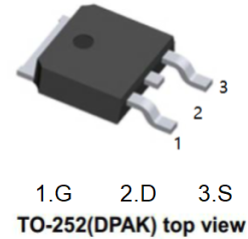


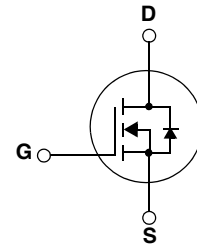
Features

- $V_{DS}(V) = 60V$
- $I_D = 36A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 22m\Omega$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 27m\Omega$ ($V_{GS} = 5V$)
- Low Miller Charge
- Low Q_{rr} Body Diode



Applications

- Motor / Body Load Control
- ABS Systems
- Powertrain Management
- Injection System
- DC-DC converters and Off-line UPS
- Distributed Power Architecture and VRMs
- Primary Switch for 12V and 24V systems



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

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	60	V
V_{GS}	Gate to Source Voltage	± 20	V
I_D	Drain Current Continuous ($V_{GS} = 10V$)	37	A
	Drain Current Continuous ($V_{GS} = 5V$)	33	A
	Continuous ($T_A = 25^\circ C$, $V_{GS} = 10V$, with $R_{\theta JA} = 52^\circ C/W$)	7.4	A
	Pulsed	Figure 4	A
E_{AS}	Single Pulse Avalanche Energy (Note 1)	45	mJ
P_D	Power Dissipation	72	W
	Derate above $25^\circ C$	0.48	W/ $^\circ C$
T_J, T_{STG}	Operating and Storage Temperature	-55 to 175	$^\circ C$
Thermal Characteristics			
$R_{\theta JC}$	Maximum Thermal resistance Junction to Case TO-252	2.1	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-252, 1in ² copper pad area	52	$^\circ C/W$

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
B_{VDSS}	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 48\text{V}$	-	-	1	μA
		$V_{GS} = 0\text{V}$	$T_C = 150^\circ\text{C}$	-	-	
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{V}$	-	-	± 100	nA
On Characteristics						
$V_{GS(TH)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	1	1.6	2	V
$R_{DS(ON)}$	Drain to Source On Resistance	$I_D = 32\text{A}, V_{GS} = 10\text{V}$	-	18	22	m Ω
		$I_D = 29\text{A}, V_{GS} = 5\text{V}$	-	22	27	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $f = 1\text{MHz}$	-	1420	1890	pF
C_{oss}	Output Capacitance		-	150	200	pF
C_{rss}	Reverse Transfer Capacitance		-	65	100	pF
R_G	Gate Resistance	$f = 1\text{MHz}$	-	3.5	-	Ω
Q_g	Total Gate Charge at 10V	$V_{GS} = 0\text{V to } 10\text{V}$	-	24	34	nC
Q_g	Total Gate Charge at 5V	$V_{GS} = 0\text{V to } 5\text{V}$				
$Q_{g(th)}$	Threshold Gate Charge	$V_{GS} = 0\text{V to } 1\text{V}$				
Q_{gs}	Gate to Source Gate Charge	$V_{DD} = 30\text{V}$ $I_D = 35\text{A}$				
Q_{gs2}	Gate Charge Threshold to Plateau					
Q_{gd}	Gate to Drain "Miller" Charge					

t_{on}	Turn-On Time	$V_{DD} = 30V, I_D = 35A$ $V_{GS} = 5V, R_{GS} = 11\Omega$	-	-	130	ns
$t_{d(on)}$	Turn-On Delay Time		-	12	-	ns
t_r	Rise Time		-	75	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	26	-	ns
t_f	Fall Time		-	34	-	ns
t_{off}	Turn-Off Time		-	-	90	ns

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Voltage	$I_{SD} = 32A$	-	-	1.25	V
		$I_{SD} = 16A$	-	-	1.0	V
t_{rr}	Reverse Recovery Time	$I_F = 35A, di/dt = 100A/\mu s$	-	-	39	ns
Q_{rr}	Reverse Recovery Charge	$I_F = 35A, di/dt = 100A/\mu s$	-	-	35	nC

Notes:

1: Starting $T_J = 25^\circ C$, $L = 110\mu H$, $I_{AS} = 28A$, $V_{DD} = 54V$, $V_{GS} = 10V$.

