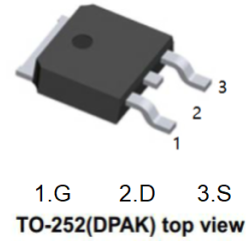


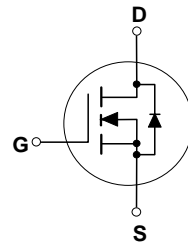
Features

- $V_{DS}(V) = 60V$
- $I_D = 38A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 21m\Omega$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 25m\Omega$ ($V_{GS} = 6V$)
- Low gate charge (33nC typical).
- Fast switching speed.
- High performance trench technology for extremely low $R_{DS(on)}$.



Applications

- DC/DC converter
- Motor drives



Absolute Maximum Ratings $T_A = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Maximum Drain Current - Continuous (Note 1) (Note 1a)	38 8.5	A
	Maximum Drain Current - Pulsed	100	
P_D	Maximum Power Dissipation @ $T_C = 25^\circ C$ (Note 1)	60	W
	$T_A = 25^\circ C$ (Note 1a)	2.8	
	$T_A = 25^\circ C$ (Note 1b)	1.3	
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$
Thermal Characteristics			
$R_{\theta JC}$	Thermal Resistance, Junction-to- Case (Note 1)	2.1	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to- Ambient (Note 1b)	96	$^\circ C/W$

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
W _{DSS}	Single Pulse Drain-Source Avalanche Energy	V _{DD} = 30 V, I _D = 38 A			140	mJ
I _{AR}	Maximum Drain-Source Avalanche Current				38	A
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	60			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		60		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 48 V, V _{GS} = 0 V			1	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 20V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -20 V, V _{DS} = 0 V			-100	nA

On Characteristics (Note 2)

V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	2	2.4	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I _D = 250 μA, Referenced to 25°C		-6.4		mV/°C
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 8.5 A V _{GS} = 6 V, I _D = 7.5 A		17 19	21 25	mΩ
I _{D(on)}	On-State Drain Current	V _{GS} = 10 V, V _{DS} = 5 V	50			A
g _{FS}	Forward Transconductance	V _{DS} = 5 V, I _D = 8.5 A		30		S

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = 30 V, V _{GS} = 0 V, f = 1.0 MHz		1835		pF
C _{oss}	Output Capacitance			210		pF
C _{rss}	Reverse Transfer Capacitance			90		pF

Switching Characteristics (Note 2)

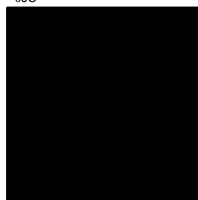
t _{d(on)}	Turn-On Delay Time	V _{DD} = 30 V, I _D = 1 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		15	27	ns
t _r	Turn-On Rise Time			9	18	ns
t _{d(off)}	Turn-Off Delay Time			35	56	ns
t _f	Turn-Off Fall Time			16	26	ns
Q _g	Total Gate Charge	V _{DS} = 30 V, I _D = 8.5 A, V _{GS} = 10 V,		33	46	nC
Q _{gs}	Gate-Source Charge			6.5		nC
Q _{gd}	Gate-Drain Charge			7.5		nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximum Continuous Drain-Source Diode Forward Current			2.3		A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 2.3 A (Note 2)		0.75	1.2	V

Notes:

- R_{θJA} is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the drain tab. R_{θJC} is guaranteed by design while R_{θJA} is determined by the user's board design.



■ a) R_{θJA} = 45°C/W when mounted on a 1in² pad of 2oz copper.

■ b) R_{θJA} = 96°C/W when mounted on a 0.076 in² pad of 2oz copper.

Scale 1 : 1 on letter size paper

- Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

Typical Characteristics

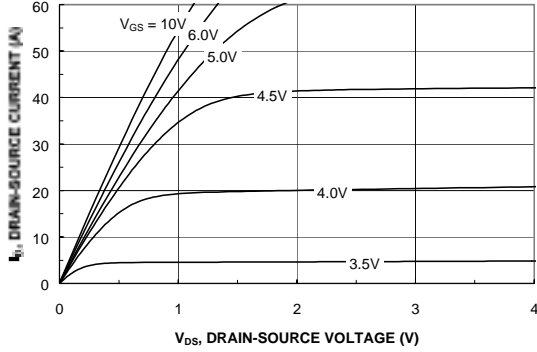


Figure 1. On-Region Characteristics.

