UMW FDD5810

60V N-Channel MOSFET

1.Features

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

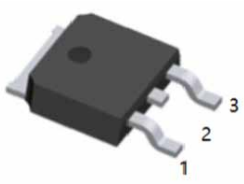
2.Applications

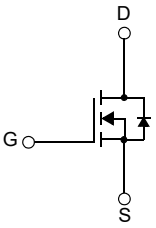
- Motor / Body Load Control
- ABS Systems
- Powertrain Management
- Injection System
- DC-DC converters and Off-line UPS
- Distributed Power Architecture and VRMs
- Primary Switch for 12V and 24V systems

3.Pinning information

Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE

TO-252(DPAK)
top view





4.Absolute Maximum Ratings T_C= 25°C

Parameter	Symbol	Rating	Units
Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GS}	±20	V
Drain Current Continuous (V_{GS}=10V)	I_D	37	A
Drain Current Continuous (V_{GS}=5V)		33	A
Continuous (T_A=25°C, V_{GS}=10V, with $R_{\theta JA}$=52°C/W)		7.4	A
Pulsed		Figure 4	A
Single Pulse Avalanche Energy (Note 1)	E_{AS}	45	mJ
Power Dissipation	P_D	72	W
Derate above 25°C		0.48	°C/W
Operating and Storage Temperature	T_J, T_{STG}	-55 to 150	°C

5.Thermal Characteristics

Parameter	Symbol	Rating	Units
Maximum Thermal resistance Junction to Case TO-252	$R_{\theta JC}$	2.1	°C/W
Thermal Resistance Junction to Ambient TO-252, 1in^2 copper pad area	$R_{\theta JA}$	52	°C/W

6.Electrical Characteristic (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain to Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=48V, V_{GS}=0V			1	μA
		V_{DS}=48V, V_{GS}=0V, T_J=125°C			250	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V			±100	nA
On Characteristics						
Gate to Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.6	2	V
Drain to Source On Resistance	$R_{DS(ON)}$	I_D=32A, V_{GS}=10V		18	22	mΩ
		I_D=29A, V_{GS}=5V		22	27	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz		1420	1890	pF
Output Capacitance	C_{oss}			150	200	pF
Reverse Transfer Capacitance	C_{rss}			65	100	pF
Gate Resistance	R_g	f=1MHz		3.5		Ω
Total Gate Charge at 10V	Q_g	V_{GS}=0V to 10V, V_{DD}=30V, I_D=35A		24	34	nC
Total Gate Charge at 5V	Q_g	V_{GS}=0V to 5V, V_{DD}=30V, I_D=35A		13	18	nC
Threshold Gate Charge	$Q_{g(th)}$	V_{GS}=0V to 1V, V_{DD}=30V, I_D=35A		1.3		nC
Gate to Source Gate Charge	Q_{gs}	V_{DD}=30V, I_D=35A		4		nC
Gate Charge Threshold to Plateau	Q_{gs2}			2.7		nC
Gate to Drain “Miller” Charge	Q_{gd}			5		nC
Turn-On Time	$t_{(on)}$	V_{DD}=30V, I_D=35A, V_{GS}=5V, R_{GS}=11Ω			130	ns
Turn-On Delay Time	$t_{D(on)}$			12		ns
Rise Time	t_r			75		ns
Turn-Off DelayTime	$t_{D(off)}$			26		ns
Fall Time	t_f			34		ns
Turn-Off Time	t_{off}				90	ns

Drain–Source Diode Characteristics						
Source to Drain Diode Forward Voltage	V_{SD}	I_{SD}=32A			1.25	V
		I_{SD}=16A			1	V
Reverse Recovery Time	t_{rr}	I_F=35A, di/dt=100A/μs			39	ns
Reverse Recovery Charge	Q_{rr}	I_F=35A, di/dt=100A/μs			35	nC

Notes:

1: Starting T_J=25°C, L=110μH, I_{AS}=28A, V_{DD}=54V, V_{GS}=10V.

