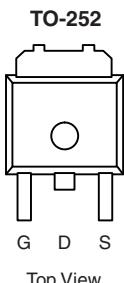
FQD25N06-VB Datasheet

N-Channel 60-V (D-S) MOSFET

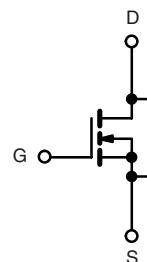
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
60	0.025 at $V_{GS} = 10$ V	45
	0.030 at $V_{GS} = 4.5$ V	40

FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature



Drain Connected to Tab



ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Gate-Source Voltage	V_{GS}	± 20	V	
Continuous Drain Current ($T_J = 175$ °C) ^b	I_D	45	A	
		35		
Pulsed Drain Current	I_{DM}	100	A	
Continuous Source Current (Diode Conduction)	I_S	23		
Avalanche Current	I_{AS}	20		
Single Avalanche Energy (Duty Cycle ≤ 1 %)	E_{AS}	20		mJ
Maximum Power Dissipation	P_D	100	W	
		3 ^a		
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	18	22	°C/W	
	Steady State	40	50		
Maximum Junction-to-Case	R_{thJC}	3.2	4		

Notes:

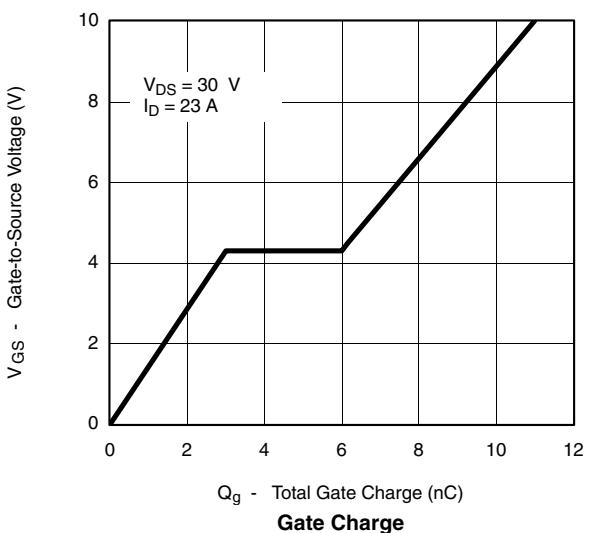
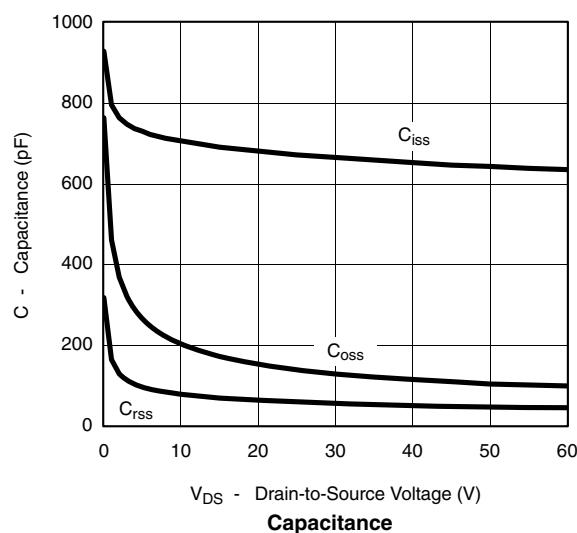
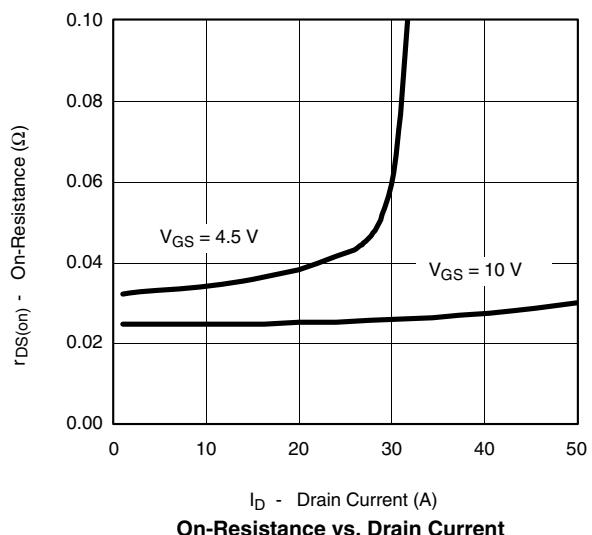
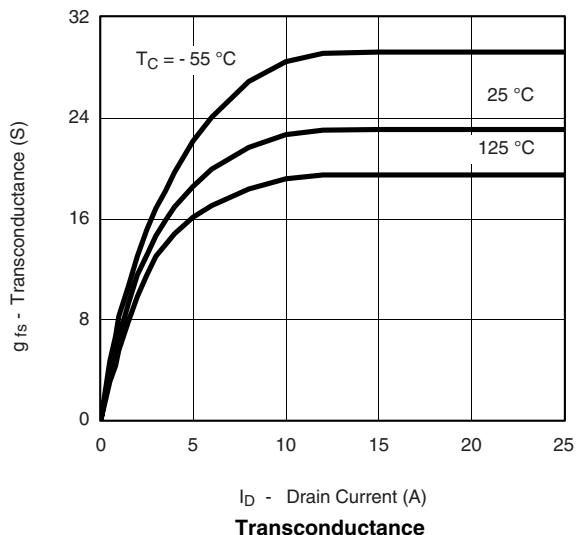
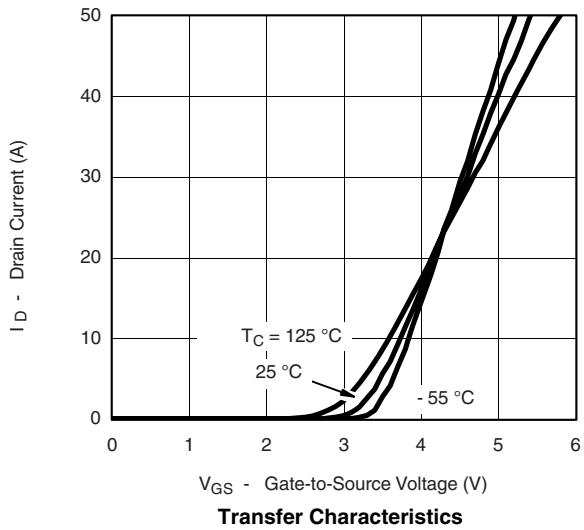
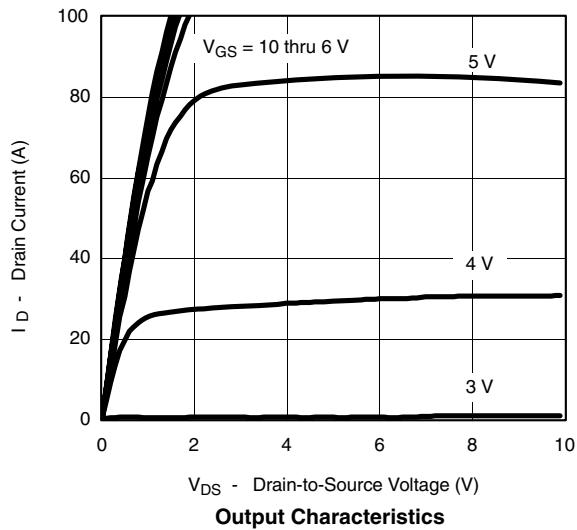
a. Surface Mounted on 1" x 1" FR4 board, $t \leq 10$ sec.