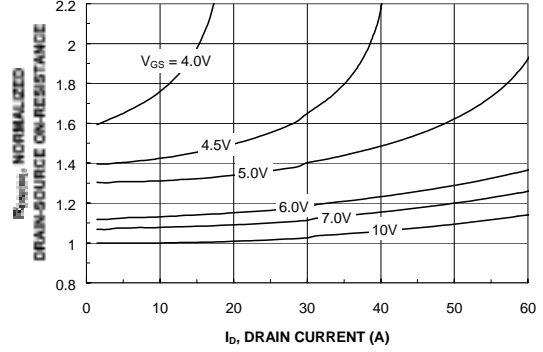


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

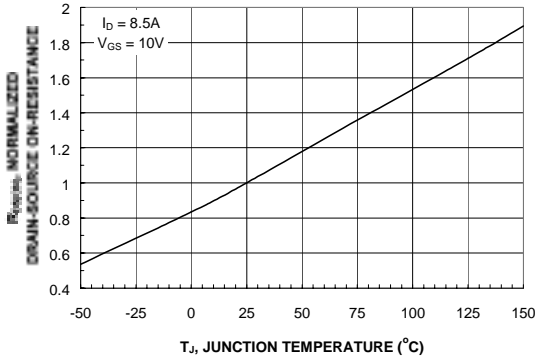


Figure 3. On-Resistance Variation with Temperature.

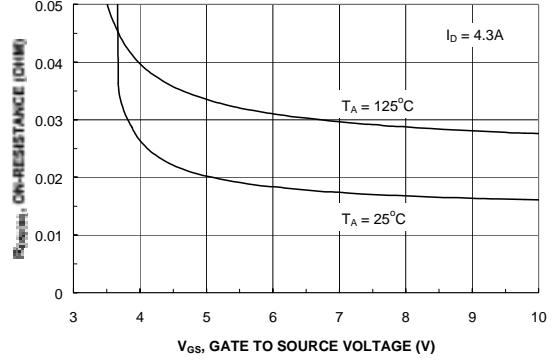


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

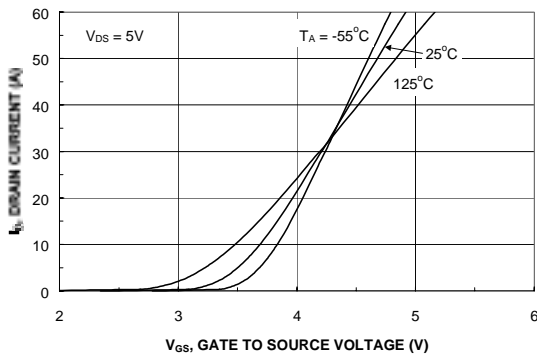


Figure 5. Transfer Characteristics.

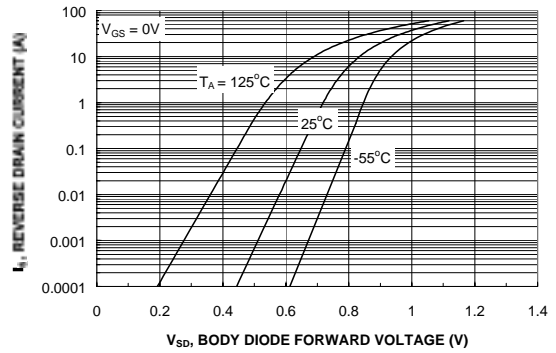


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics

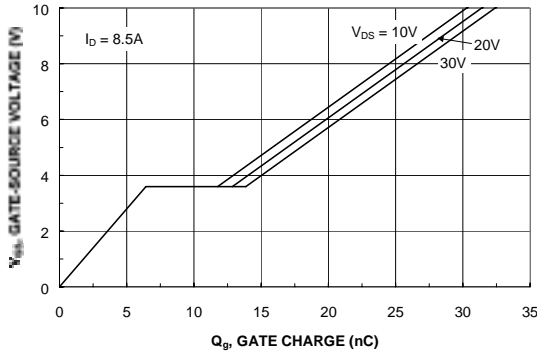


Figure 7. Gate-Charge Characteristics.

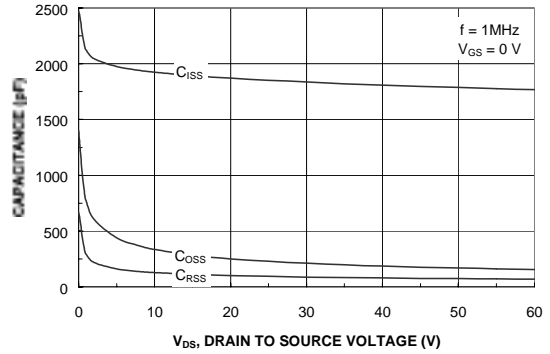


Figure 8. Capacitance Characteristics.

