TM15G06NF

N+P-Channel Enhancement Mode Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

N Channel

V_{DS} =60V, I_D =17A

$R_{DS(ON)}$=24mΩ @ V_{GS}=10V

P Channel

V_{DS} = -60V,I_D = -13A

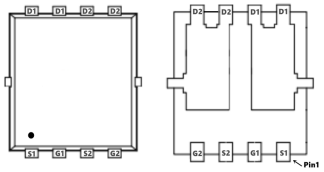
$R_{DS(ON)}$=68mΩ @ V_{GS}=-10V

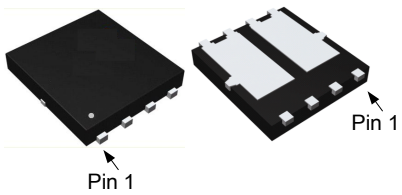
100% UIS Tested

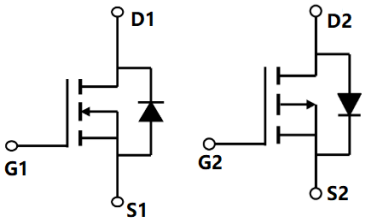
100% R_g Tested

Green Product

NF:DFN5x6-8L







Marking: 15G06

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

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current-TC=25℃	17	-13	A
	Continuous Drain Current-TC=100℃	12	-9	
	Pulsed Drain Current	63	-48	
P_D	Power Dissipation	22	20	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case[2]	7	℃/W

N-CH Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=60V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics(Note 3)						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	1.5	3	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=10A	---	24	30	mΩ
		V_{GS}=4.5V,I_D=5A	---	29	40	
Dynamic Characteristics(Note4)						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	1100	---	pF
C_{oss}	Output Capacitance		---	52	---	
C_{rss}	Reverse Transfer Capacitance		---	45	---	
Switching Characteristics(Note4)						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=30V, R_{GEN}=1.8Ω I_D=15A, V_{GS}=10V	---	7.6	---	ns
t_r	Rise Time		---	20	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	15	---	ns
t_f	Fall Time		---	24	---	ns
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=10A	---	20.3	---	nC
Q_{gs}	Gate-Source Charge		---	3.7	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	5.3	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Drain Diode Forward Voltage	V_{GS}=0V,I_S=20A	---	---	1.2	V
I_S	Maximum Continuous Drain to Source Diode Forward Current		---	---	17	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		---	---	63	A
Trr	Reverse Recovery Time	IF =10A, di/dt = 100A/μs	---	29	---	Ns
Qrr	Reverse Recovery Charge		---	43	---	nc

Typical Characteristics: (T_C=25℃ unless otherwise noted)

