

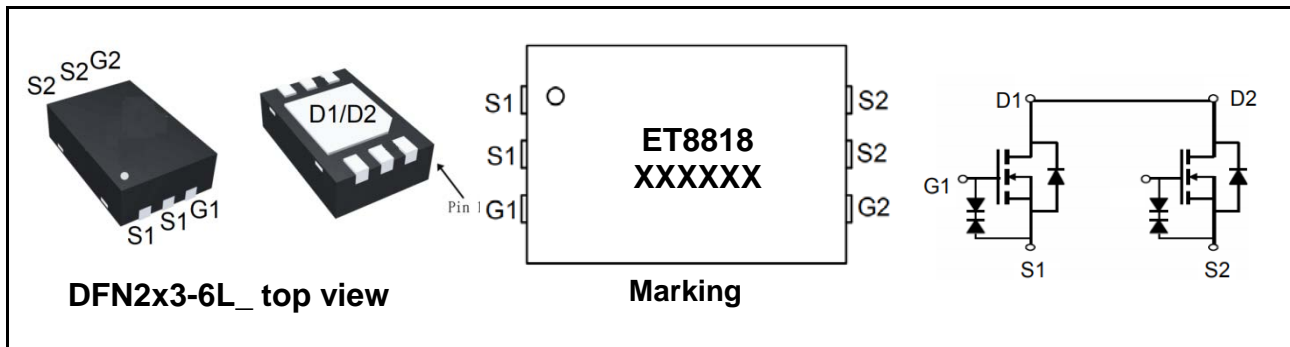
## Dual N-Channel Enhancement-Mode MOSFET (20V,10A)

### PRODUCT SUMMARY

$V_{DSS}$	$I_D$	$R_{DS(on)}$ (m $\Omega$ ) Typ
20V	10A	7.2 @ $V_{GS} = 4.5V, I_D = 10A$
		7.5 @ $V_{GS} = 4.0V, I_D = 5A$
		11 @ $V_{GS} = 2.5V, I_D = 2.5A$

### Features

- Super high density cell design for extremely low RDS(ON)
- Exceptional on-resistance and maximum DC current capability
- ESD Rating:2000V HBM□
- Lead (Pb) -free and halogen-free



### Absolute Maximum Ratings ( $T_A = 25^\circ C$ , unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current (Continuous) @ $T_A = 25^\circ C$	10	A
	Drain Current (Continuous) @ $T_A = 75^\circ C$	8	A
$I_{DM}$	Drain Current (Pulsed) <sup>a</sup>	32	A
$P_D$	Total Power Dissipation @ $T_A = 25^\circ C$	1.5	W
	Total Power Dissipation @ $T_A = 75^\circ C$	1.2	W
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ C$
$R_{QJA}$	Thermal Resistance Junction to Ambient (PCB mounted) <sup>b</sup>	80	$^\circ C/W$

a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

b: 1-in<sup>2</sup> 2oz Cu PCB board

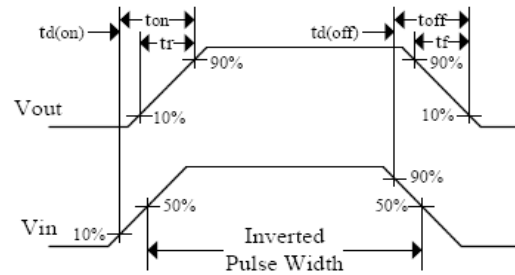
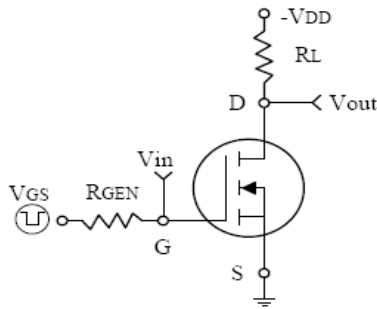


### Electrical Characteristics (T<sub>A</sub>=25°C, unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
<b>• Off Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>• On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	0.5	0.7	1.0	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	6	7.2	8.9	mΩ
		V <sub>GS</sub> =4.0V, I <sub>D</sub> =5A	6.3	7.5	9.2	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2.5A	10.3	11	12.5	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =5A	5	-	-	s
<b>• Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	-	1265	-	PF
C <sub>oss</sub>	Output Capacitance		-	225	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	155	-	
<b>• Switching Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	-	29	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	5.2	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	6.3	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =15V, R <sub>L</sub> =15Ω, I <sub>D</sub> =20A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω	-	300	-	nS
t <sub>r</sub>	Turn-on Rise Time		-	1000	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	4000	-	
t <sub>f</sub>	Turn-off Fall Time		-	2500	-	
<b>• Drain-Source Diode Characteristics</b>						
V <sub>SD</sub>	Drain-Source Diode Forward	V <sub>GS</sub> =0V, I <sub>S</sub> =10A	-	0.85	1.2	V