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

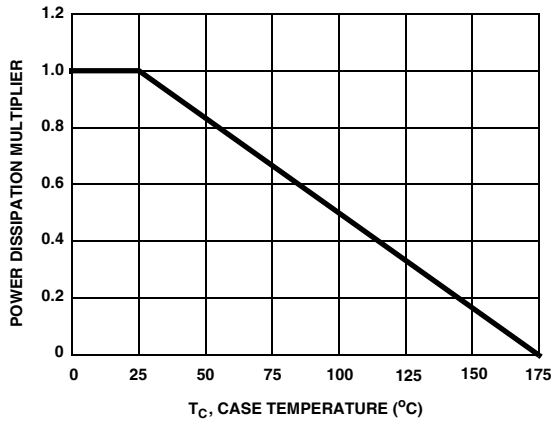


Figure 1. Normalized Power Dissipation vs Case Temperature

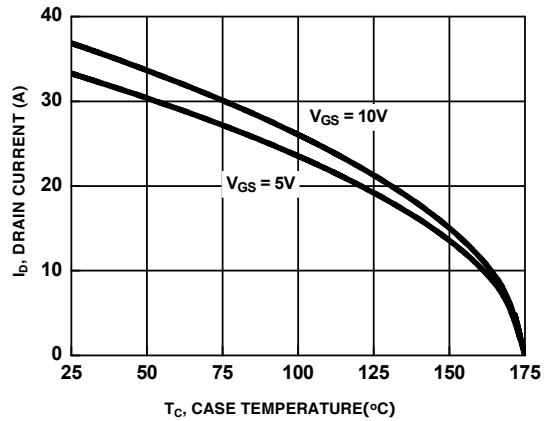


Figure 2. Maximum Continuous Drain Current vs Case Temperature

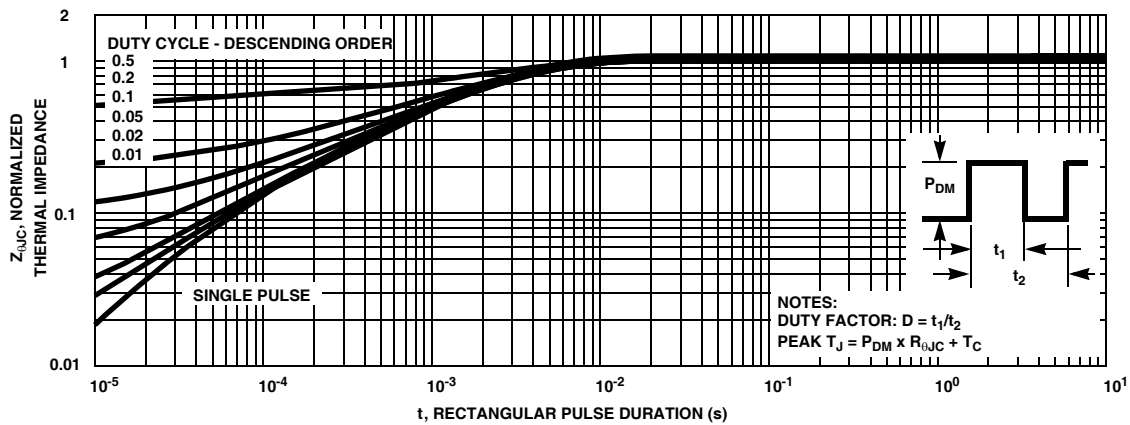


Figure 3. Normalized Maximum Transient Thermal Impedance

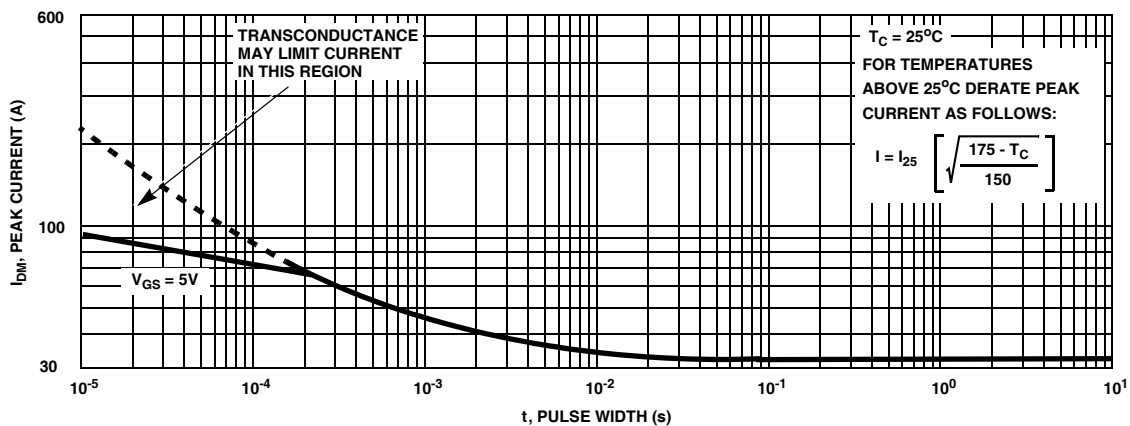


Figure 4. Peak Current Capability

