

## General Description

The G110N06K is N-channel MOS Field Effect Transistor designed for high current switching applications. Rugged  $E_{AS}$  capability and ultra low  $R_{DS(ON)}$  is suitable for PWM, load switching applications.

## Features

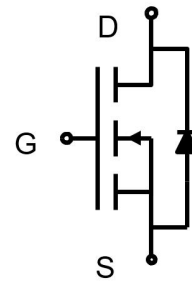
- 

$V_{DSS}$	$R_{DS(ON)}$ @10V(Typ)	$I_D$
60V	5.5 m $\Omega$	110A

- Ultra Low On-Resistance
- High UIS and UIS 100%Test
- RoHS Compliant

## Application

- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



Schematic diagram



TO-252

## Ordering Information

Part Number	Marking	Case	Packaging
G110N06K	G110N06	TO-252	2500pcs/Reel

Table 1. Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	60	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	$\pm 20$	V
$I_{D(DC)}$	Drain Current (DC) at $T_c=25^\circ C$	110	A
$I_{D(DC)}$	Drain Current (DC) at $T_c=100^\circ C$	65	A
$I_{DM(pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	368	A
dv/dt	Peak Diode Recovery Voltage	30	V/ns
$P_D$	Maximum Power Dissipation( $T_c=25^\circ C$ )	160	W
	Derating Factor	0.8	W/°C
$E_{AS}$	Single Pulse Avalanche Energy (Note 2)	484	mJ
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	°C

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. $E_{AS}$  condition: $T_J=25^\circ C, V_{DD}=33V, V_G=10V, I_D=45A$

**Table 2. Thermal Characteristic**

Symbol	Parameter	Value	Unit
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	0.78	°C/W

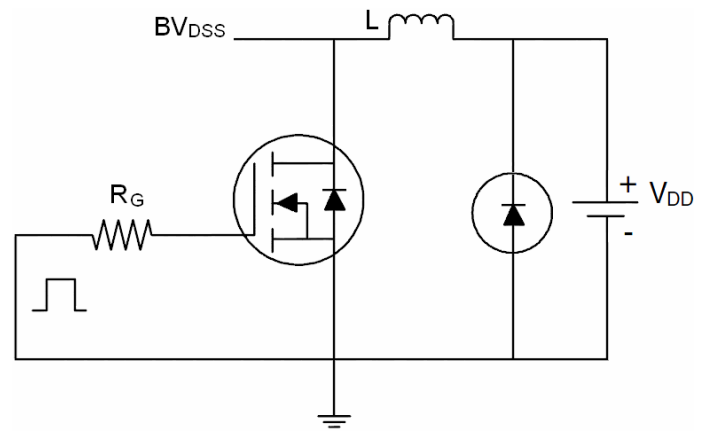
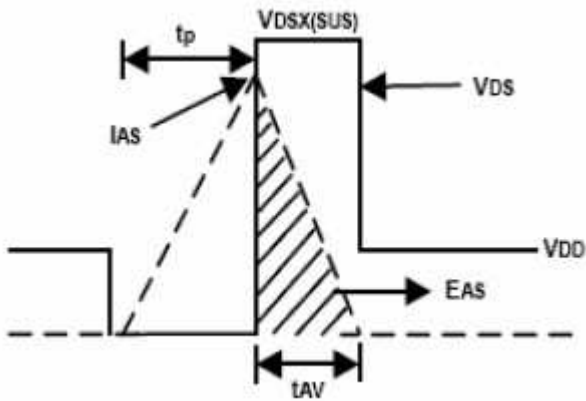
**Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(Tc=25°C)	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(Tc=125°C)	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			10	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.8	2.5	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =4A		5.5	6.4	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A		6.0	8.4	mΩ
<b>Dynamic Characteristics</b>						
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =15A	20			S
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz		5538		pF
C <sub>oss</sub>	Output Capacitance			380		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			304		pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, I <sub>D</sub> =40A, V <sub>GS</sub> =10V		113		nC
Q <sub>gs</sub>	Gate-Source Charge			14		nC
Q <sub>gd</sub>	Gate-Drain Charge			54		nC
<b>Switching Times</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =30V, I <sub>D</sub> =2A, R <sub>L</sub> =15Ω V <sub>GS</sub> =10V, R <sub>G</sub> =2.5Ω		13		nS
t <sub>r</sub>	Turn-on Rise Time			15		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			27		nS
t <sub>f</sub>	Turn-Off Fall Time			32		nS
<b>Source-Drain Diode Characteristics</b>						
I <sub>SD</sub>	Source -Drain Current (Body Diode)			110		A
I <sub>SDM</sub>	Pulsed Source-Drain Current(Body Diode)			368		A
V <sub>SD</sub>	Forward On Voltage <sup>(Note 1)</sup>	T <sub>J</sub> =25°C, I <sub>SD</sub> =20A, V <sub>GS</sub> =0V		0.7	1.2	V
t <sub>rr</sub>	Reverse Recovery Time <sup>(Note 1)</sup>	T <sub>J</sub> =25°C, I <sub>F</sub> =75A di/dt=100A/μs		49		nS
Q <sub>rr</sub>	Reverse Recovery Charge <sup>(Note 1)</sup>			97		nC
t <sub>on</sub>	Forward Turn-on Time	Intrinsic turn-on time is negligible(turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

