

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

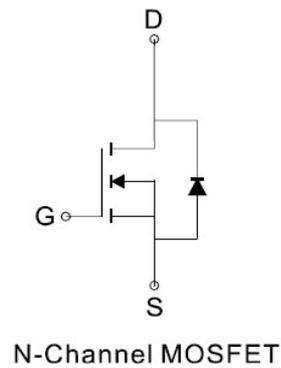
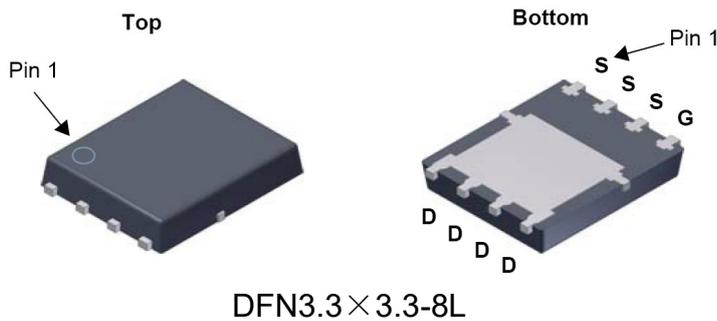
FEATURES

- V_{DS} = 20V, I_D = 45A
- R_{DS(ON)} @V_{GS}= 10V, TYP 2.3mΩ
- R_{DS(ON)} @V_{GS}= 4.5V, TYP 2.5mΩ
- R_{DS(ON)} @V_{GS}= 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 R_{DS(ON)}. This device is ideal for load switch and battery protection applications.

PIN CONFIGURATION



Absolute Maximum Ratings (T_A=25°C Unless Otherwise Noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	20	V
Gate-Source Voltage	V _{GS}	±12	V
Continuous Drain Current ^{NOTE}	I _D	TA=25°C	A
		TA=100°C	
Pulsed Drain Current ^{NOTE}	I _{DM}	180	
Maximum Power Dissipation*	PD	78	W
Operating Junction Temperature	T _J	-55 to 150	°C
Thermal Resistance-Junction to Ambient*	R _{θJA}	50	°C/W
Thermal Resistance-Junction to Lead*	R _{θJL}	24	

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

NOTE: same as the second page

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

Symbol	Parameter	Limit	Min	Typ	Max	Unit
STATIC						
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20			V
VGS(th)	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.7	1.5	V
IGSS	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
IDSS	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$			1	μA
RDS(ON)	Drain-Source On-State Resistance ^a	$V_{GS}=10V, I_D=20A$		2.3	3.0	m Ω
		$V_{GS}=4.5V, I_D=15A$		2.5	3.5	
		$V_{GS}=2.5V, I_D=7A$		3.4	4.5	
VSD	Diode Forward Voltage	$I_S=10A, V_{GS}=0V$		0.73	1.1	V
DYNAMIC						
Qg	Total Gate Charge(4.5V)	$V_{DS}=10V, V_{GS}=10V, I_D=10A$		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	$V_{DS}=0V, V_{GS}=0V, f=1MHz$		1.2		Ω
td(on)	Turn-On Delay Time	$V_{DD}=10V, V_{GS}=10V, R_{GEN}=3\Omega, I_D=1A$		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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- b: FORSEMI reserves the right to improve product design, functions and reliability without notice.
- c. Single pulse width limited by junction temperature $T_J(MAX)=150^{\circ}\text{C}$.
- d. The R_{qJA} is the sum of the thermal impedance from junction to case R_{qJC} 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 $T_J(MAX)=150^{\circ}\text{C}$. 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 $T_A=25^{\circ}\text{C}$.

● Typical Characteristics

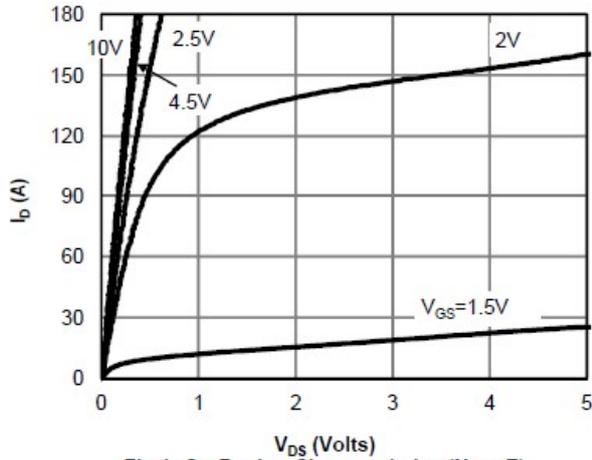


Fig 1: On-Region Characteristics (Note E)