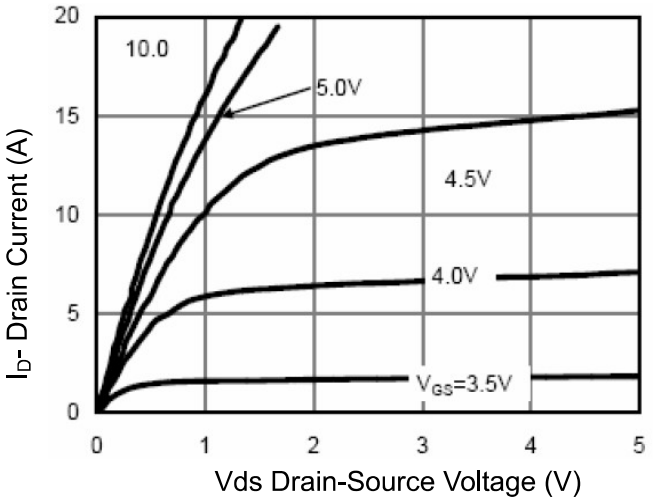


Figure 1 Output Characteristics

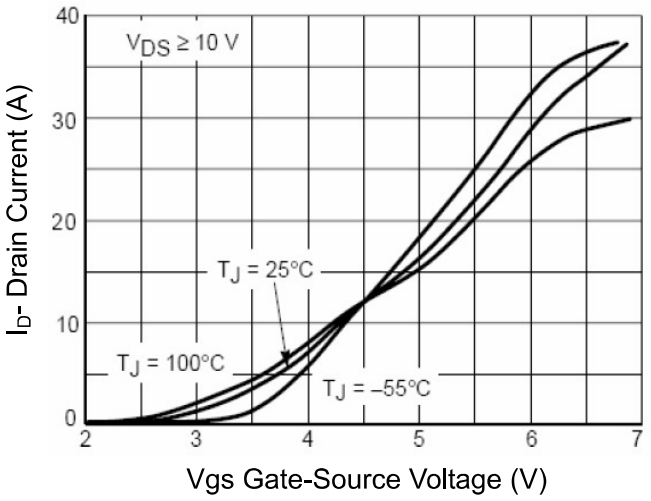


Figure 2 Transfer Characteristics

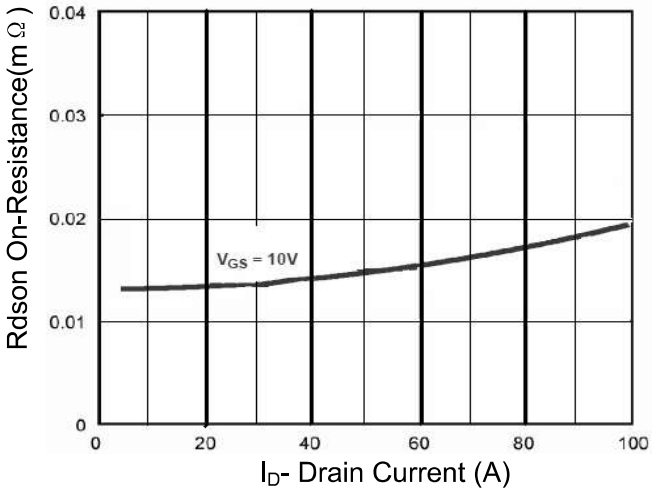


Figure 3 Rdson- Drain Current

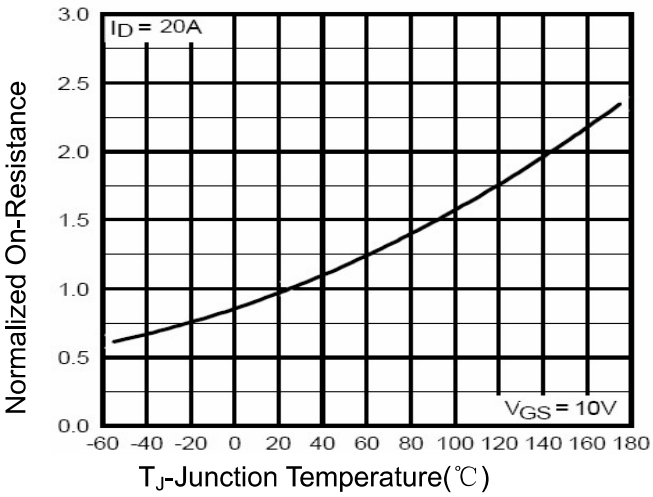
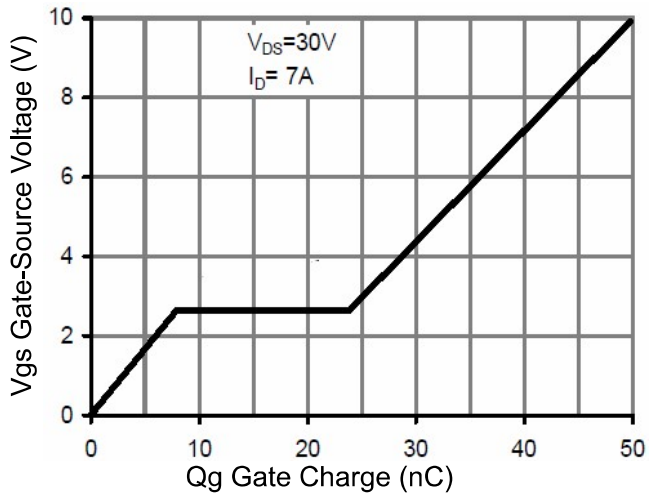


