N-Channel 20-V (D-S) MOSFET

FEATURES

VDS = 20V, ID = 45A

RDS(ON) @VGS= 10V, TYP 2.3mΩ

RDS(ON) @VGS= 4.5V, TYP 2.5mΩ

RDS(ON) @VGS= 2.5V, TYP 3.4mΩ

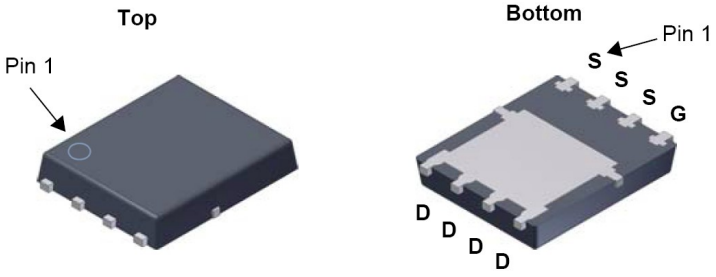
high density cell design for extremely low $R_{DS(ON)}$

Exceptional on-resistance and maximum DC current capability

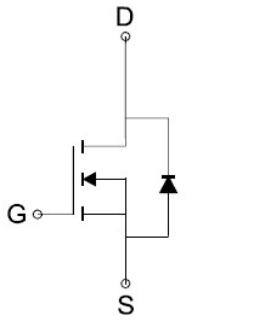
GENERAL DESCRIPTION

The FS4476 combines advanced trench MOSFET technology with a low resistance package to provide extremely low RDS(ON). This device is ideal for load switch and battery protection applications.

PIN CONFIGURATION



DFN3.3×3.3-8L



N-Channel MOSFET

Absolute Maximum Ratings (T_A=25℃ Unless Otherwise Noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		VDSS	20	V
Gate-Source Voltage		VGSS	±12	V
Continuous Drain Current[NOTE]	TA=25℃	I_D	45	A
	TA=100℃		32	
Pulsed Drain Current [NOTE]		I_{DM}	180	
Maximum Power Dissipation*	TA=25℃	PD	78	W
Operating Junction Temperature		TJ	-55 to 150	℃
Thermal Resistance-Junction to Ambient*		RθJA	50	℃/W
Thermal Resistance-Junction to Lead*		RθJL	24	

* The device mounted on 1in2 FR4 board with 2 oz copper

NOTE: same as the second page

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	20			V
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	0.4	0.7	1.5	V
IGSS	Gate Leakage Current	VDS=0V, VGS=±12V			±100	nA
IDSS	Zero Gate Voltage Drain Current	VDS=20V, VGS=0V			1	μA
RDS(ON)	Drain-Source On-State Resistance a	VGS=10V, ID= 20A		2.3	3.0	mΩ
		VGS=4.5V, ID= 15A		2.5	3.5	
		VGS=2.5V, ID= 7A		3.4	4.5	
VSD	Diode Forward Voltage	IS=10A, VGS=0V		0.73	1.1	V
DYNAMIC						
Qg	Total Gate Charge(4.5V)	VDS=10V, VGS=10V, ID=10A		72		nC
Qgs	Gate-Source Charge			6.5		
Qgd	Gate-Drain Charge			8.5		
Ciss	Input capacitance	V_{DS}=10V,V_{GS}=0V, f=1.0MHz		3800		pF
Coss	Output Capacitance			1430		
Crss	Reverse Transfer Capacitance			280		
Rg	Gate-Resistance	VDS=0V, VGS=0V, f=1MHz		1.2		Ω
td(on)	Turn-On Delay Time	VDD=10V,VGS=10V, RGEN=3Ω, ID=1A		8		ns
tr	Turn-On Rise Time			11		
td(off)	Turn-Off Delay Time			62		
tf	Turn-Off Fall Time			23		

Note:

a: Pulse test: pulse width < =300us, duty cycle < =2%

b: FORSEMI reserves the right to improve product design, functions and reliability without notice.

c. Single pulse width limited by junction temperature TJ(MAX)=150° C.

d. The RqJA is the sum of the thermal impedance from junction to case RqJC and case to ambient.

e. The static characteristics in Figures 1 to 6 are obtained using <300ms pulses, duty cycle 0.5% max.

f. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of TJ(MAX)=150° C. The SOA curve provides a single pulse rating.

g. The maximum current rating is package limited.

h. These tests are performed with the device mounted on 1 in2 FR-4 board with 2oz. Copper, in a still air environment with TA=25° C.

