

1.Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

2.Features

- $V_{DS(V)}=20V$
- $I_D=35A$
- $R_{DS(ON)}<5.5m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<8.5m\Omega(V_{GS}=4.5V)$
- Low gate resistance
- Low gate charge: $Q_{g(TOT)}=34nC(Typ)$, $V_{GS}=10V$

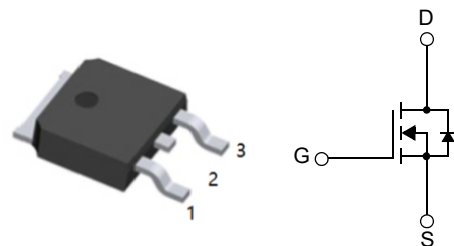
3.Application

- Vcore DC-DC for Desktop Computers and Servers
- VRM for Intermediate Bus Architecture

4.Pinning information

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

TO-252(DPAK)
top view



5.Absolute Maximum Ratings $T_c=25^\circ C$

Parameter	Symbol	Rating	Units
Drain to Source Voltage	V_{DS}	20	V
Gate to Source Voltage	V_{GS}	± 20	
Drain Current -Continuous (Package Limited)	I_D	35	A
-Continuous (Die Limited)		93	
-Pulsed (Note 1)		354	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	144	mJ
Power Dissipation	P_D	77	W
Storage Junction Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$



6.Thermal Characteristics

Parameter	Symbol	Rating	Units
Thermal Resistance, Junction-to-Case TO-252	$R_{\theta JC}$	1.94	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient TO-252	$R_{\theta JA}$	100	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient TO-252, 1in ² copper pad area	$R_{\theta JA}$	52	$^{\circ}\text{C/W}$



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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	20			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D =250μA Referenced to 25°C		14.6		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =16V			1	μA
Gate to Source Leakage Current	I _{GSS}	V _{GS} =±20V			±100	nA
Gate to Source Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.6	2.5	V
Gate to Source Threshold Voltage Temperature Coefficient	$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	I _D =250μA Referenced to 25°C		-6.7		mV/°C
Drain to Source On Resistance	R _{DS(on)}	V _{GS} =10V, I _D =35A		4	5.5	mΩ
		V _{GS} =4.5V, I _D =33A		5.7	8.5	mΩ
		V _{GS} =10V, I _D =35A, T _J =175°C		6.5	8.9	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =35A		175		S
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V f=1MHz		1865	2480	pF
Output Capacitance	C _{oss}			550	730	pF
Reverse Transfer Capacitance	C _{rss}			335	445	pF
Gate Resistance	R _g	f=1MHz		1.2		Ω
Turn-On DelayTime	t _{D(on)}	V _{DD} =10V, I _D =35A V _{GS} =10V, R _{GEN} =10Ω		9	18	ns
Rise Time	t _r			11	20	ns
Turn-Off DelayTime	t _{D(off)}			47	75	ns
Fall Time	t _f			25	40	ns
Total Gate Charge at 10V	Q _{g(TOT)}	V _{GS} =0V to 10V	V _{DD} =10V I _D =35A I _g =1mA	34	48	nC
Total Gate Charge at 5V	Q _{g(5)}	V _{GS} =0V to 5V		16	22	nC
Gate to Source Gate Charge	Q _{gs}			3.2		nC
Gate to Drain "Miller" Charge	Q _{gd}			5.9		nC
Source to Drain Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =35A		0.89	1.25	V
		V _{GS} =0V, I _S =15A		0.82	1.2	V



Reverse Recovery Time	t_{rr}	$I_F=35A, di/dt=100A/\mu s$		30	45	ns
Reverse Recovery Charge	Q_{rr}	$I_F=35A, di/dt=100A/\mu s$		23	35	nC

Notes:

- 1: Pulse time<300μs, Duty cycle = 2%.
- 2: Starting $T_J=25^{\circ}C$, $L=0.3mH$, $I_{AS}=31A$, $V_{DD}=18V$, $V_{GS}=10V$.