Note: Pulse Test: Pulse Width ≤ 300us, Duty Cycle ≤ 2%

### Typical Characteristics Curves (Ta=25°C, unless otherwise note)



Switching Test Circuit and Switching Waveforms

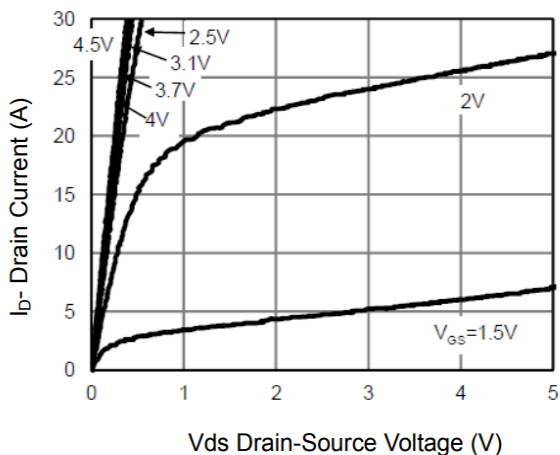


Figure 1 Output Characteristics

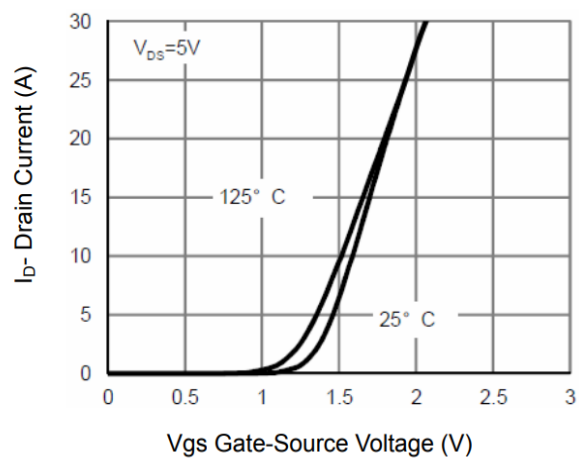


Figure 2 Transfer Characteristics

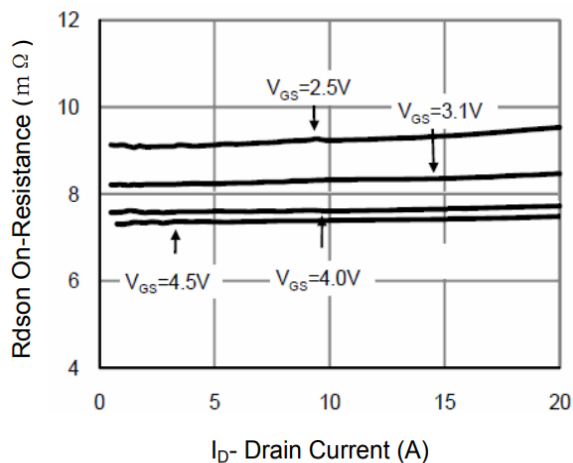


Figure 3 Rdson- Drain Current

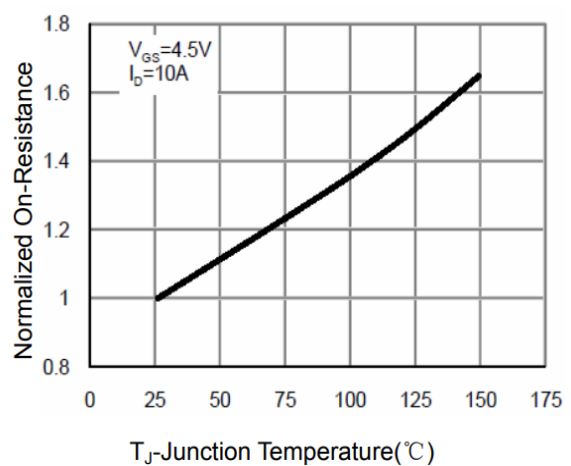
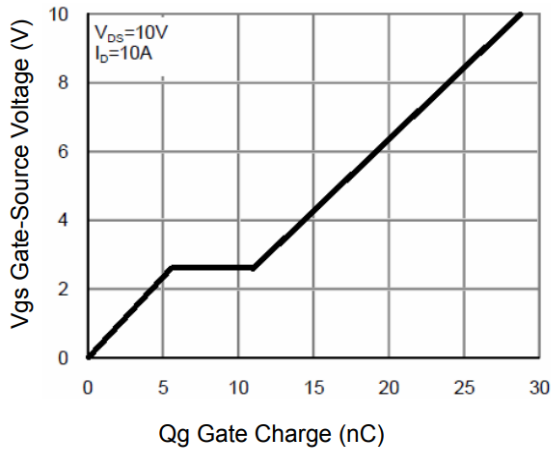
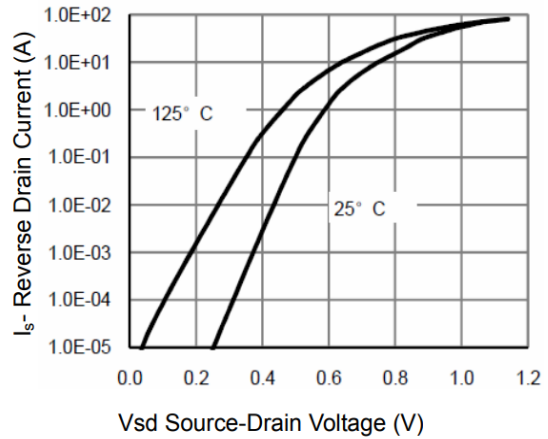