Figure 4 Rdson-Junction Temperature



Fiure 5 Gate Chare

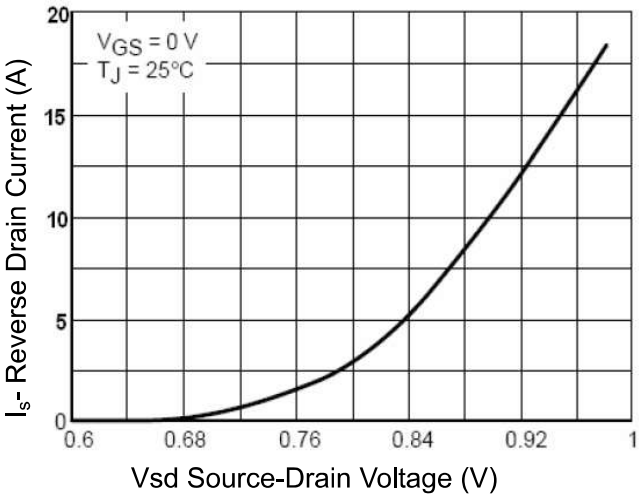


Figure 6 Source- Drain Diode Forward

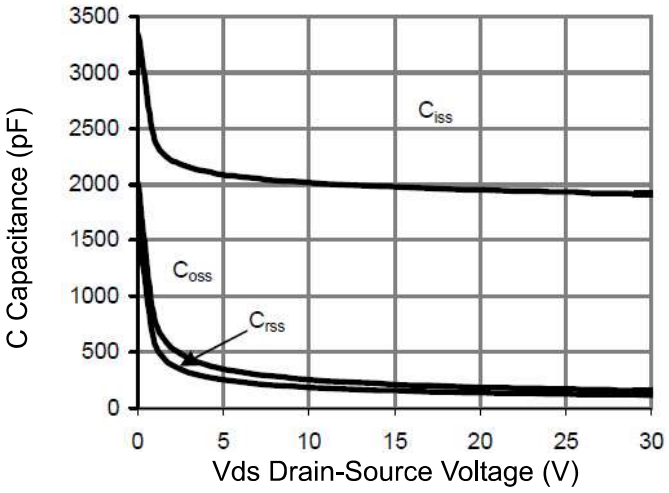


Figure 7 Capacitance vs Vds

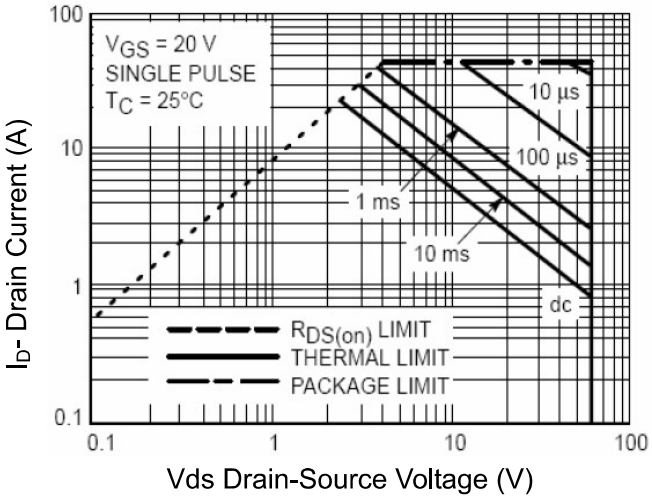
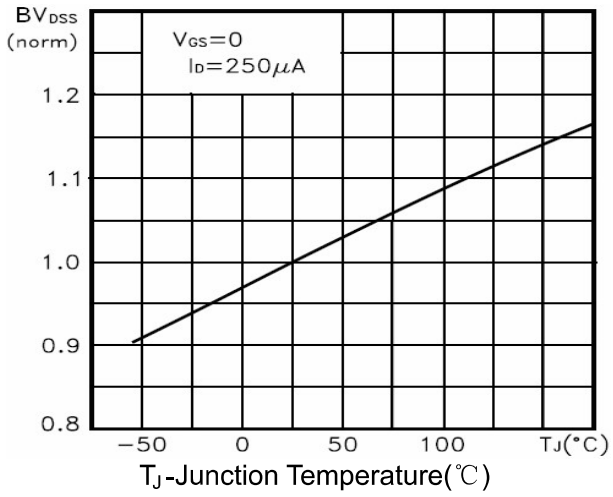