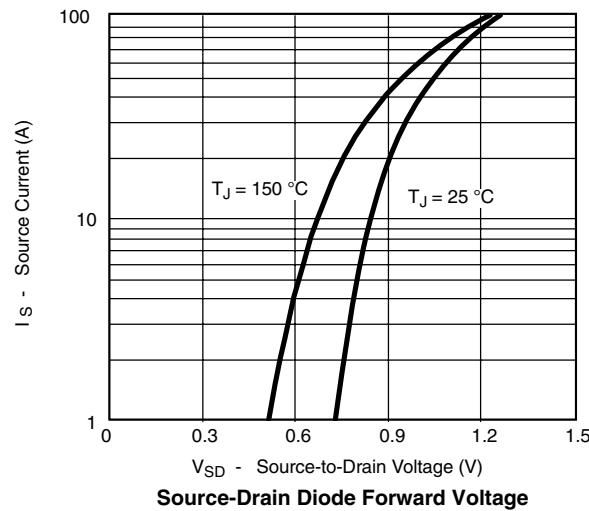
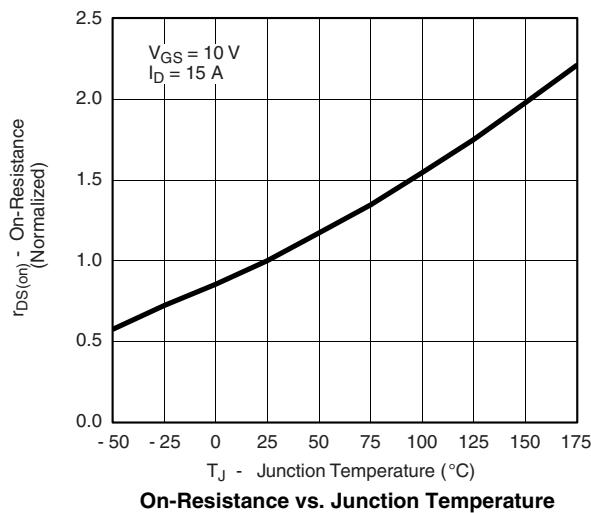
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}, I_D = 250 \mu\text{A}$	60			V
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250 \mu\text{A}$	1.0	2.0	3.0	
Gate-Body Leakage	I_{GSS}	$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = 60 \text{ V}, V_{\text{GS}} = 0 \text{ V}$		1		μA
		$V_{\text{DS}} = 60 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 125^\circ\text{C}$		50		
		$V_{\text{DS}} = 60 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 175^\circ\text{C}$		250		
On-State Drain Current ^b	$I_{\text{D}(\text{on})}$	$V_{\text{DS}} = 5 \text{ V}, V_{\text{GS}} = 10 \text{ V}$	50			A
Drain-Source On-State Resistance ^b	$r_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 10 \text{ V}, I_D = 15 \text{ A}$		0.025		Ω
		$V_{\text{GS}} = 10 \text{ V}, I_D = 15 \text{ A}, T_J = 125^\circ\text{C}$		0.055		
		$V_{\text{GS}} = 10 \text{ V}, I_D = 15 \text{ A}, T_J = 175^\circ\text{C}$		0.069		
		$V_{\text{GS}} = 4.5 \text{ V}, I_D = 10 \text{ A}$		0.030		
Forward Transconductance ^b	g_{fs}	$V_{\text{DS}} = 15 \text{ V}, I_D = 15 \text{ A}$		20		S
Dynamic^a						
Input Capacitance	C_{iss}	$V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = 25 \text{ V}, f = 1 \text{ MHz}$		1500		pF
Output Capacitance	C_{oss}			140		
Reverse Transfer Capacitance	C_{rss}			60		
Total Gate Charge ^c	Q_g	$V_{\text{DS}} = 30 \text{ V}, V_{\text{GS}} = 10 \text{ V}, I_D = 23 \text{ A}$		11	17	nC
Gate-Source Charge ^c	Q_{gs}			3		
Gate-Drain Charge ^c	Q_{gd}			3		
Turn-On Delay Time ^c	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = 30 \text{ V}, R_L = 1.3 \Omega$ $I_D \geq 23 \text{ A}, V_{\text{GEN}} = 10 \text{ V}, R_g = 2.5 \Omega$		8	15	ns
Rise Time ^c	t_r			15	25	
Turn-Off Delay Time ^c	$t_{\text{d}(\text{off})}$			30	45	
Fall Time ^c	t_f			25	40	
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$)						
Pulsed Current	I_{SM}				50	A
Diode Forward Voltage	V_{SD}	$I_F = 15 \text{ A}, V_{\text{GS}} = 0 \text{ V}$		1.0	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 15 \text{ A}, \text{di}/\text{dt} = 100 \text{ A}/\mu\text{s}$		30	60	ns