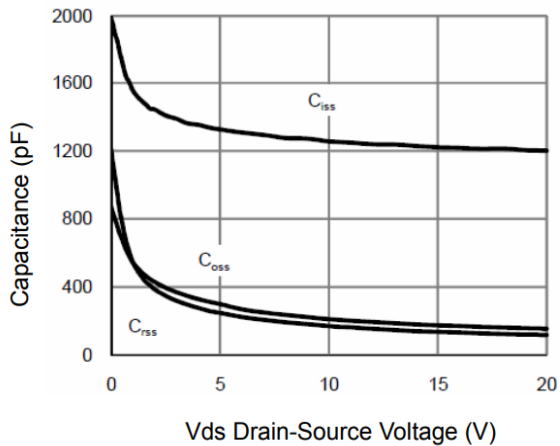
Figure 4 Rdson-Junction Temperature



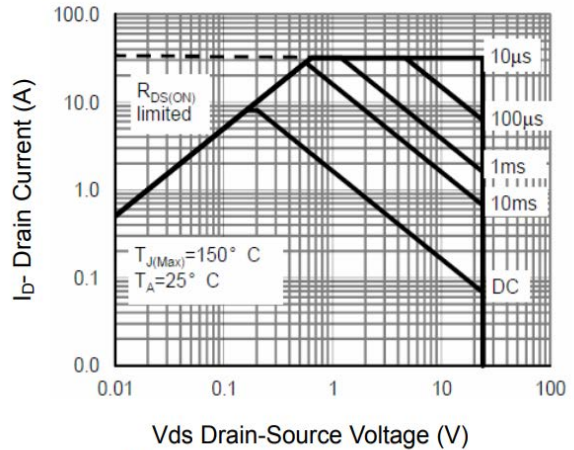
**Figure 5 Gate Charge**



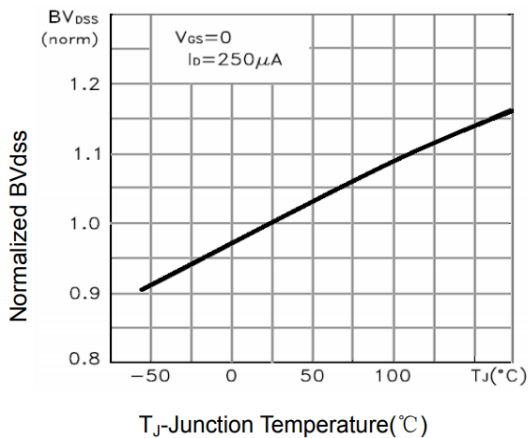
**Figure 6 Source- Drain Diode Forward**