7.1Typical characteristic

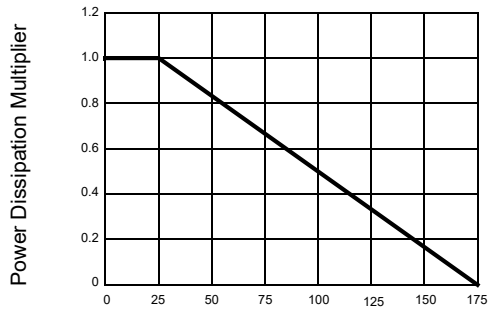


Figure 1: Normalized Power Dissipation vs Case Temperature

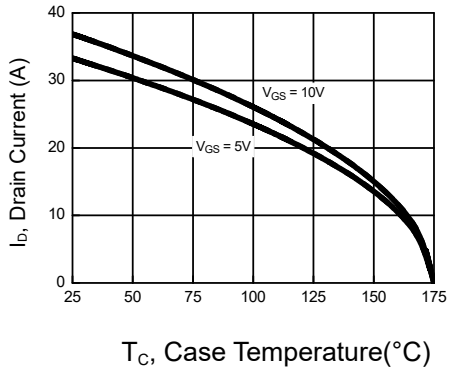


Figure 2: Maximum Continuous Drain Current vs Case Temperature

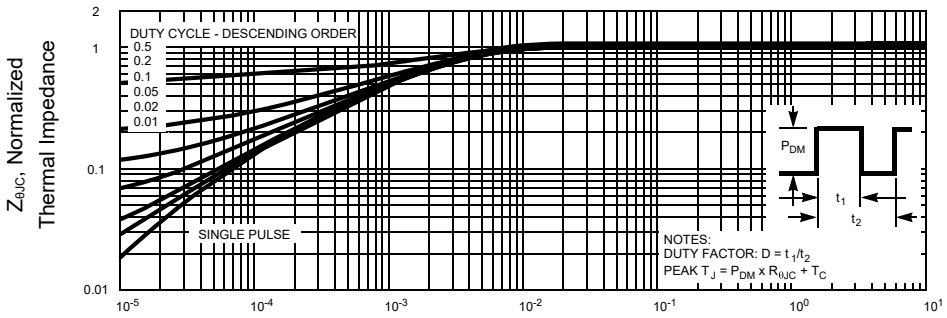


Figure 3: Normalized Maximum Transient Thermal Impedance

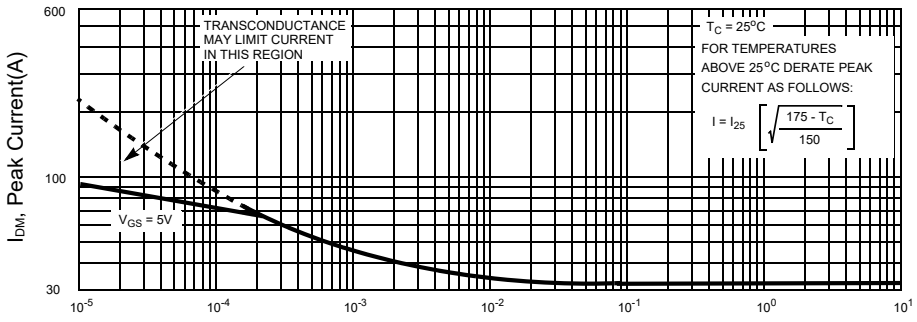


Figure 4: Peak Current Capability

7.2Typical characteristic

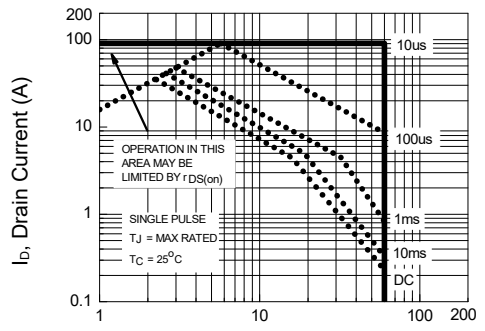


Figure 5: Forward Bias Safe Operating Area

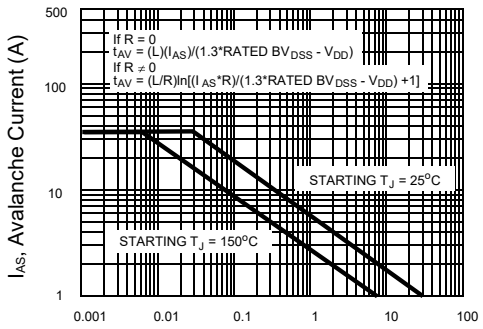