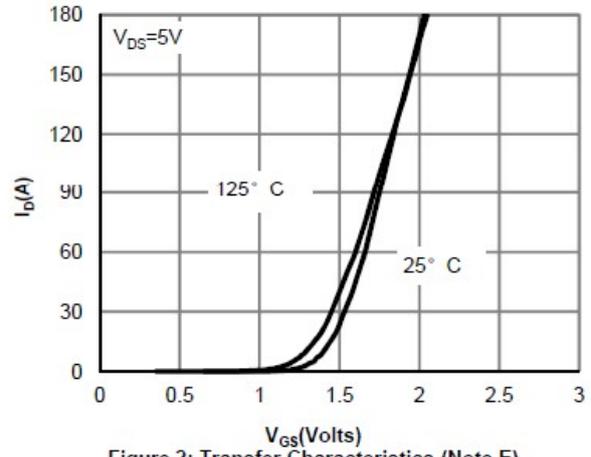


Figure 2: Transfer Characteristics (Note E)

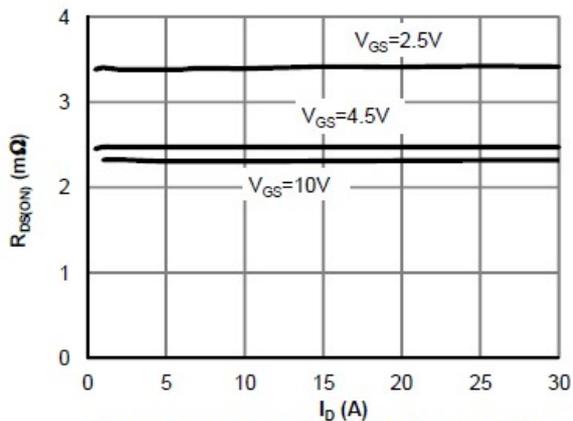


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

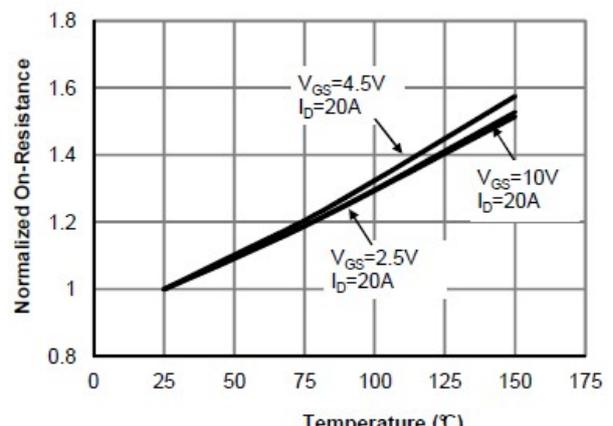


Figure 4: On-Resistance vs. Junction Temperature (Note E)