Notes:

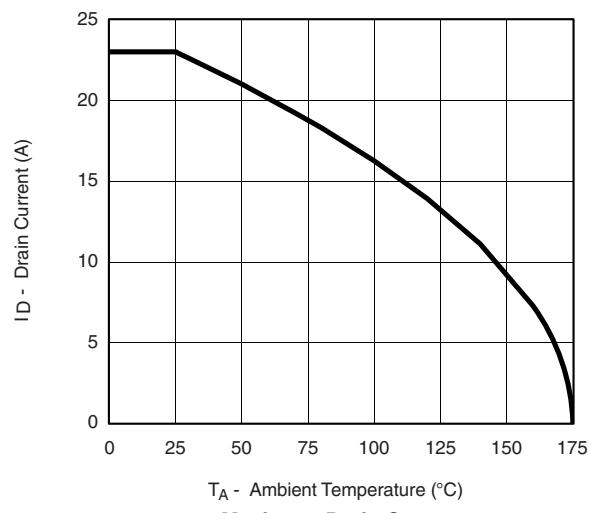
- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
- c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C unless noted


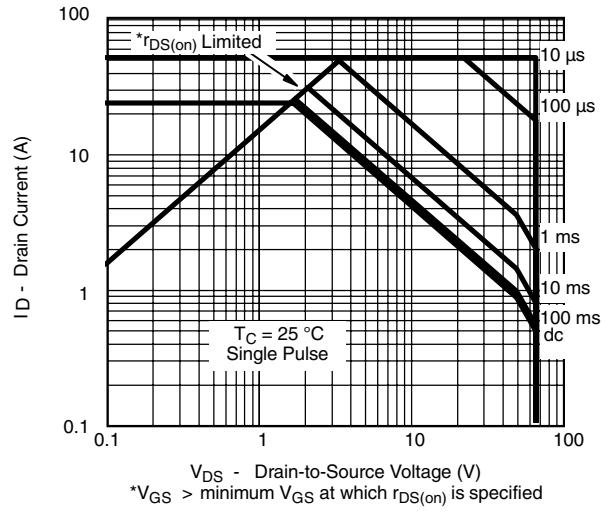
TYPICAL CHARACTERISTICS 25 °C unless noted

THERMAL RATINGS



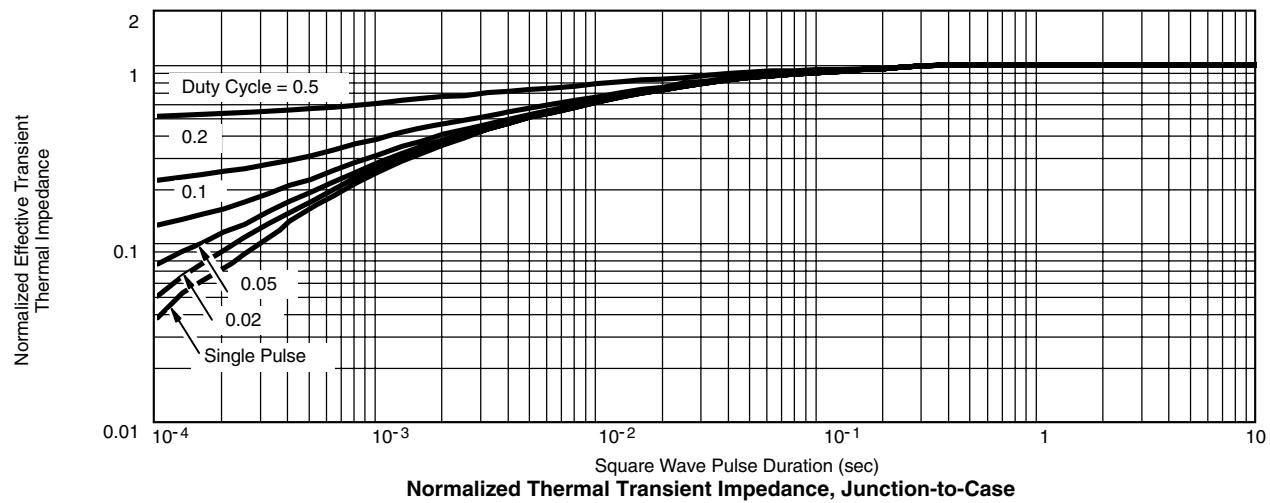
T_A - Ambient Temperature (°C)

