

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
-40V	3.5mΩ@-10V	-150A
	6.0mΩ@-4.5V	

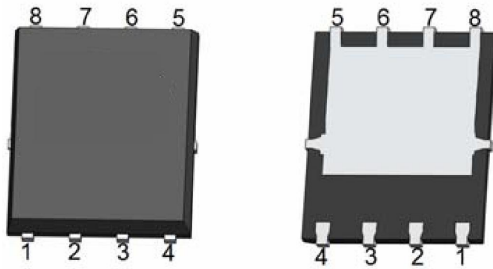
### Feature

- High density cell design for low Rdson
- Split gate trench MOSFET technology
- Excellent gate charge x Rdson product(FOM)

### Application

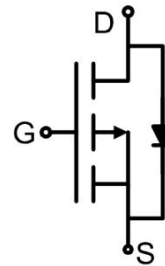
- Automotive Systems
- DC/DC Converter

### Package

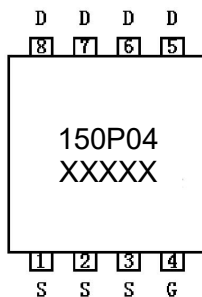


DFN5X6-8L

### Circuit diagram



### Marking



### Absolute maximum ratings (T<sub>c</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	-40	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	-150	A
Continuous Drain Current(T <sub>c</sub> =100°C)	I <sub>D</sub> (100°C)	-120	A
Pulsed Drain Current	I <sub>DM</sub>	-600	A
Power Dissipation	P <sub>D</sub>	150	W
Thermal Resistance,Junction-to-Case	R <sub>θJC</sub>	0.83	°C/W
Single pulse avalanche energy	E <sub>AS</sub>	1076	mJ
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

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

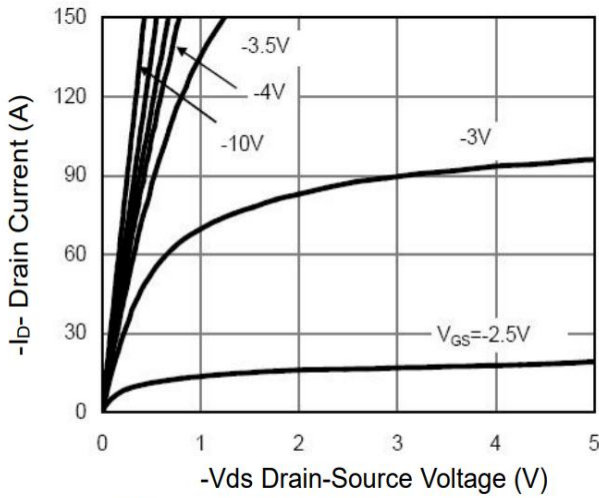
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-40			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V			-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-0.8		-1.8	V
Drain-source on-resistance <sup>1)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -75A		2.8	3.5	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -75A		3.9	6.0	mΩ
Gate resistance	R <sub>G</sub>	F=1.0MHz		5.5		Ω
Forwad Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -75A		30		S
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -20, V <sub>GS</sub> = 0V, f = 1MHz		8940		pF
Output Capacitance	C <sub>oss</sub>			1900		
Reverse Transfer Capacitance	C <sub>rss</sub>			45		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -75A		104.4		nC
Gate-Source Charge	Q <sub>gs</sub>			20.8		
Gate-Drain Charge	Q <sub>gd</sub>			13.5		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = -20V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -75A, R <sub>GEN</sub> = 1.6Ω		18		nS
Turn-on rise time	t <sub>r</sub>			13		
Turn-off delay time	t <sub>d(off)</sub>			90		
Turn-off fall time	t <sub>f</sub>			15		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current <sup>1)</sup>	I <sub>S</sub>				-150	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = -75A			-1.2	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = -75A		35		nS
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100A/μs <sup>1)</sup>		85		nC

Notes:

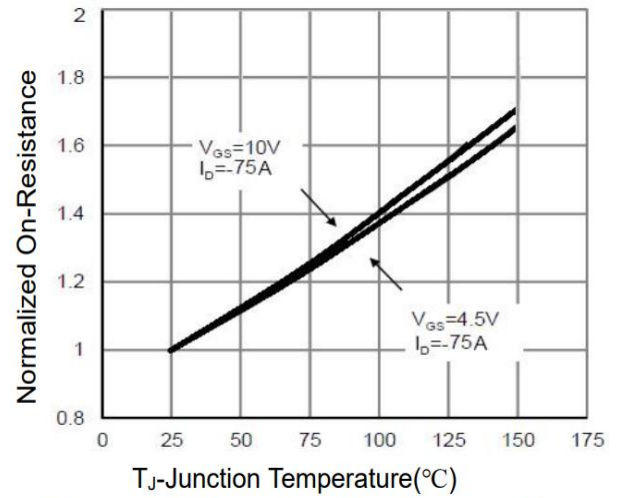
1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.