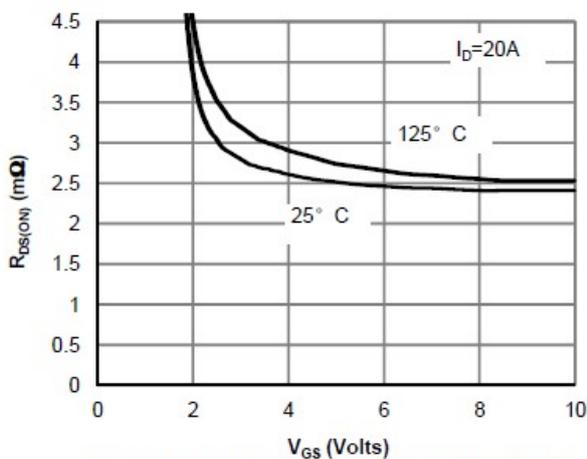


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

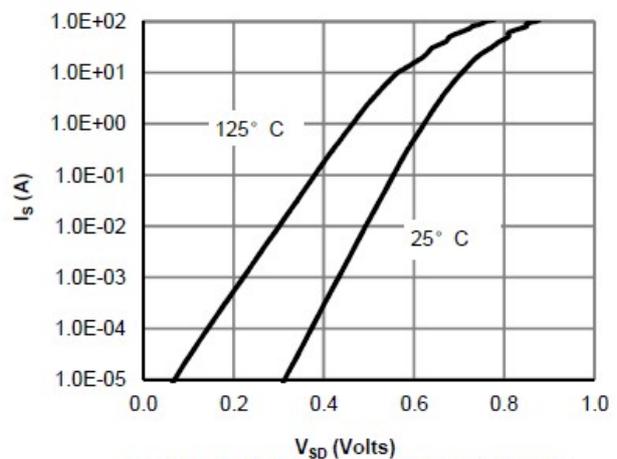


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

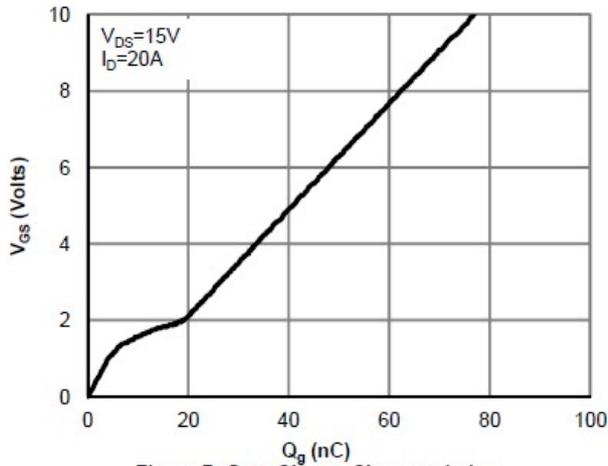


Figure 7: Gate-Charge Characteristics

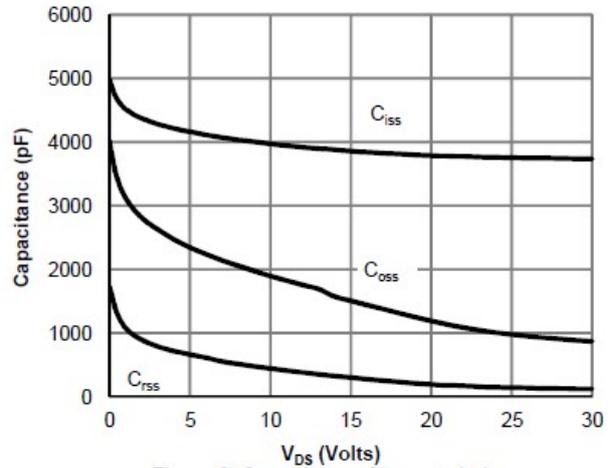


Figure 8: Capacitance Characteristics

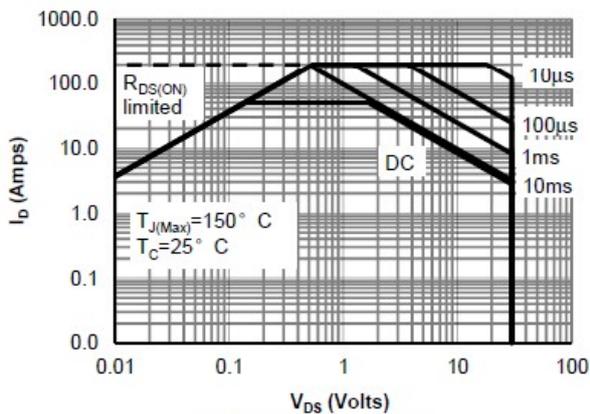


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