**Maximum Drain Current
vs. Ambient Temperature**



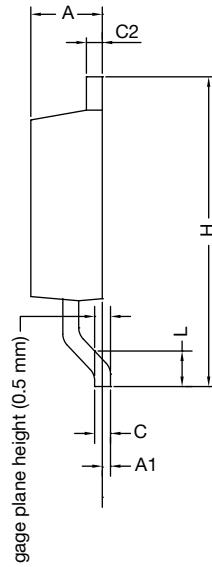
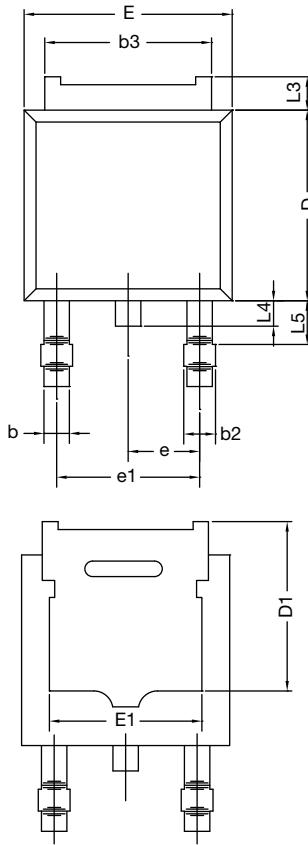
V_{DS} - Drain-to-Source Voltage (V)
 $*V_{GS} > \text{minimum } V_{GS} \text{ at which } r_{DS(on)} \text{ is specified}$

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

TO-252AA CASE OUTLINE

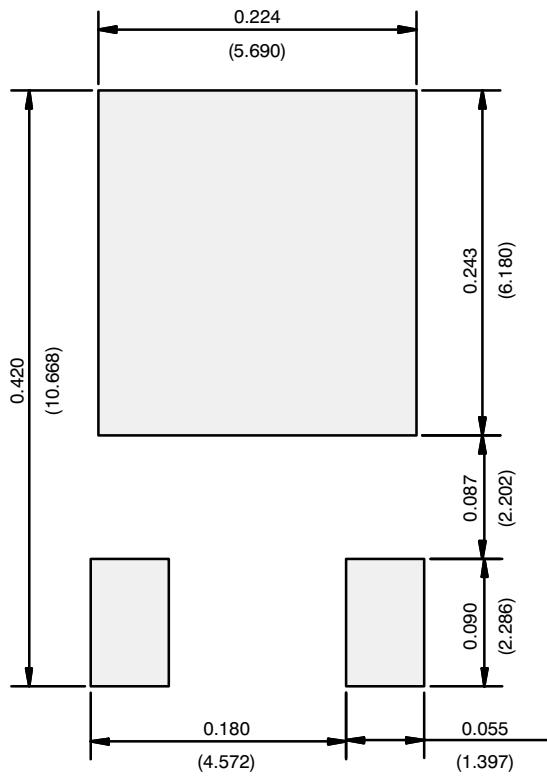


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.14	1.52	0.045	0.060

ECN: X12-0247-Rev. M, 24-Dec-12
 DWG: 5347

Note

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)

Recommended Minimum Pads
Dimensions in Inches/(mm)

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