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

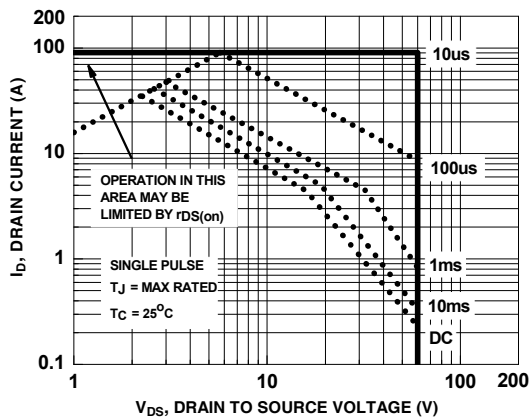


Figure 5. Forward Bias Safe Operating Area

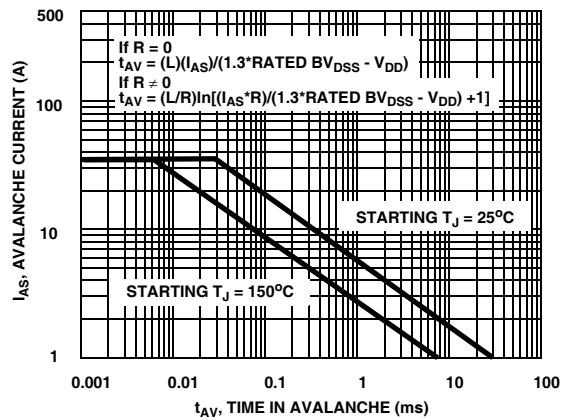


Figure 6. Unclamped Inductive Switching Capability

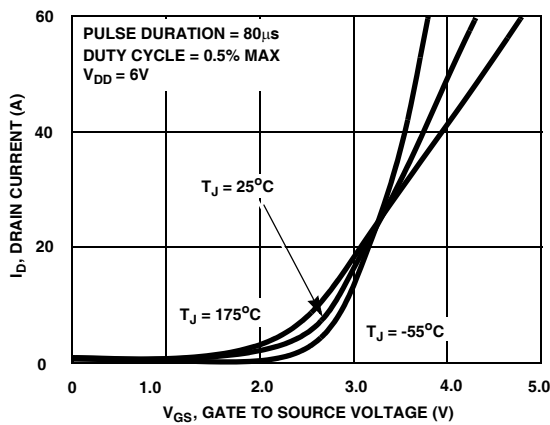


Figure 7. Transfer Characteristics

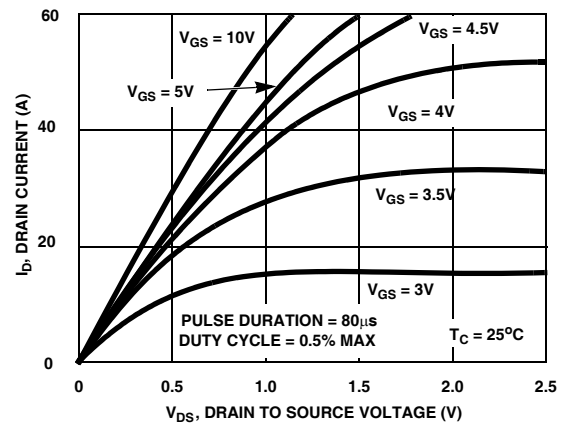


Figure 8. Saturation Characteristics

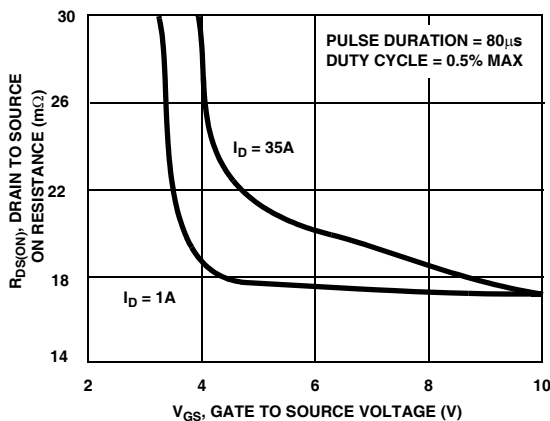