2) Guaranteed by design, not subject to production testing.

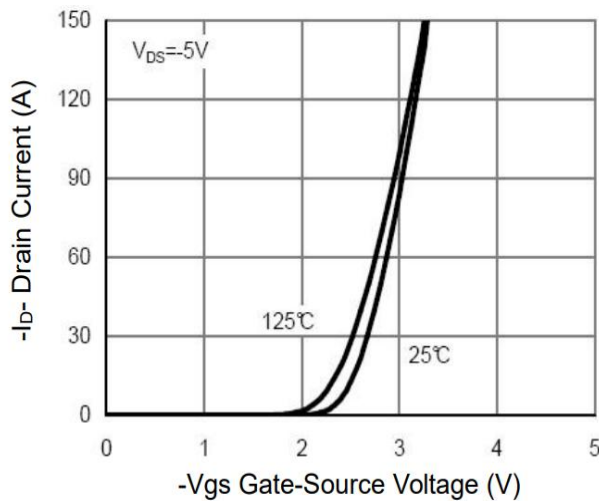
## Typical Characteristics



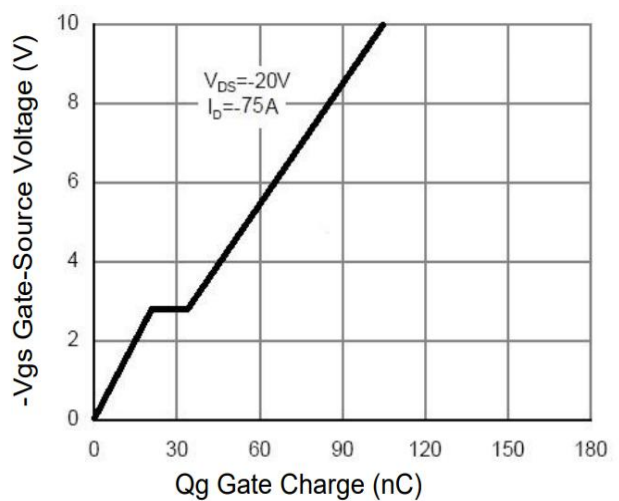
**Figure 1 Output Characteristics**



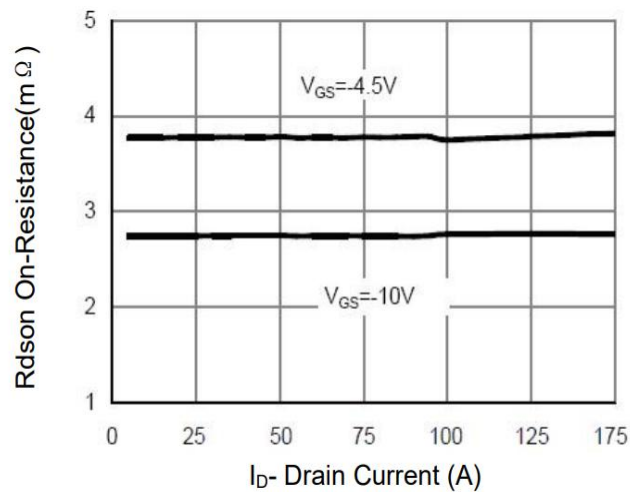
**Figure 2  $R_{dson}$ -Junction Temperature**



