



## TGD N-Channel Enhancement Mode Power MOSFET

### Description

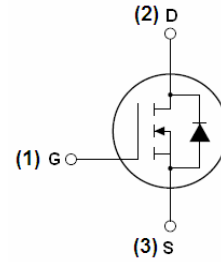
The TGD0130G uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

### General Features

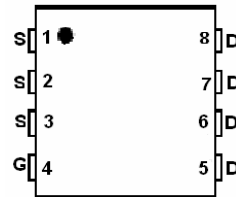
- $V_{DS} = 100V, I_D = 30A$   
 $R_{DS(ON)} < 28m\Omega @ V_{GS}=10V$  (Typ:24m $\Omega$ )
- Special process technology for high ESD capability
- High density cell design for ultra low  $R_{dson}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation

### Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



pin assignment



DFN5X6-8L top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
0130G	0130G	DFN5X6-8L	-	-	-

### Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current-Continuous	30	A
$I_D (100^\circ\text{C})$	Drain Current-Continuous( $T_C=100^\circ\text{C}$ )	21	A
$I_{DM}$	Pulsed Drain Current	70	A
$P_D$	Maximum Power Dissipation	75	W
	Derating factor	0.5	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ\text{C}$

### Thermal Characteristic

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 2)	2.0	$^\circ\text{C}/\text{W}$
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**Electrical Characteristics ( $T_C=25^{\circ}\text{C}$  unless otherwise noted)**

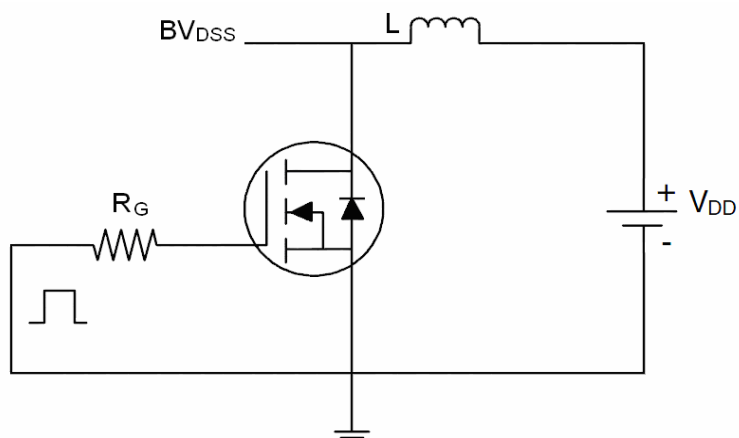
Symbol		Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics							
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage		V <sub>GS</sub> =0V I <sub>D</sub> =250μA	100	110	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current		V <sub>DS</sub> =100V,V <sub>GS</sub> =0V	-	-	1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current		V <sub>GS</sub> =±20V,V <sub>DS</sub> =0V	-	-	±100	nA
On Characteristics <sup>(Note 3)</sup>							
V <sub>GS(th)</sub>	Gate Threshold Voltage		V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250μA	2	3	4	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance		V <sub>GS</sub> =10V, I <sub>D</sub> =10A	-	24	28	mΩ
g <sub>FS</sub>	Forward Transconductance		V <sub>DS</sub> =5V,I <sub>D</sub> =10A	-	15	-	S
Dynamic Characteristics <sup>(Note4)</sup>							
C <sub>ISS</sub>	Input Capacitance		V <sub>DS</sub> =25V,V <sub>GS</sub> =0V, F=1.0MHz	-	2000	-	PF
C <sub>OSS</sub>	Output Capacitance			-	300	-	PF
C <sub>RSS</sub>	Reverse Transfer Capacitance			-	250	-	PF
Switching Characteristics <sup>(Note 4)</sup>							
t <sub>d(on)</sub>	Turn-on Delay Time		V <sub>DD</sub> =50V,R <sub>L</sub> =5Ω V <sub>GS</sub> =10V,R <sub>GEN</sub> =3Ω	-	7	-	nS
t <sub>r</sub>	Turn-on Rise Time			-	7	-	nS
t <sub>d(off)</sub>	Turn-Off Delay Time			-	29	-	nS
t <sub>f</sub>	Turn-Off Fall Time			-	7	-	nS
Q <sub>g</sub>	Total Gate Charge		V <sub>DS</sub> =50V,I <sub>D</sub> =18A, V <sub>GS</sub> =10V	-	39	-	nC
Q <sub>gs</sub>	Gate-Source Charge			-	8	-	nC
Q <sub>gd</sub>	Gate-Drain Charge			-	12	-	nC
Drain-Source Diode Characteristics							
V <sub>SD</sub>	Diode Forward Voltage <sup>(Note 3)</sup>		V <sub>GS</sub> =0V,I <sub>S</sub> =20A	-	-	1.2	V
I <sub>S</sub>	Diode Forward Current <sup>(Note 2)</sup>		-	-	-	30	A
t <sub>rr</sub>	Reverse Recovery Time		T <sub>J</sub> = 25°C, I <sub>F</sub> = 18A di/dt = 100A/μs <sup>(Note3)</sup>	-	32	-	nS
Q <sub>rr</sub>	Reverse Recovery Charge			-	53	-	nC
t <sub>on</sub>	Forward Turn-On Time		Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