Figure 9. Drain to Source On Resistance vs Gate Voltage and Drain Current

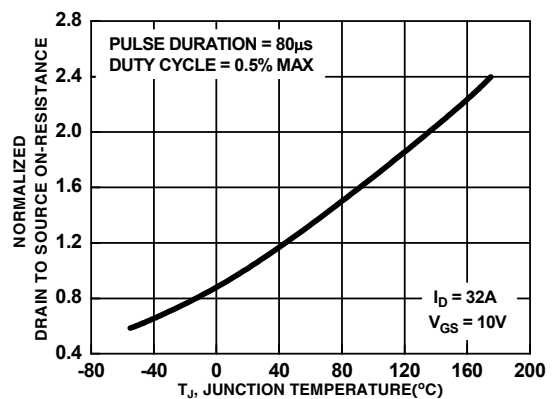


Figure 10. Normalized Drain to Source On Resistance vs Junction Temperature

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

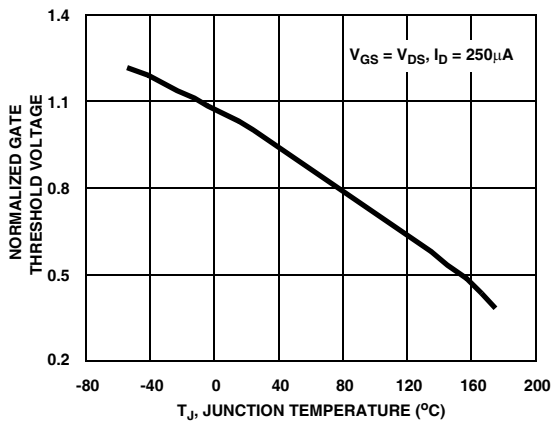


Figure 11. Normalized Gate Threshold Voltage vs Junction Temperature

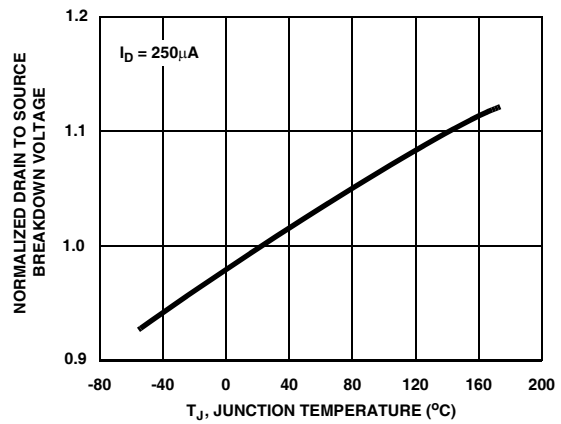