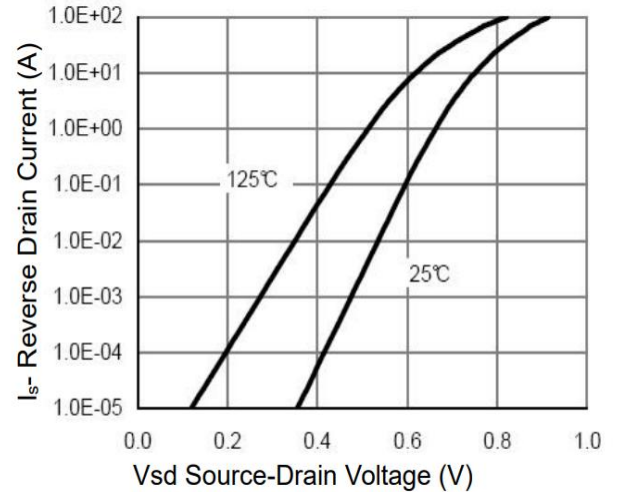
**Figure 3 Transfer Characteristics**



**Figure 4 Gate Charge**

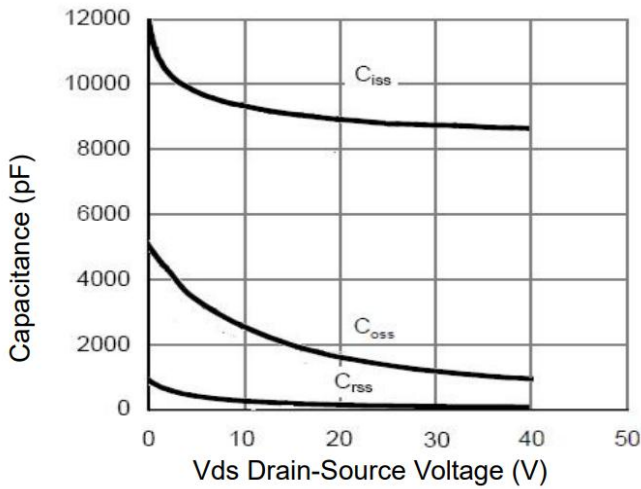


**Figure 5  $R_{dson}$ - Drain Current**

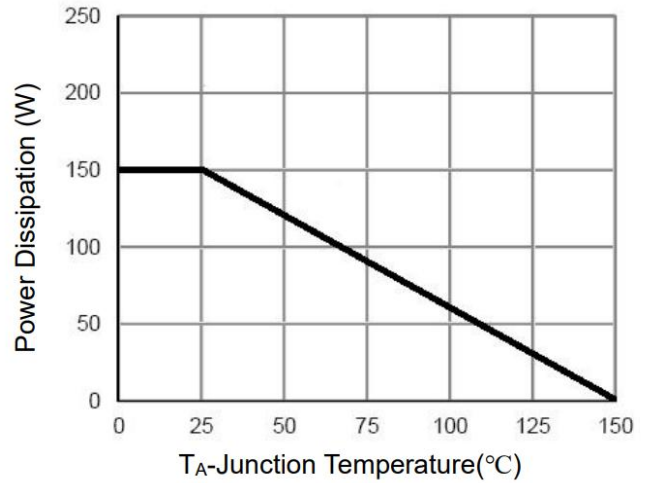


**Figure 6 Source- Drain Diode Forward**

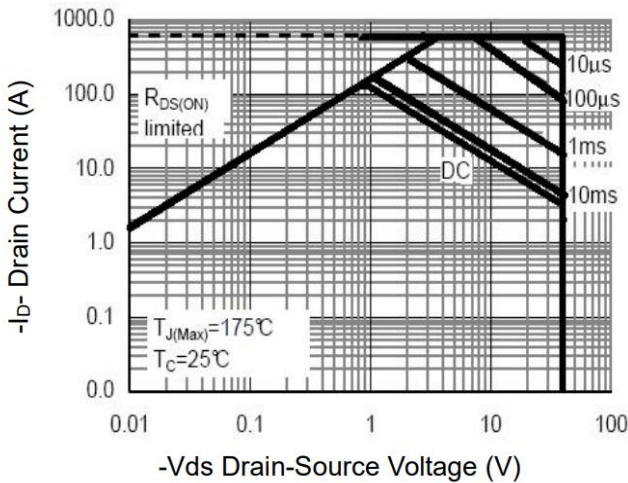
## Typical Characteristics



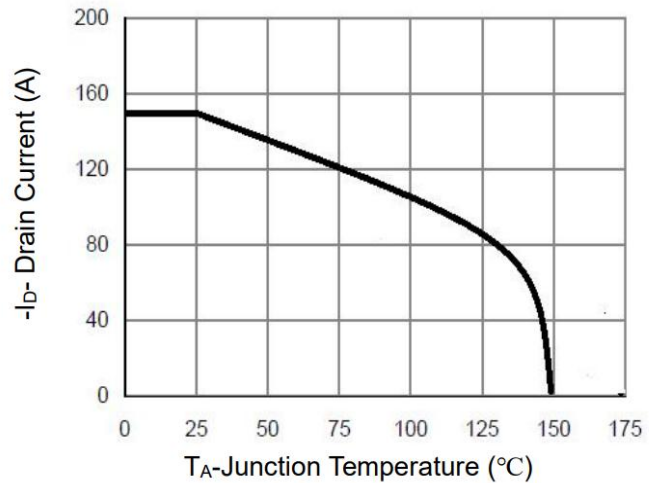
**Figure 7 Capacitance vs Vds**



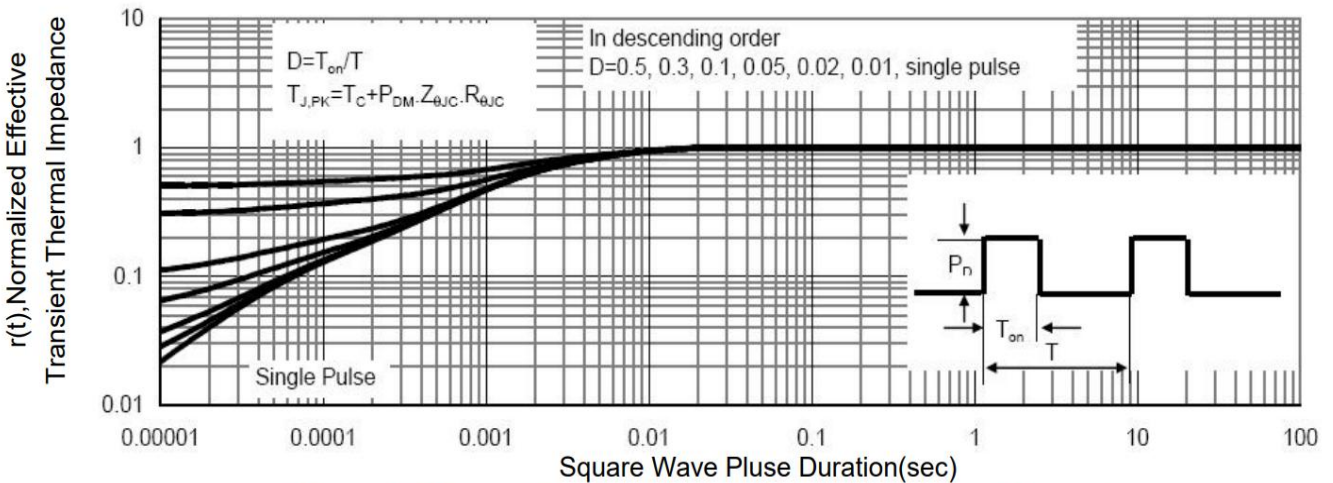