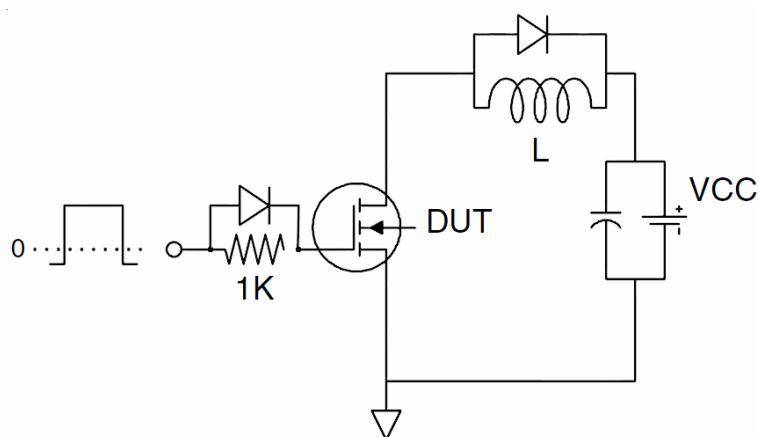
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

## Test Circuit

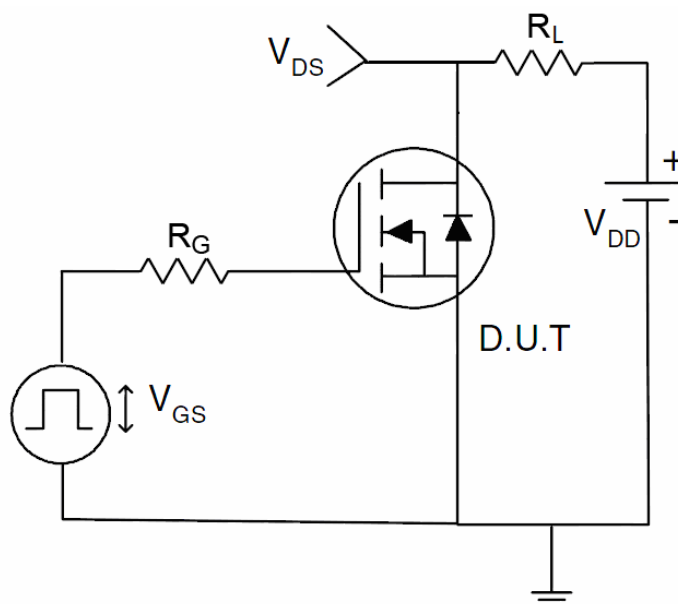
### 1) $E_{AS}$ Test Circuit



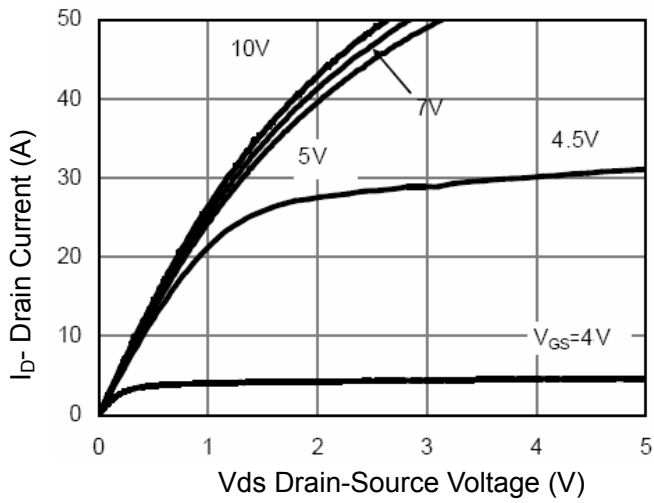
### 2) Gate Charge Test Circuit



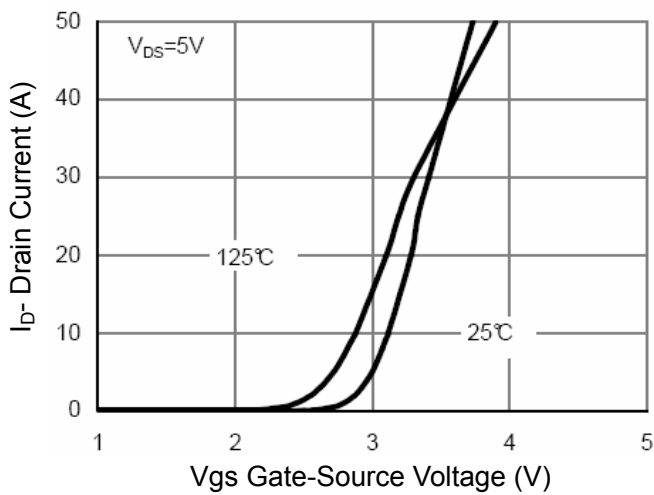
### 3) Switch Time Test Circuit



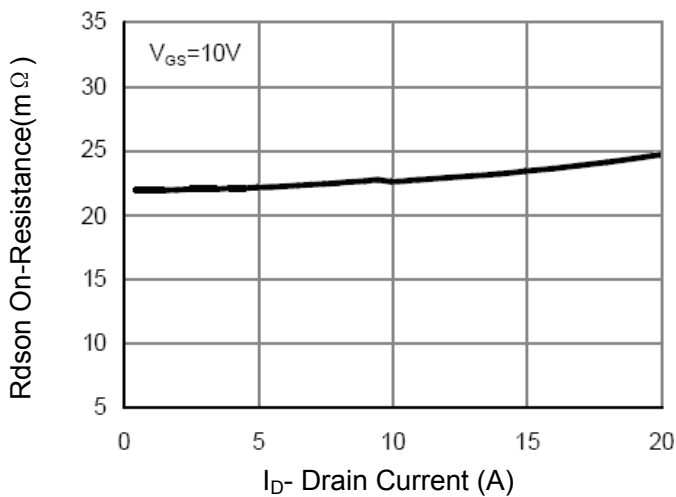
## Typical Electrical and Thermal Characteristics (Curves)