Figure 12. Normalized Drain to Source Breakdown Voltage vs Junction Temperature

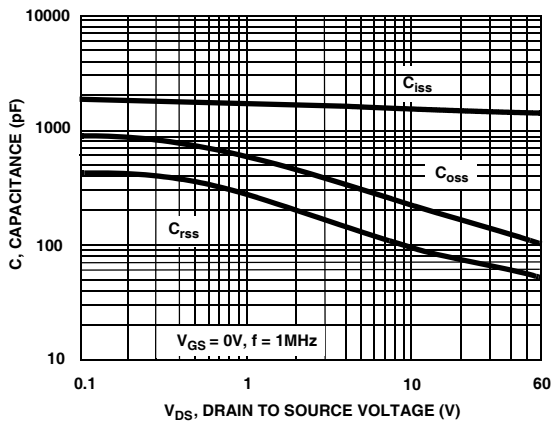


Figure 13. Capacitance vs Drain to Source Voltage

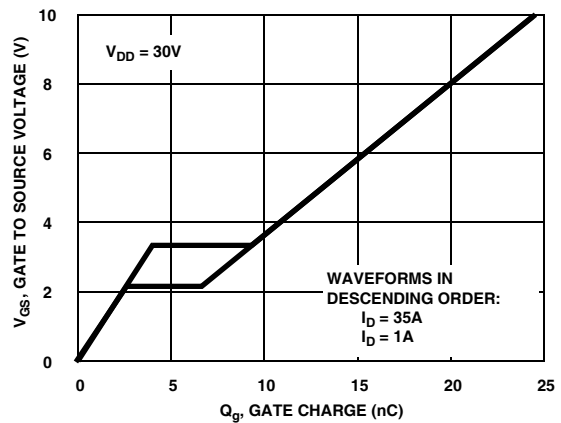
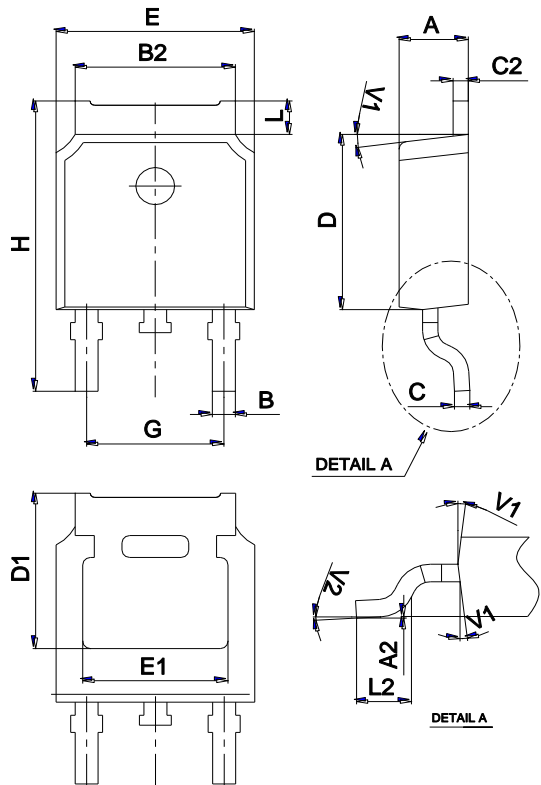


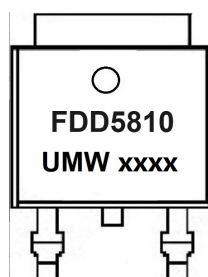
Figure 14. Gate Charge Waveforms for Constant Gate Current

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 FDD5810	TO-252	2500	Tape and reel