Figure 8 Safe Operation Area



Fi ure 9 BV vs Junction Temerature

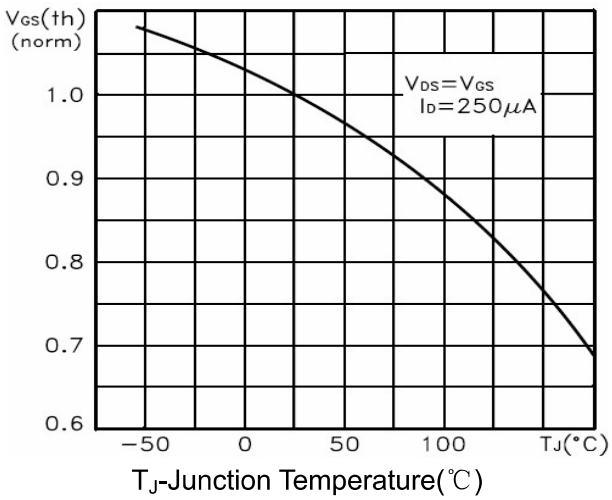


Figure 10 $V_{GS(th)}$ vs Junction Temperature

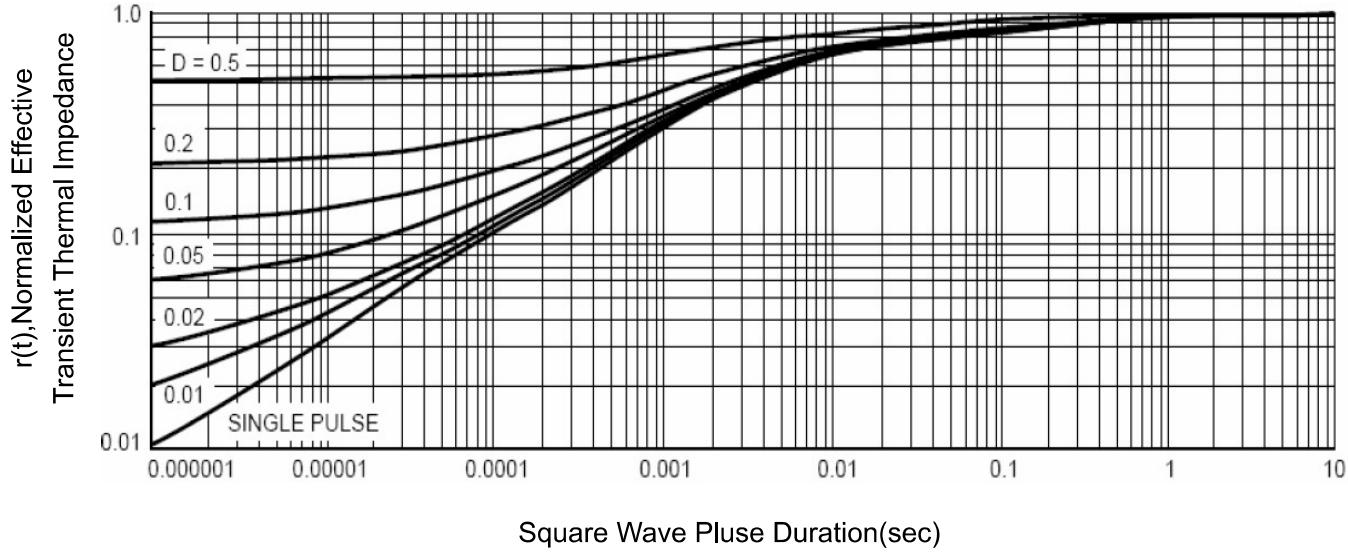


Figure 11 Normalized Maximum Transient Thermal Impedance

TM15G06NF

N+P-Channel Enhancement Mode Mosfet

P-CH Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-60V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics[3]						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-1	-1.5	-2.2	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=-10V,I_D=-12A	---	68	76	mΩ
		V_{GS}=-4.5V,I_D=-8A	---	77	90	
G_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-2A	---	10	---	S
Dynamic Characteristics[4]						
C_{iss}	Input Capacitance	V_{DS}=-30V, V_{GS}=0V, f=1MHz	---	1600	---	pF
C_{oss}	Output Capacitance		---	90	---	
C_{rss}	Reverse Transfer Capacitance		---	75	---	
Switching Characteristics[,4]						
$t_{d(on)}$	Turn-On Delay Tim	V_{DS}=-30V,R_{GEN}=3Ω, V_{GS}=-10V	---	11	---	ns
t_r	Rise Time		---	14	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	33	---	ns
t_f	Fall Time		---	13	---	ns
Q_g	Total Gate Charge	V_{GS}=-10V, V_{DS}=-30V, I_D=-12A	---	37.6	---	nC
Q_{gs}	Gate-Source Charge		---	4.3	---	nC
Q_{gd}	Gate-Drain Charge		---	7.2	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Drain Diode Forward Voltage[3]	V_{GS}=0V,I_S=-12A,T_J=25℃	---	---	-1.2	V
I_S	Continuous Source Current[2]	---	---	---	-13	A
Trr	Reverse Recovery Time	T_J=25℃, IF=-12A di/dt=-100A/μs(Note3)	---	-35	---	ns
Qrr	Reverse Recovery Charge		---	-38	---	nC

Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: Tj=25℃,V_{DD}=-20V,V_G=-10V,L=1mH,Rg=25Ω

Typical Characteristics: (T_C=25℃ unless otherwise noted)