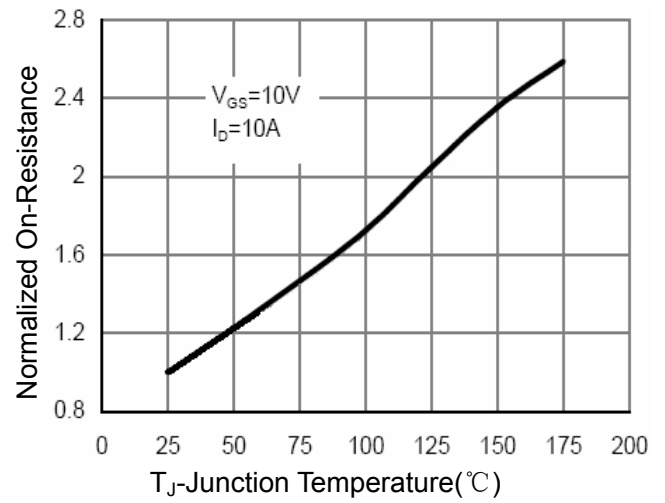
**Figure 1 Output Characteristics**



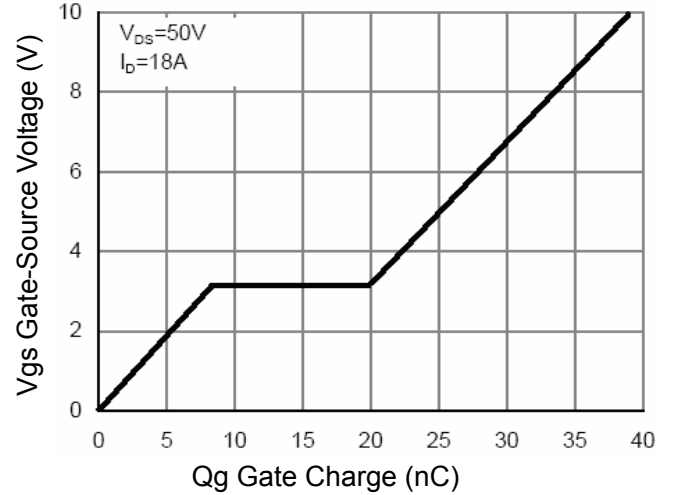
**Figure 2 Transfer Characteristics**



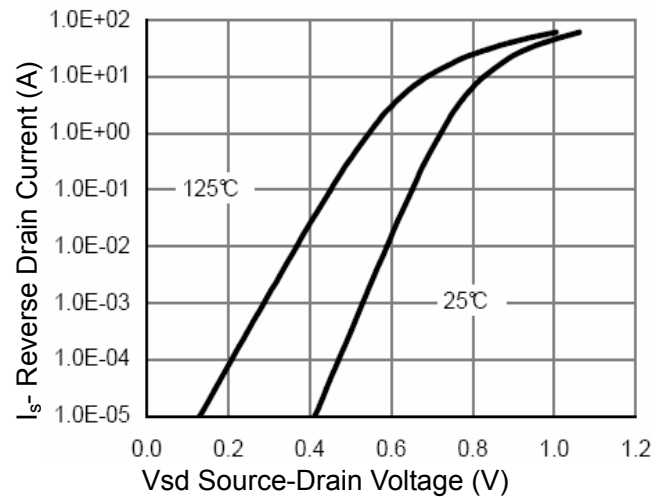
**Figure 3 Rdson- Drain Current**