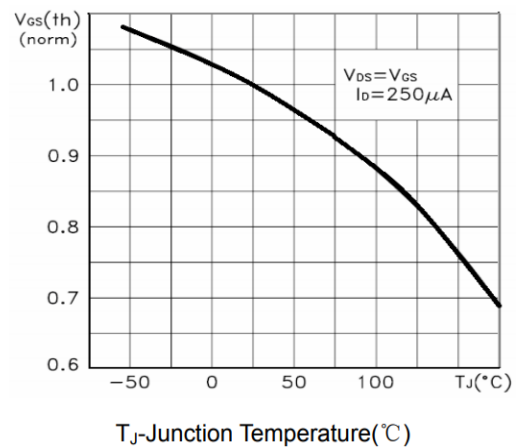
**Figure 7 Capacitance vs Vds**



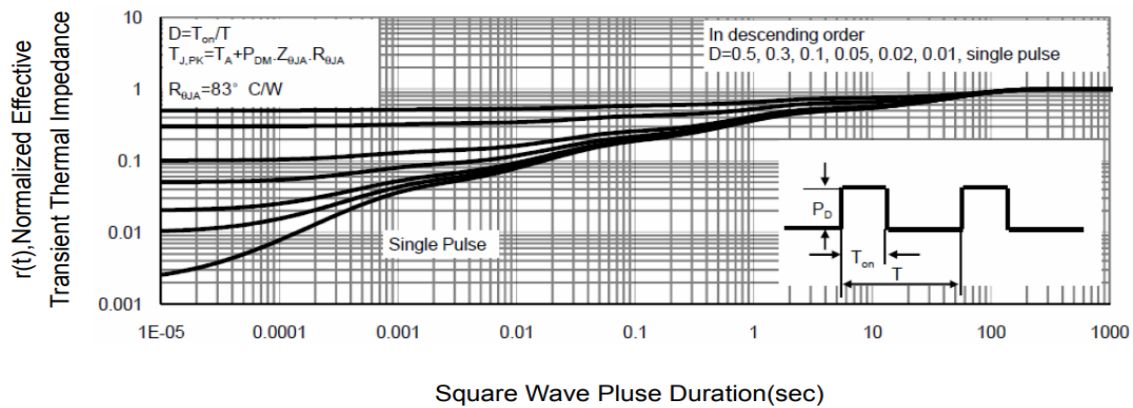
**Figure 8 Safe Operation Area**



**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**

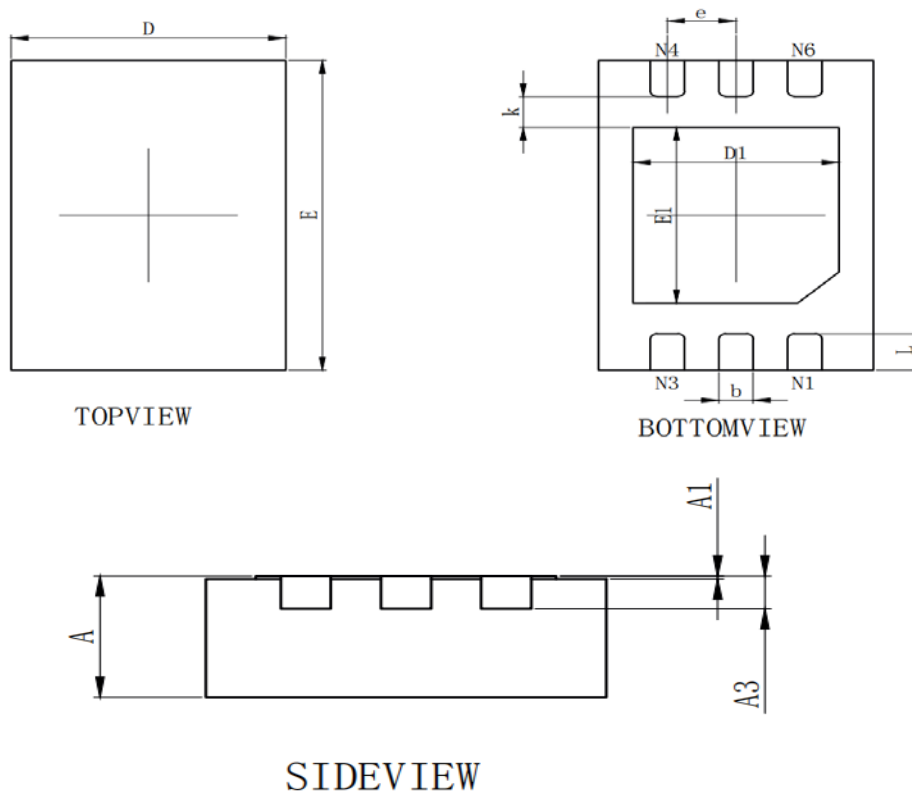


**Figure 10 V<sub>GS(th)</sub> vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

## DFN2\*3-6L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF		0.008REF	
D	1.95	2.050	0.077	0.081
E	2.950	3.050	0.116	0.120
D1	1.450	1.550	0.057	0.061
E1	1.650	1.750	0.065	0.069
k	0.200MIN		0.008MIN	
b	0.200	0.300	0.008	0.012
e	0.500TYP		0.020TYP	
L	0.300	0.400	0.012	0.016