Typical Characteristics

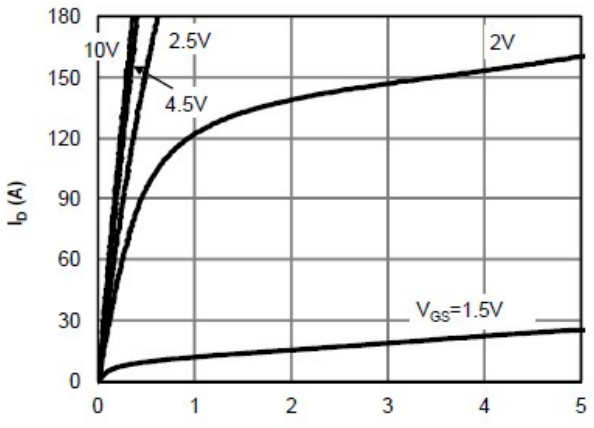


Fig 1: On-Region Characteristics (Note E)

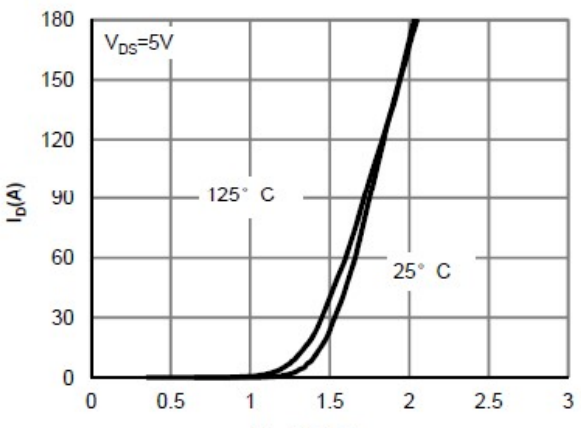


Figure 2: Transfer Characteristics (Note E)

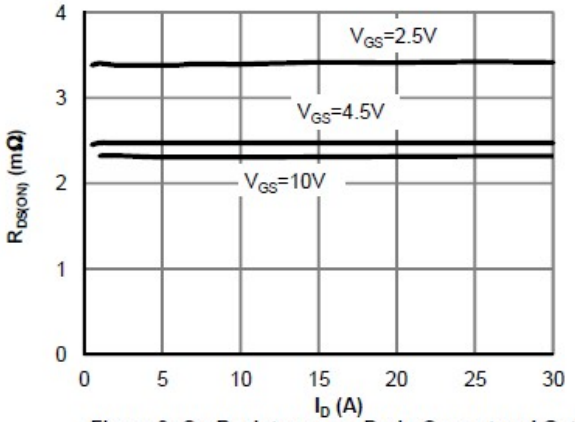


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

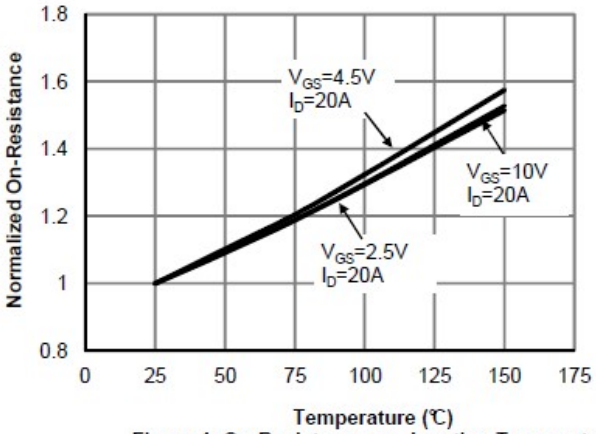


Figure 4: On-Resistance vs. Junction Temperature (Note E)