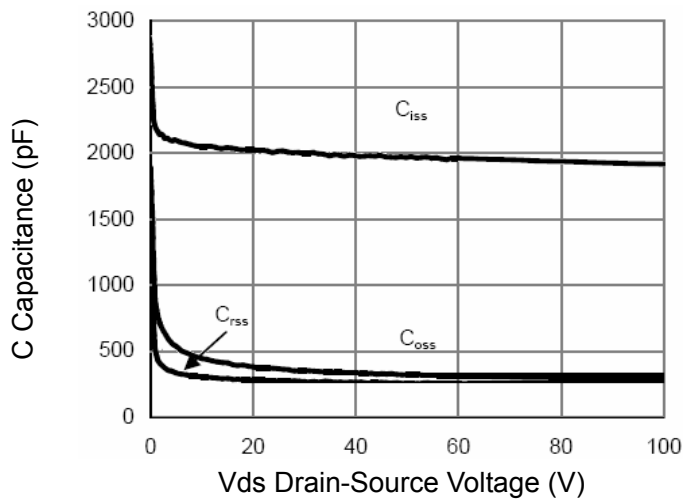
**Figure 4 Rdson-Junction Temperature**



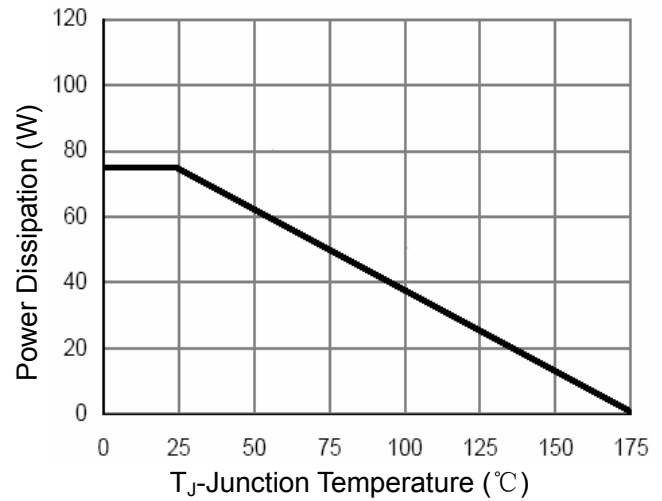
**Figure 5 Gate Charge**



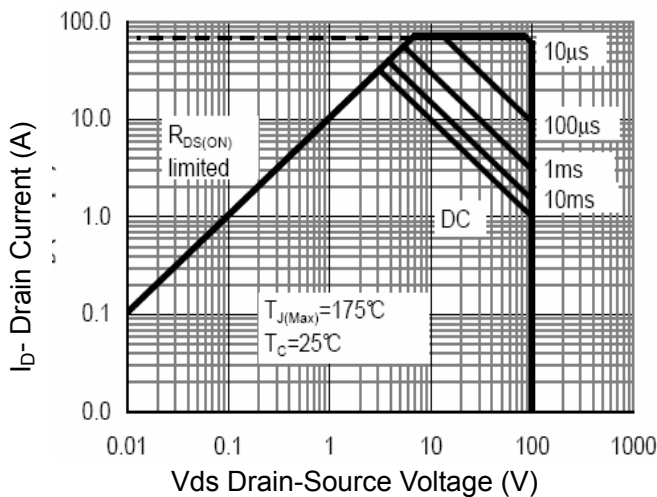
**Figure 6 Source- Drain Diode Forward**