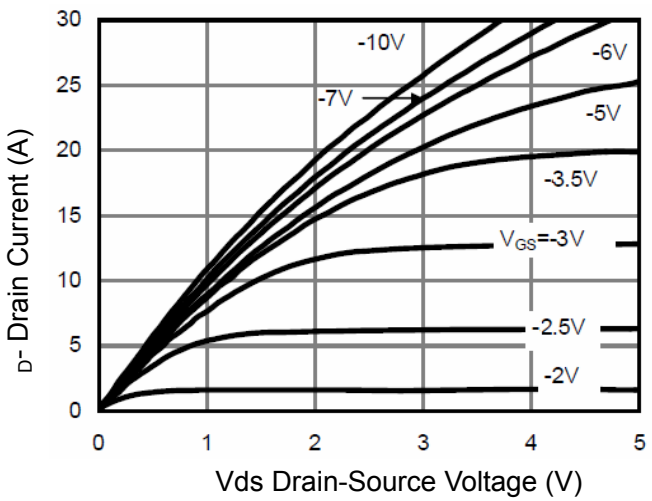


Figure 1 Output Characteristics

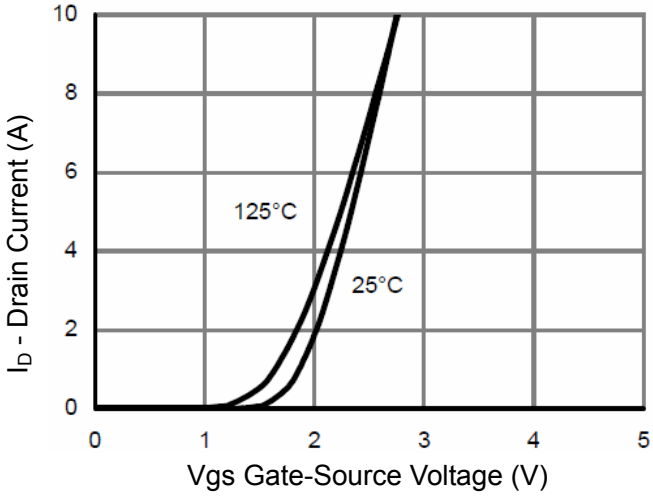


Figure 2 Transfer Characteristics

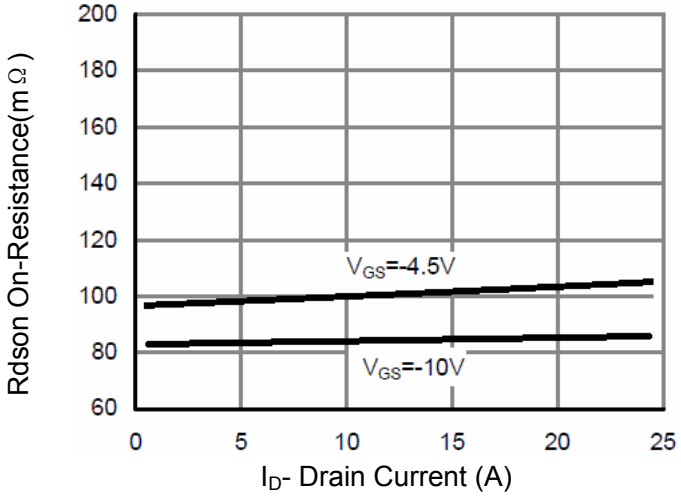


Figure 3 Rdson- Drain Current

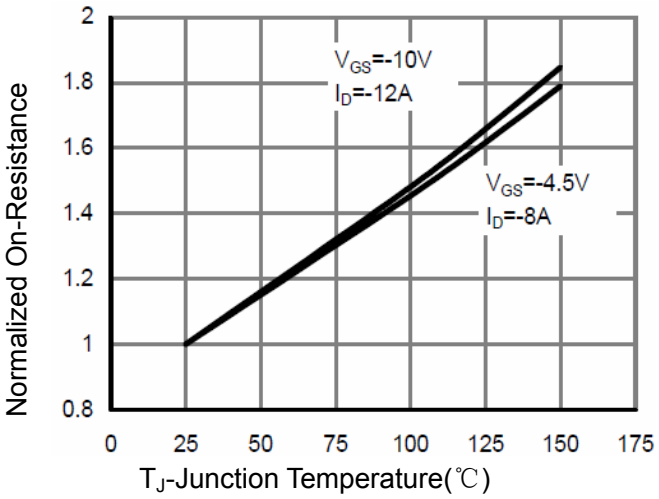