8.1 Typical characteristic

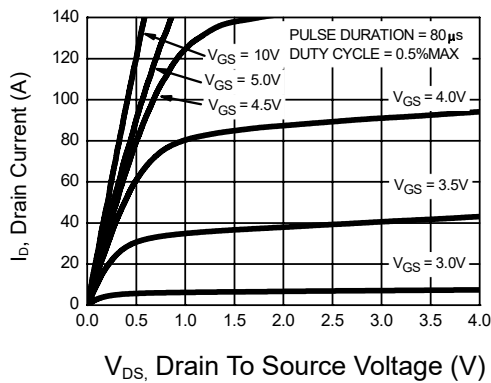


Figure 1: On-Region Characteristics

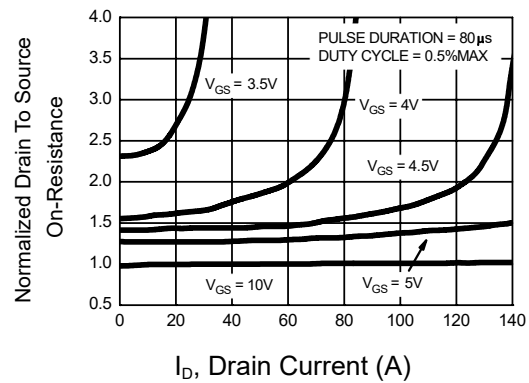


Figure 2: Normalized On-Resistance vs Drain Current and Gate Voltage

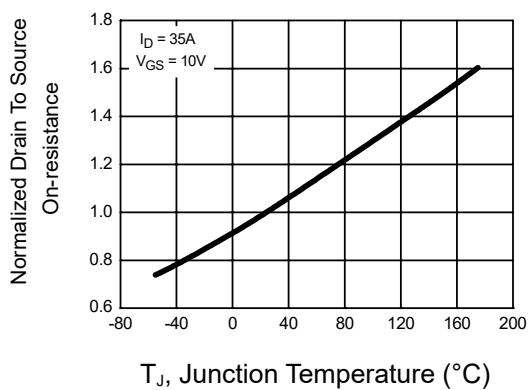


Figure 3: Normalized On Resistance vs Junction Temperature

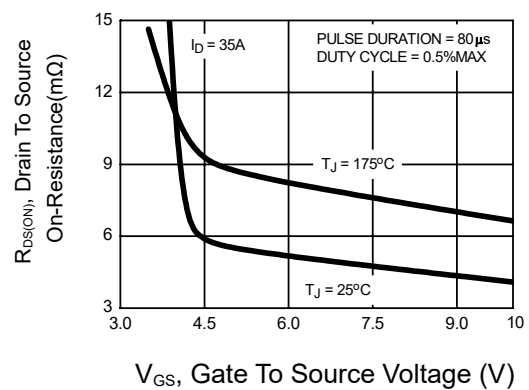


Figure 4: On-Resistance Variation with Gate-to-Source Voltage