Figure 6: Unclamped Inductive Switching Capability

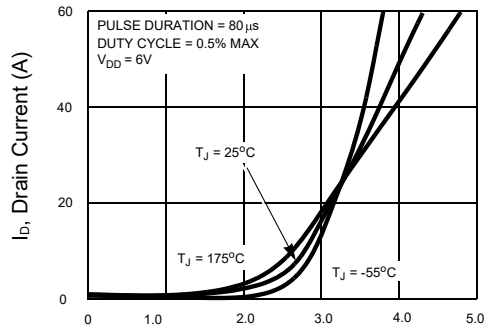


Figure 7: Transfer Characteristics

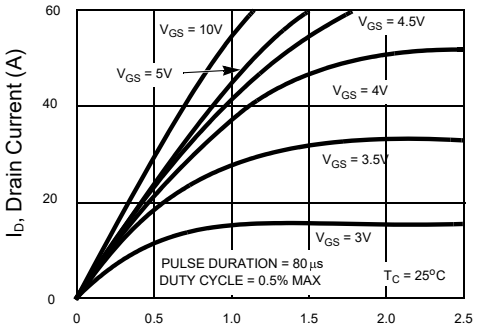


Figure 8: Saturation Characteristics

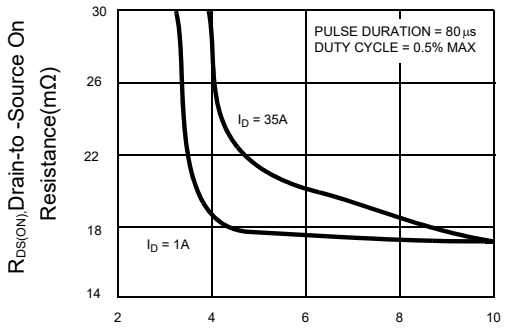


Figure 9: Drain to Source On Resistance vs Gate Voltage and Drain Current

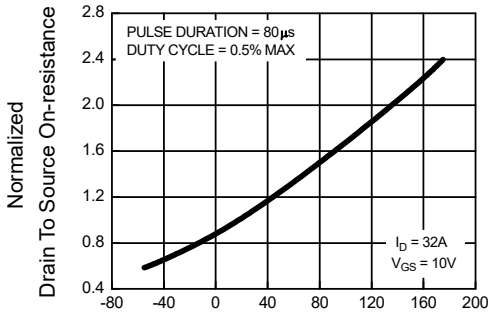


Figure 10: Normalized Drain to Source On Resistance vs Junction Temperature

7.3Typical characteristic

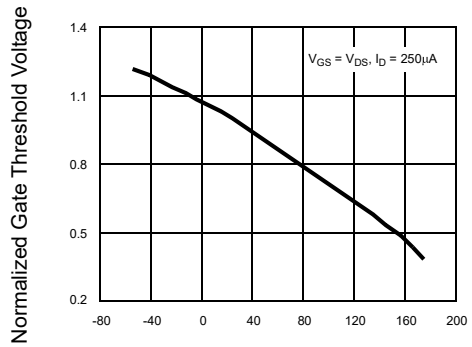


Figure 11: Normalized Gate Threshold Voltage vs Junction Temperature

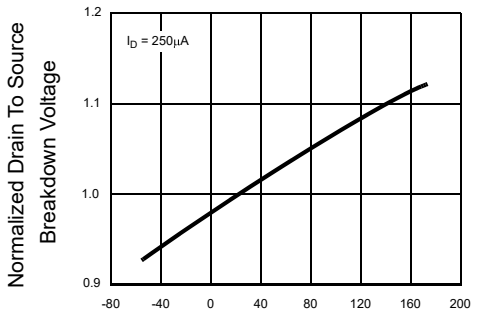