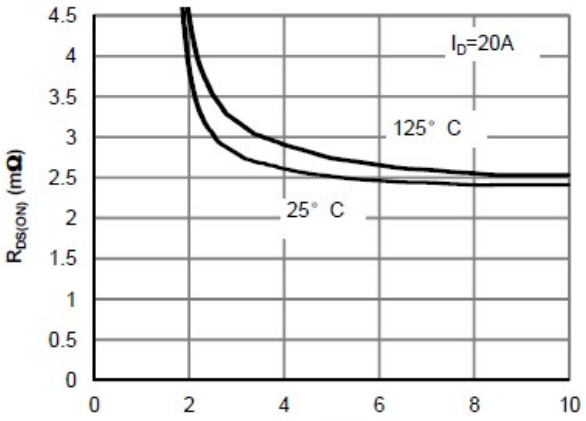


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

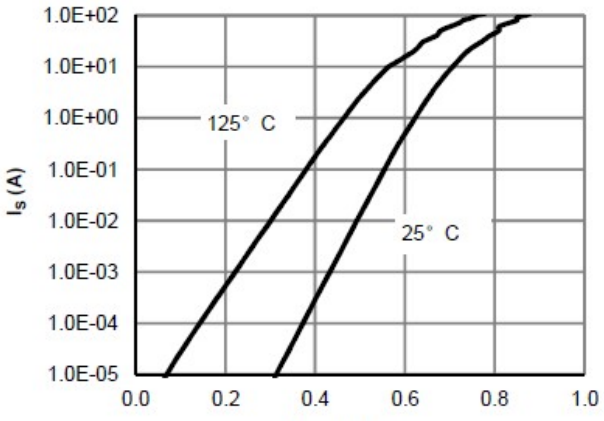


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

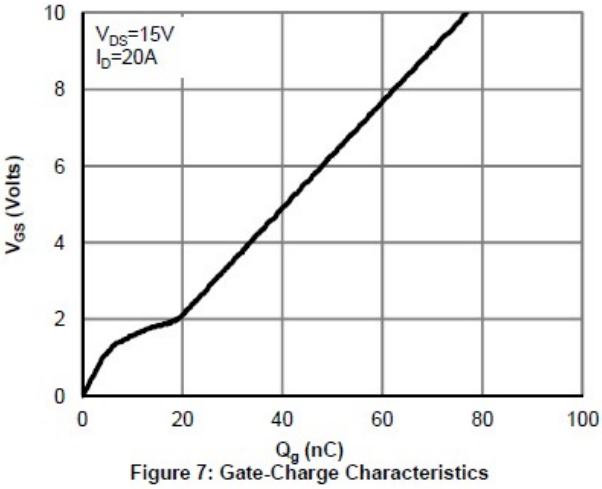


Figure 7: Gate-Charge Characteristics

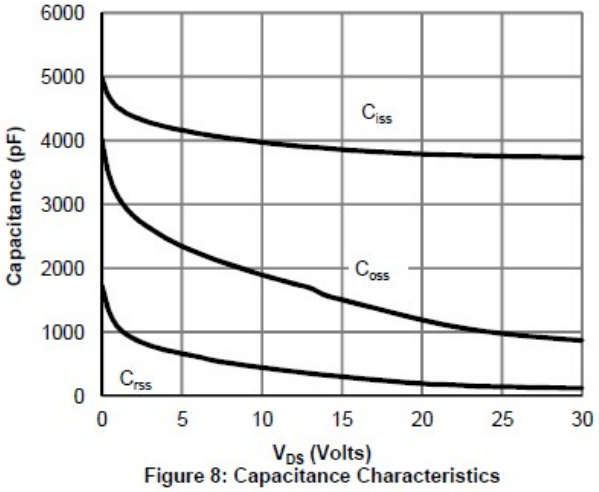
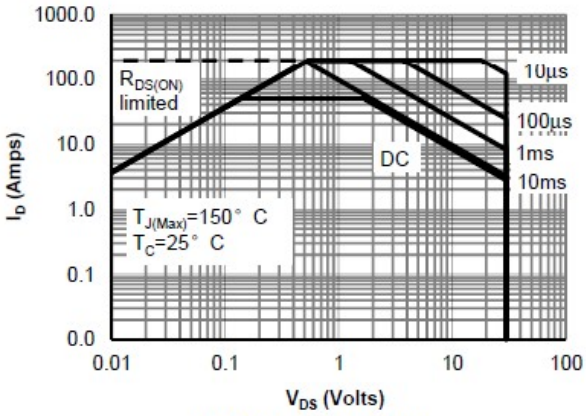