**Figure 8 Power De-rating**



**Figure 9 Safe Operation Area** (Note 3)

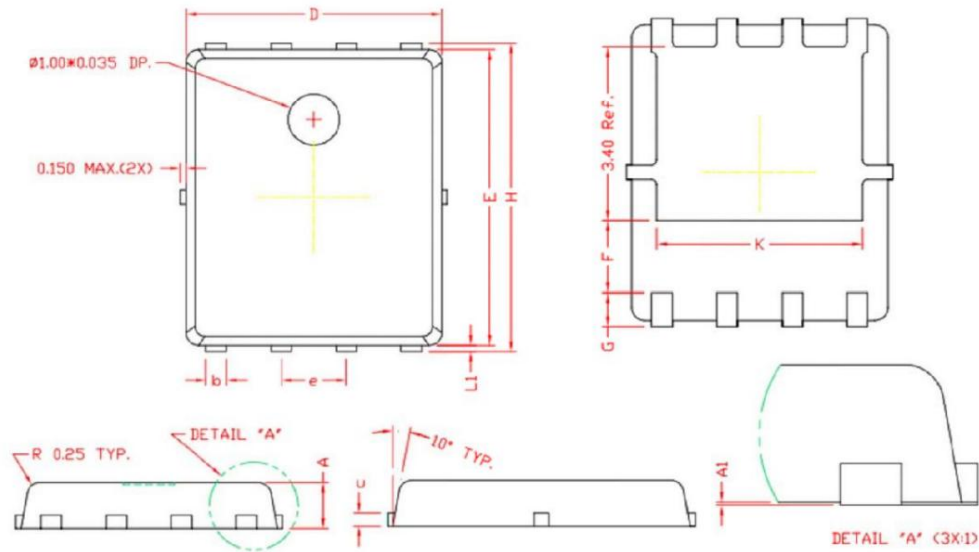


**Figure 10 Current De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

### DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.800	1.000	0.031	0.039
A1	0.000	0.050	0.000	0.002
b	0.350	0.490	0.013	0.019
c	0.254REF		0.010REF	
D	4.900	5.100	0.192	0.200
E	5.700	5.900	0.224	0.232
H	5.950	6.200	0.234	0.244
F	1.400REF.		0.055TYP.	
e	1.270BSC.		0.050BSC.	
G	0.600REF		0.024REF	
K	4.000REF		0.157REF	
L1	0.100	0.180	0.003	0.007