Figure 12: Normalized Drain to Source Breakdown Voltage vs Junction Temperature

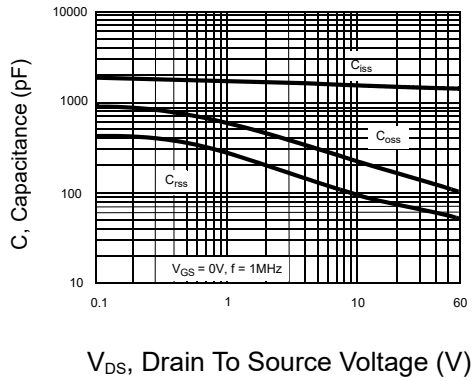


Figure 13: Capacitance vs Drain to Source Voltage

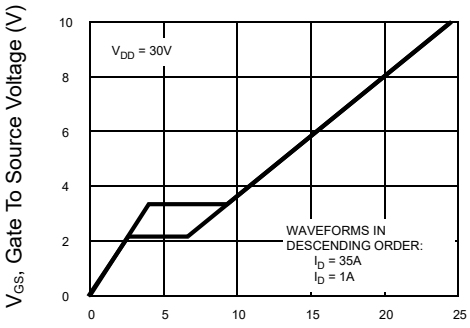
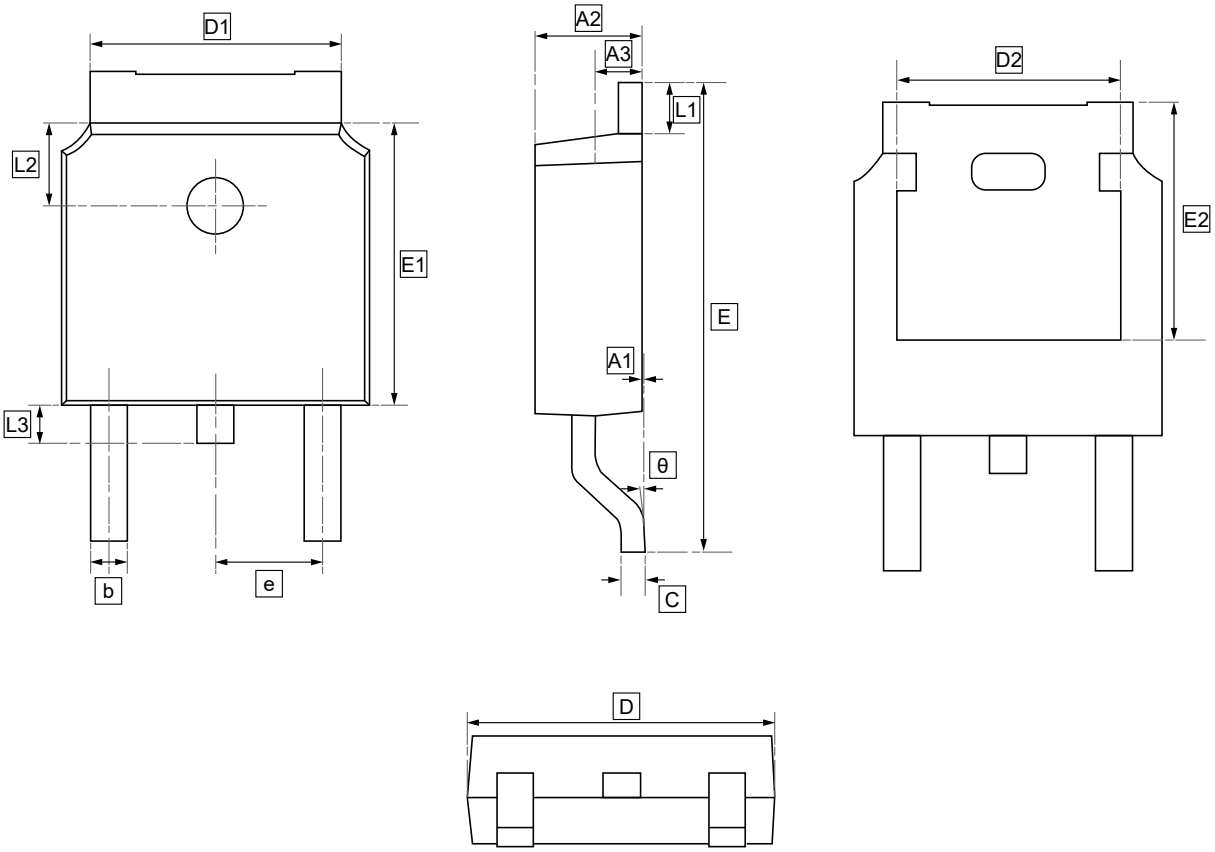


Figure 14: Gate Charge Waveforms for Constant Gate Current

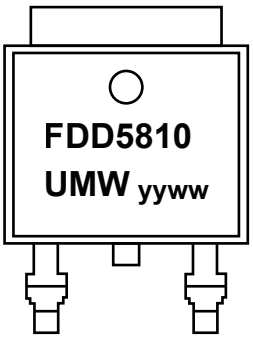
8.TO-252 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38	BSC	1.27	1.90	1.00	8.00

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDD5810	TO-252	2500	Tape and reel

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