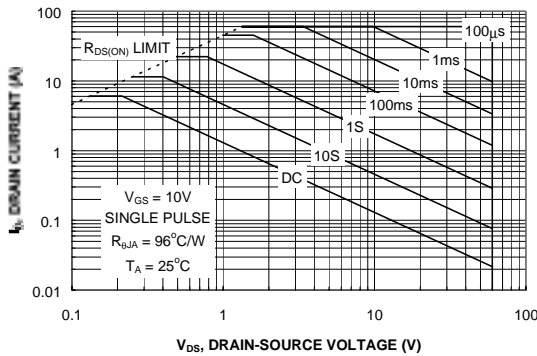


Figure 9. Maximum Safe Operating Area.

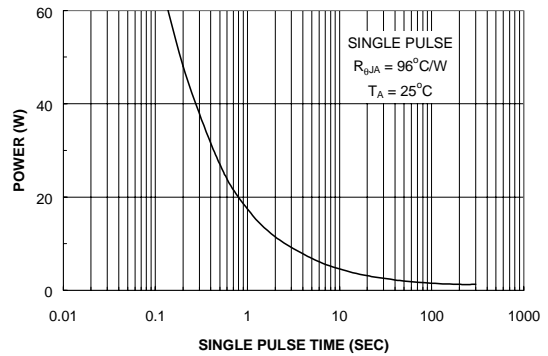


Figure 10. Single Pulse Maximum Power Dissipation.

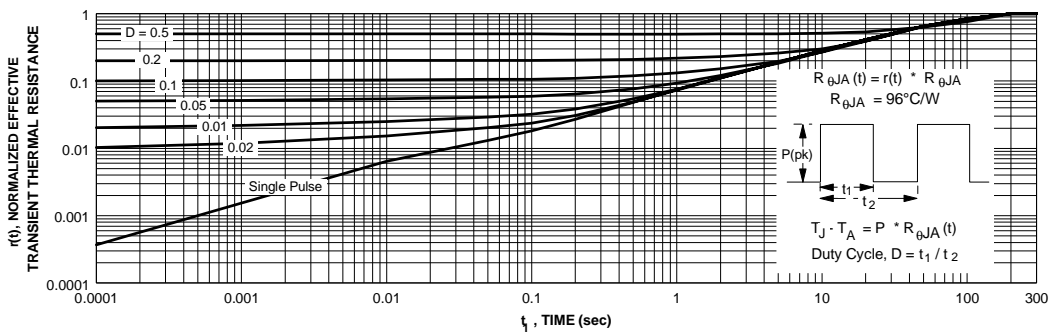
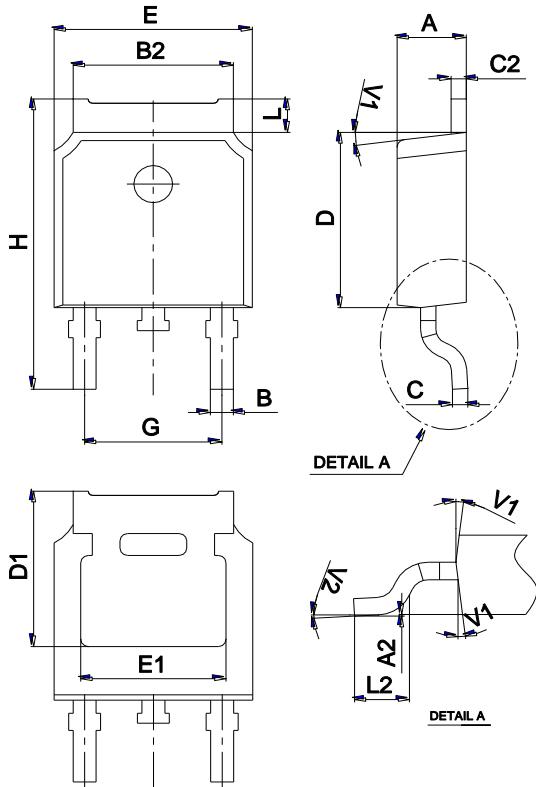


Figure 11. Transient Thermal Response Curve.

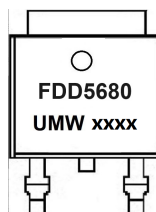
Thermal characterization performed using the conditions described in Note 1b. Transient thermal response will change depending on the circuit board design.

Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2		0°	6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW FDD5680	TO-252	2500	Tape and reel