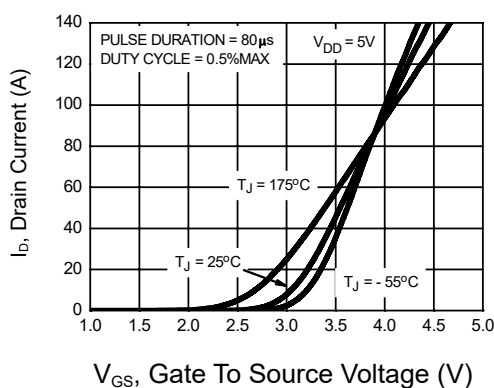


Figure 5: Transfer Characteristics

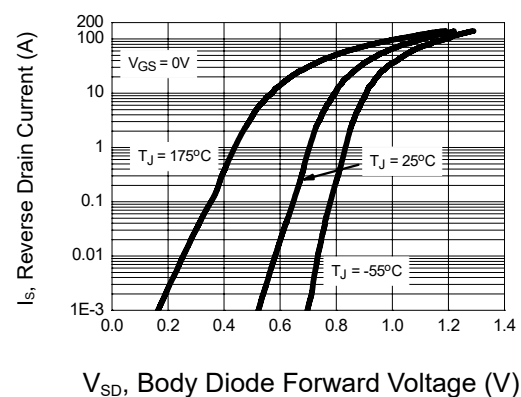


Figure 6: Source to Drain Diode Forward Voltage vs Source Current



8.2 Typical characteristic

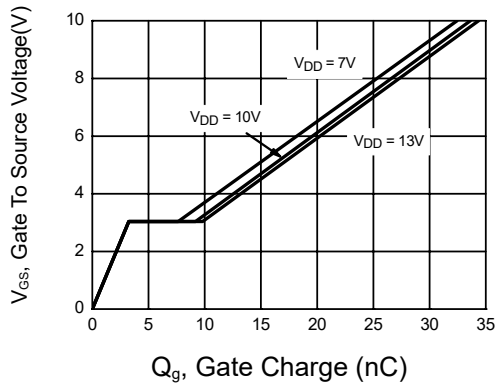


Figure 7: Gate Charge Characteristics

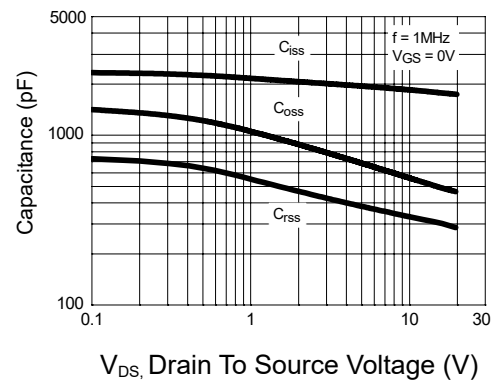


Figure 8: Capacitance vs Drain to Source Voltage