Figure 4 Rdson-Junction Temperature

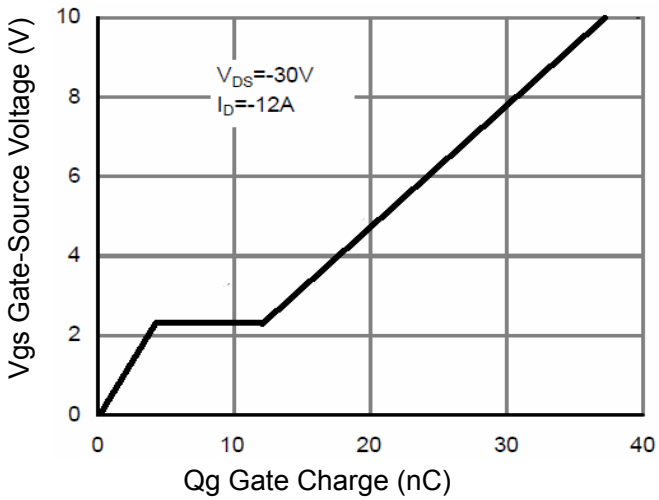


Figure 5 Gate Charge

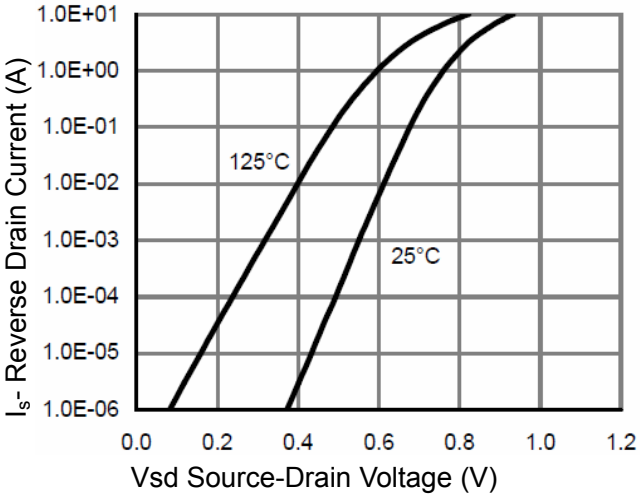


Figure 6 Source- Drain Diode Forward

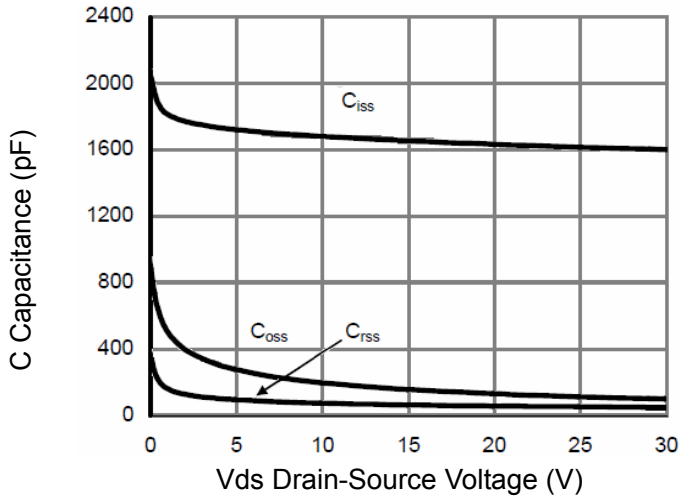