Figure 8: Capacitance Characteristics



VGS> or equal to 2.5V

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

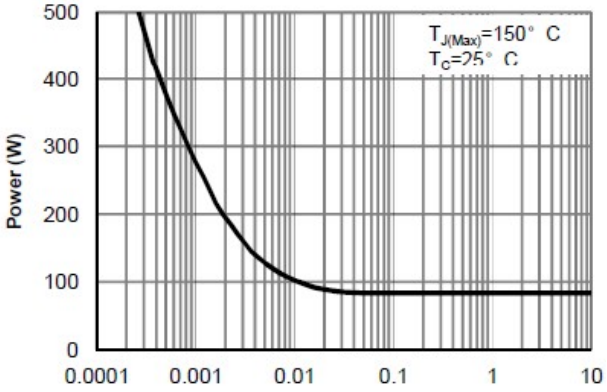


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

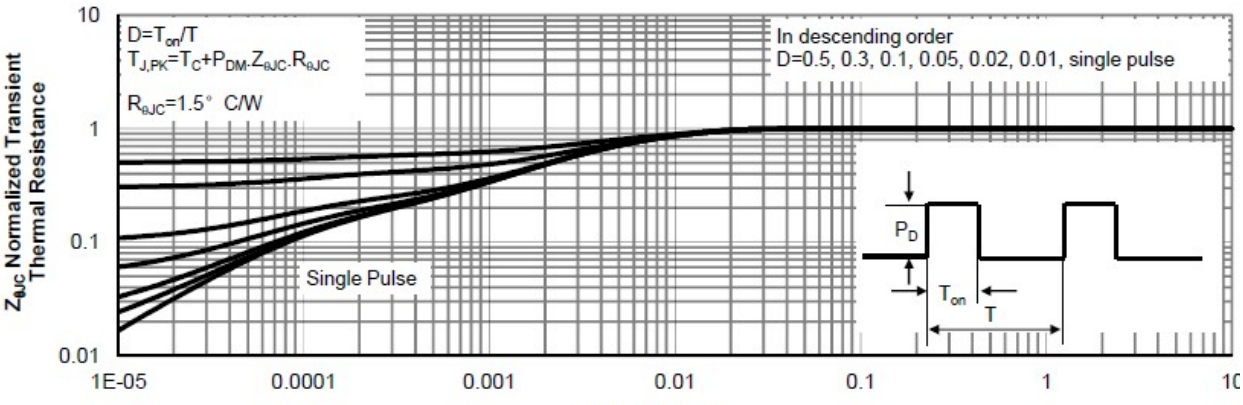
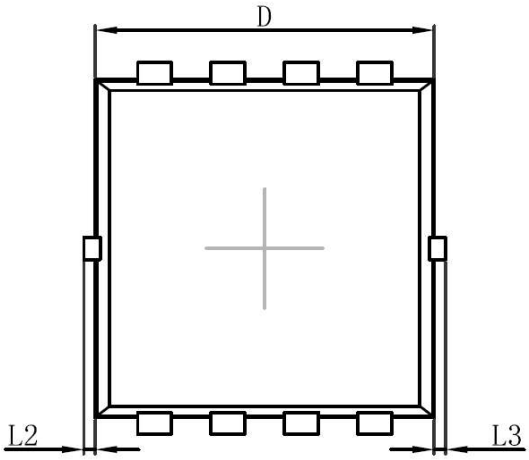
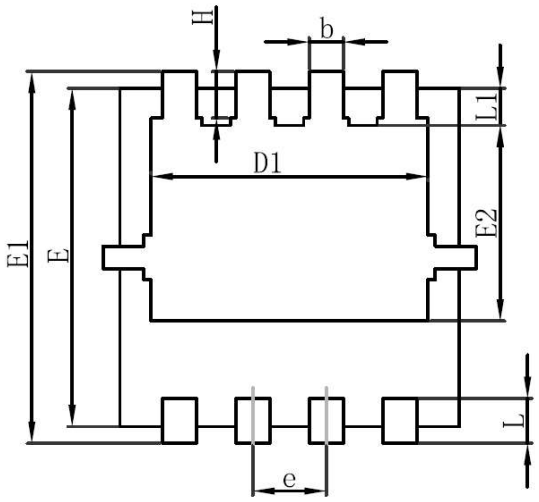


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

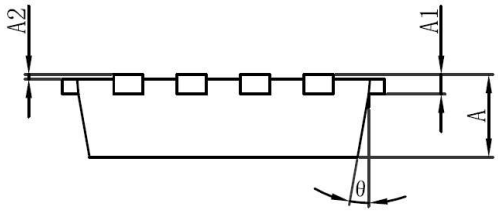
- **PACKAGE DFN3.3×3.3-8L**



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°