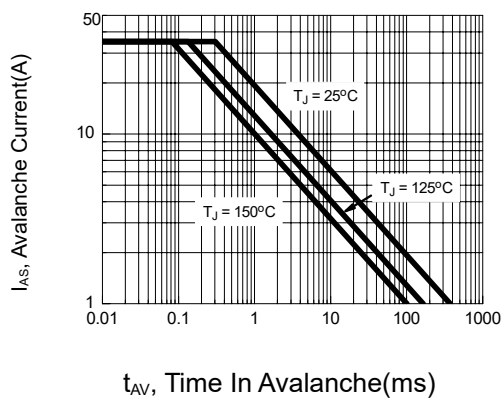


Figure 9: Unclamped Inductive Switching Capability

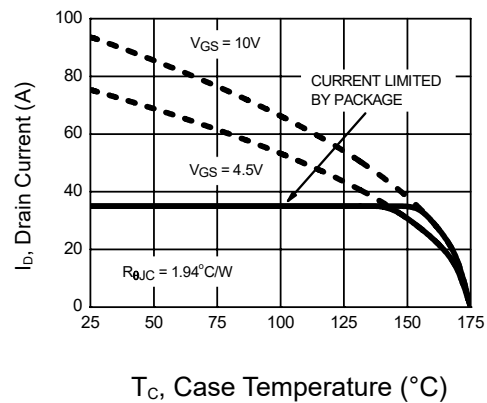


Figure 10: Maximum Continuous Drain Current vs Case Temperature

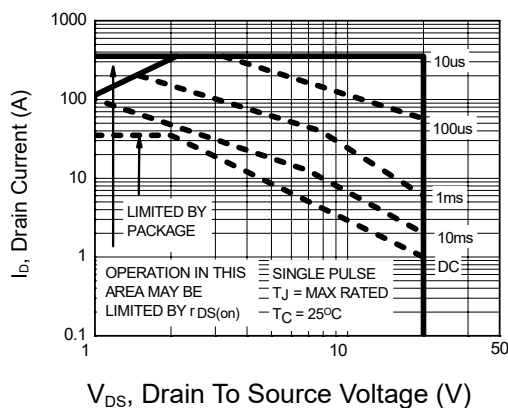


Figure 11: Forward Bias Safe Operating Area

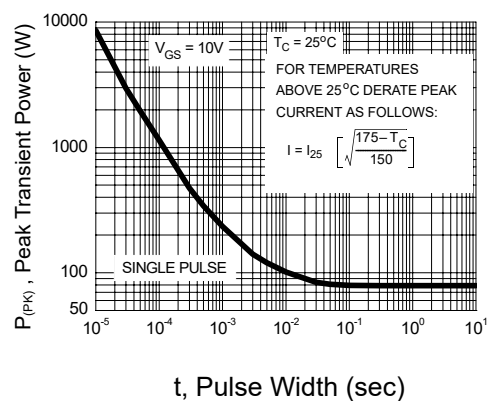
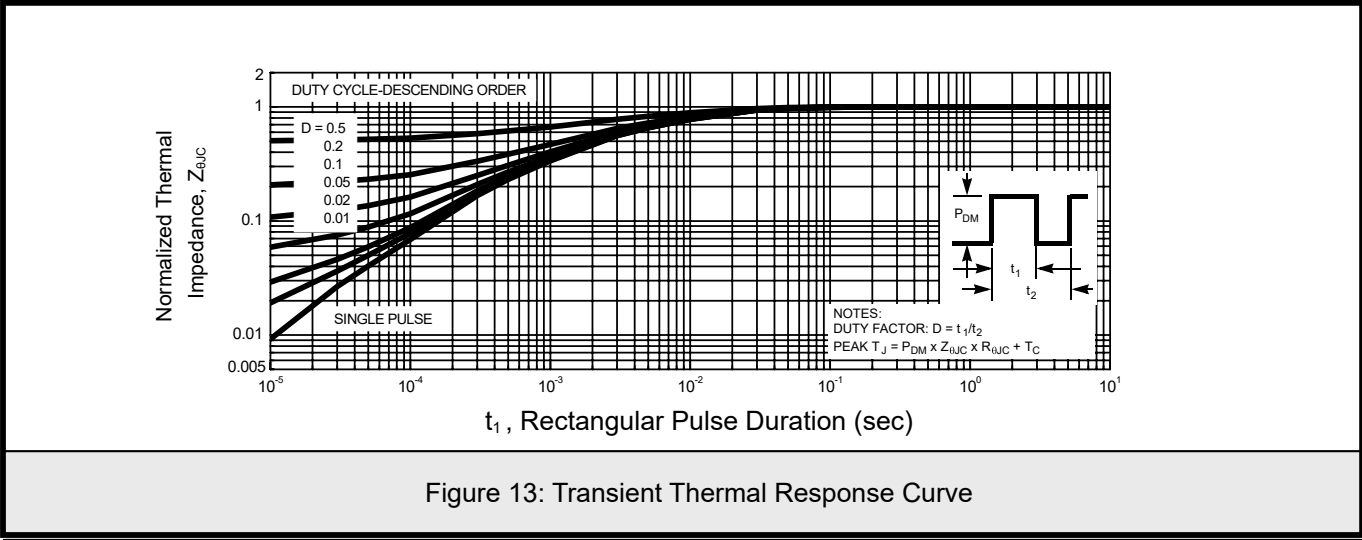