Figure 7 Capacitance vs Vds

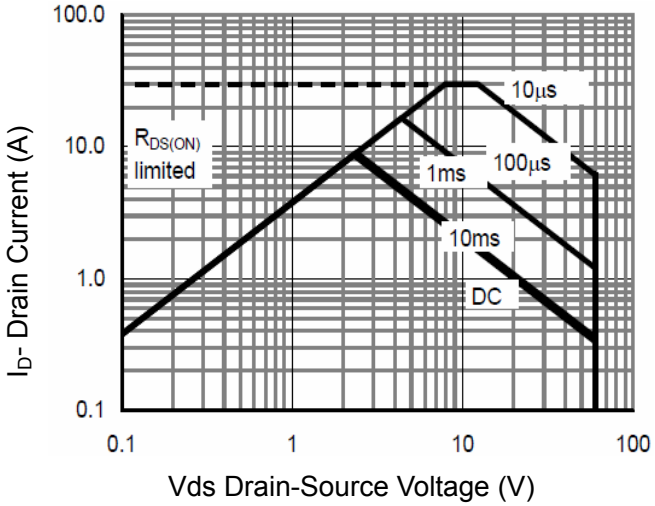


Figure 8 Safe Operation Area

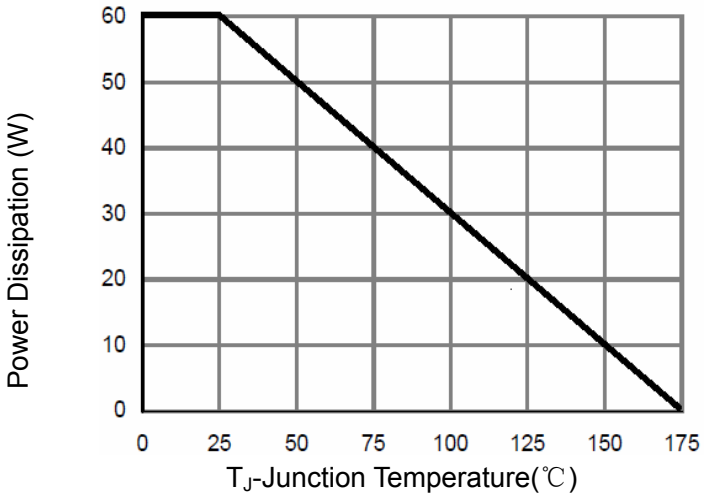


Figure 9 Power De-rating

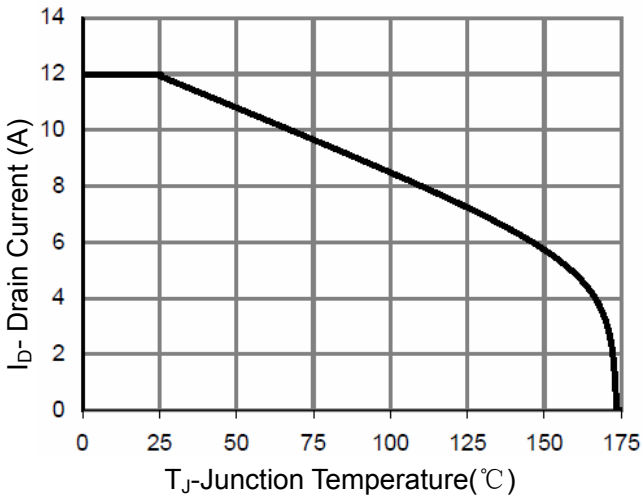


Figure 10 ID Current De-rating