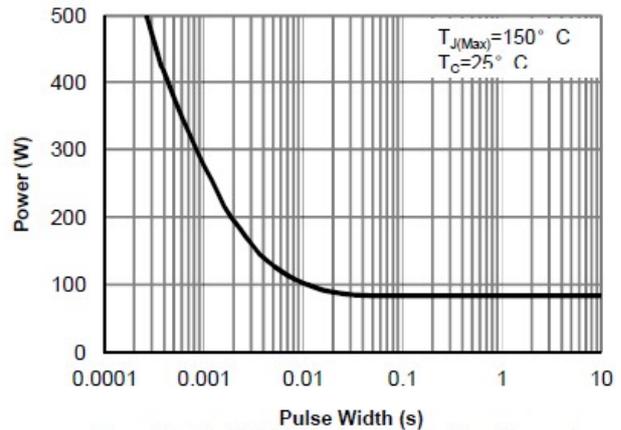


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

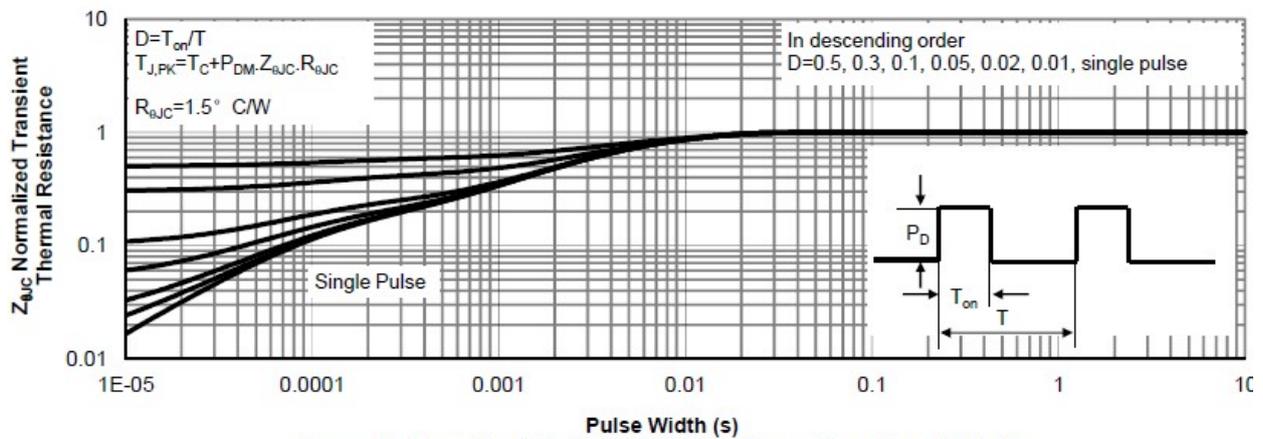
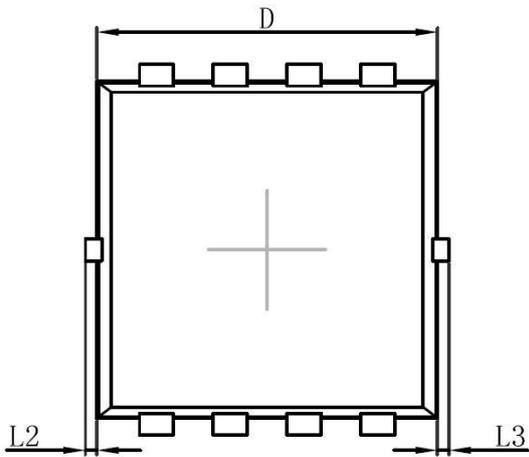


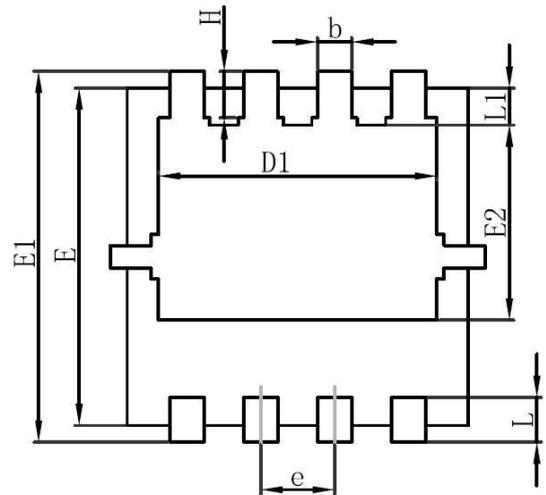
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

FS4476

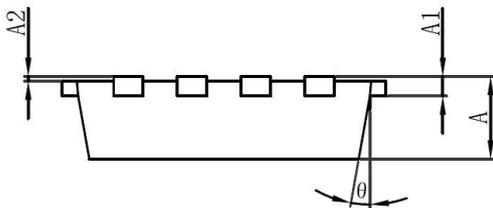
● PACKAGE DFN3.3×3.3-8L



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°