Figure 12: Single Pulse Maximum Power Dissipation

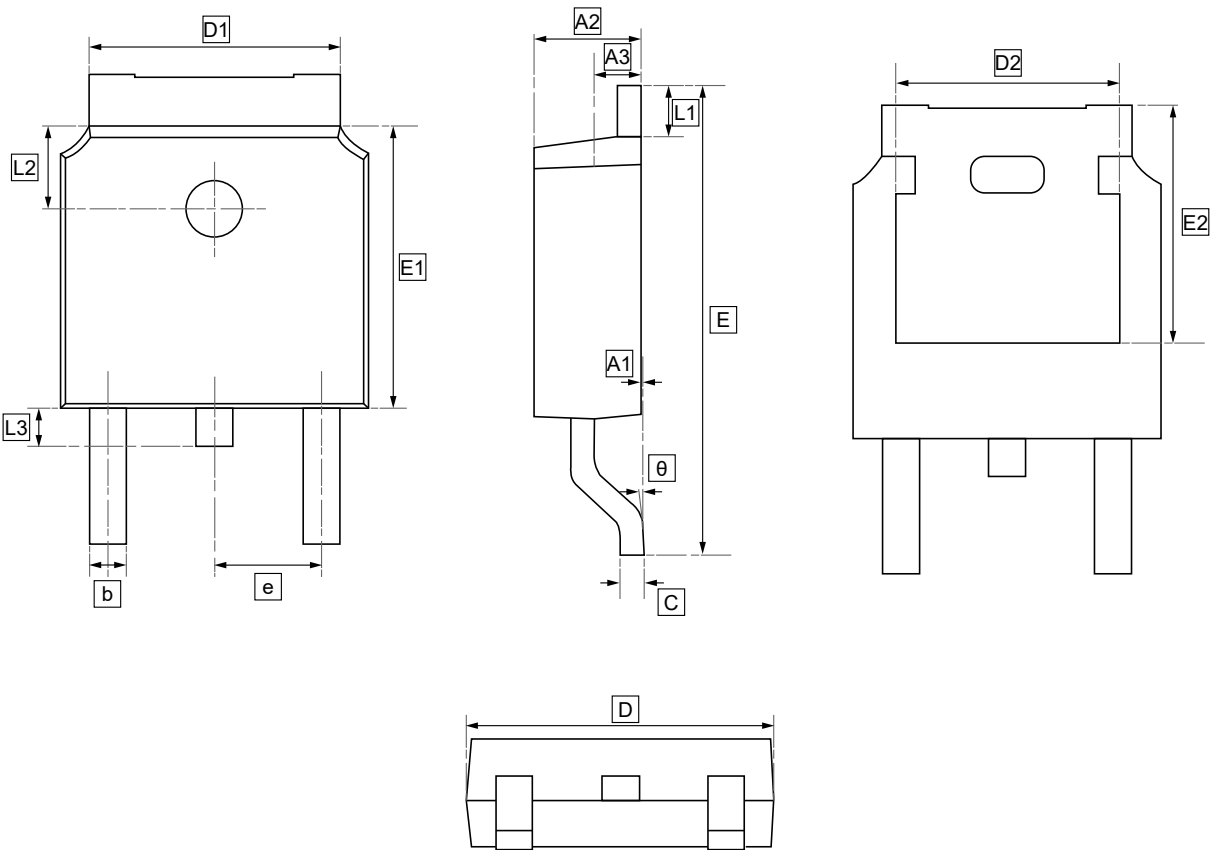


8.3Typical characteristic





9.TO-252 Package Outline Dimensions

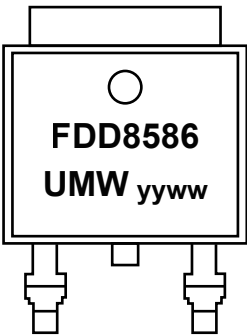


DIMENSIONS (mm are the original dimensions)

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 BSC	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		1.27	1.90	1.00	8.00



10.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDD8586	TO-252	2500	Tape and reel



11.Disclaimer

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