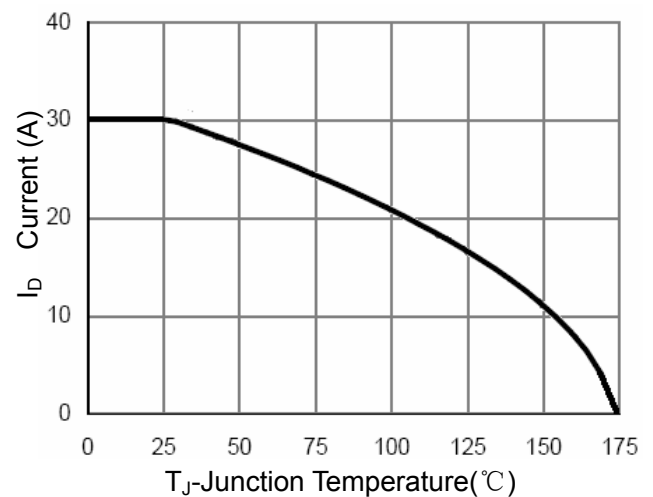
**Figure 7 Capacitance vs Vds**



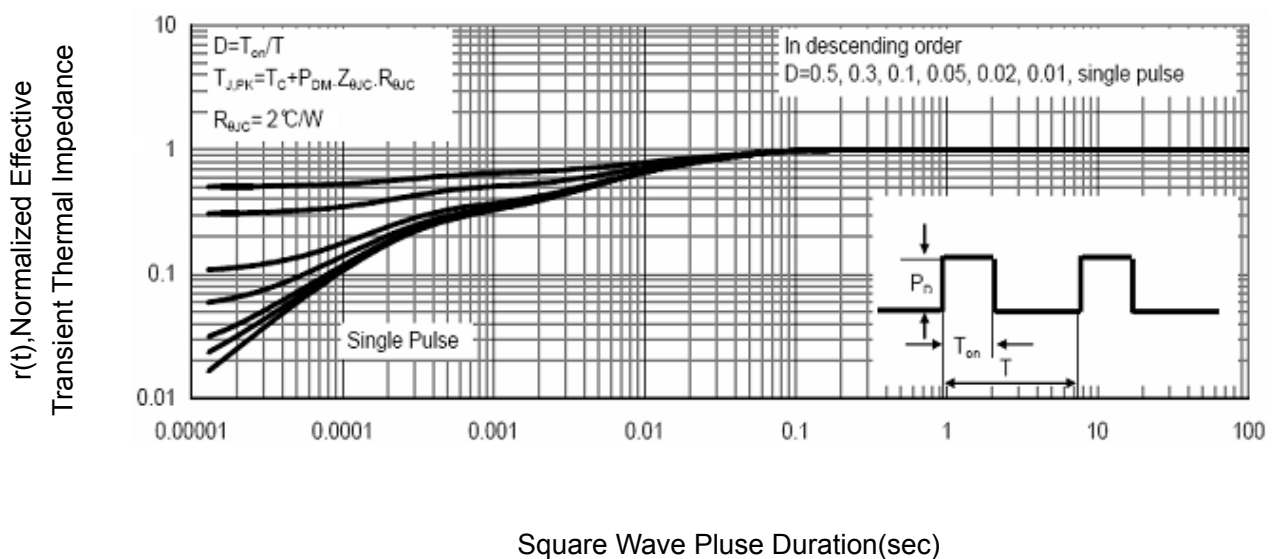
**Figure 9 Power De-rating**



**Figure 8 Safe Operation Area**

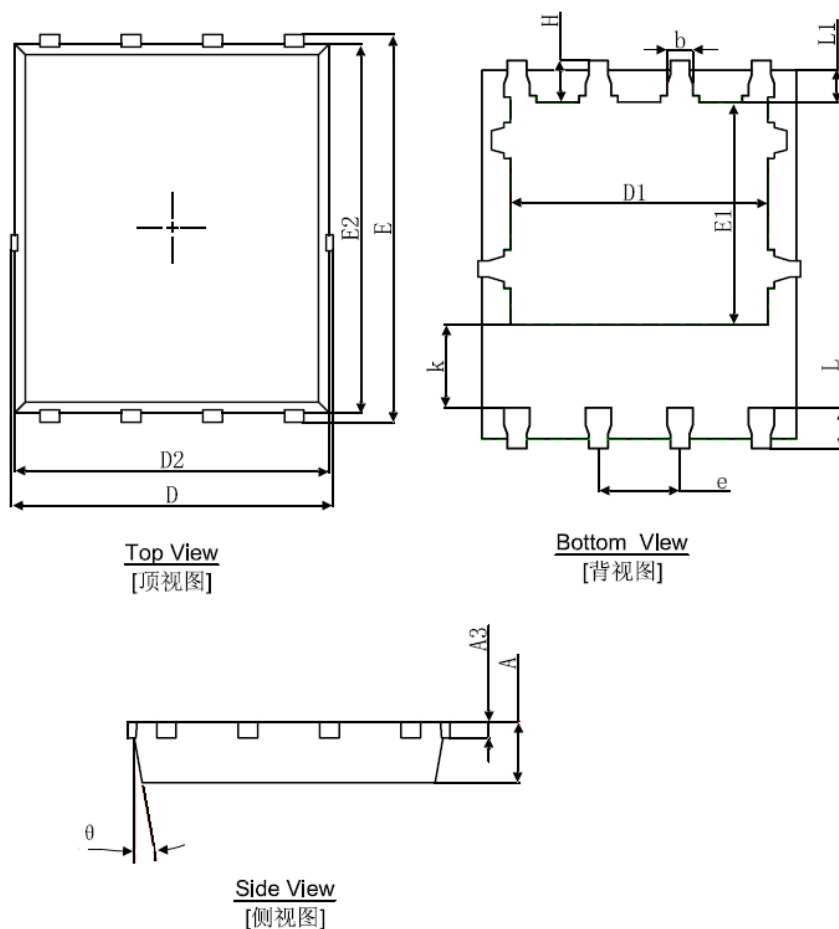


**Figure 10 ID Current- Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

## DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	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	0.035	0.450	0.014	0.018
e	1.270(TYP.)		0.050(TYP.)	
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	8°	12°	8°	12°