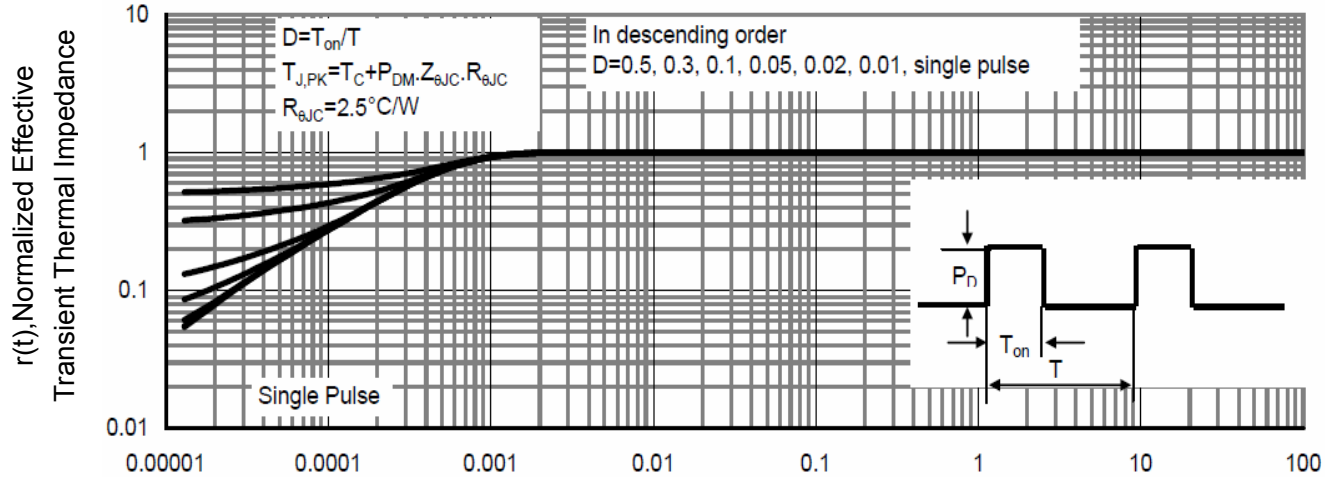
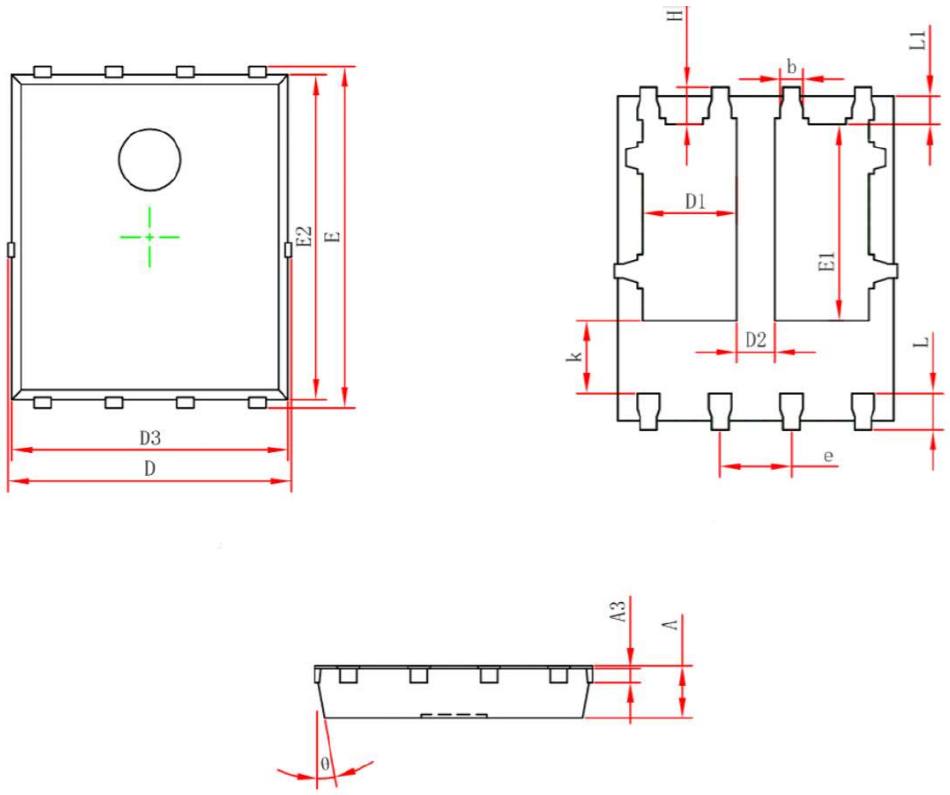


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data:DFN5x6-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.154REF.		0.006REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°