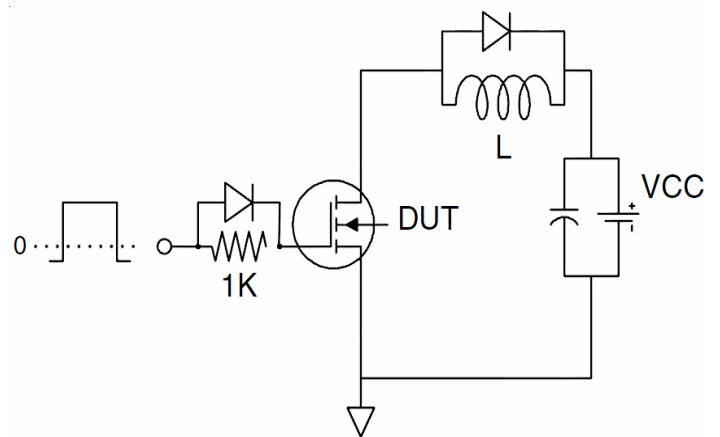
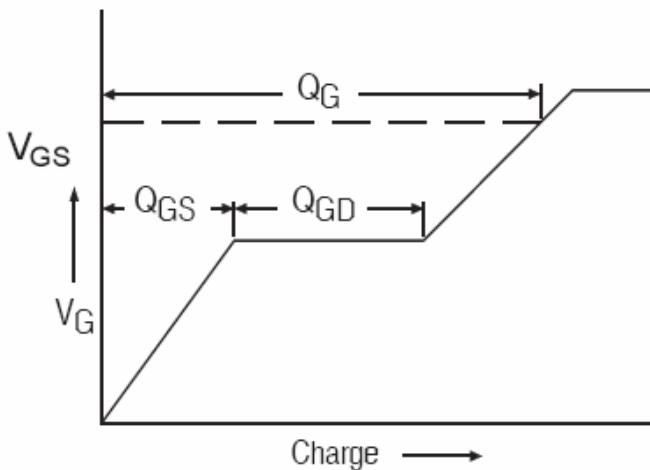
Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C

## Test Circuit

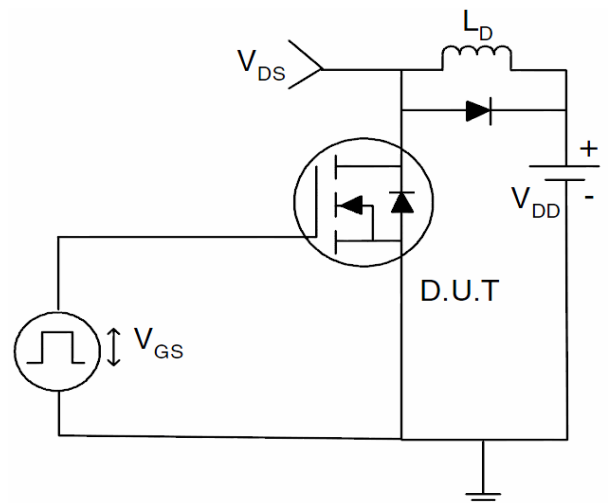
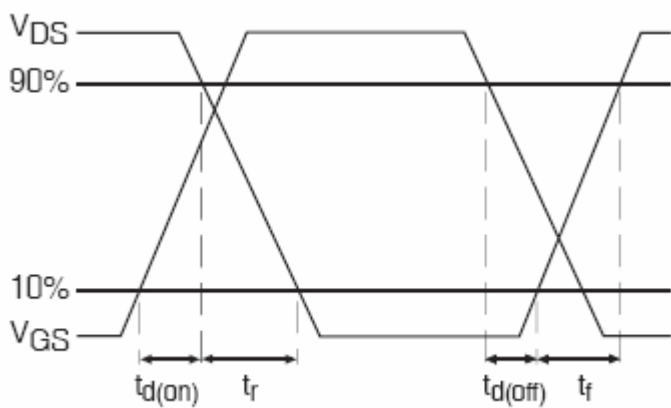
### 1) $E_{AS}$ Test Circuits



### 2) Gate Charge Test Circuit:



### 3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Safe Operating Area

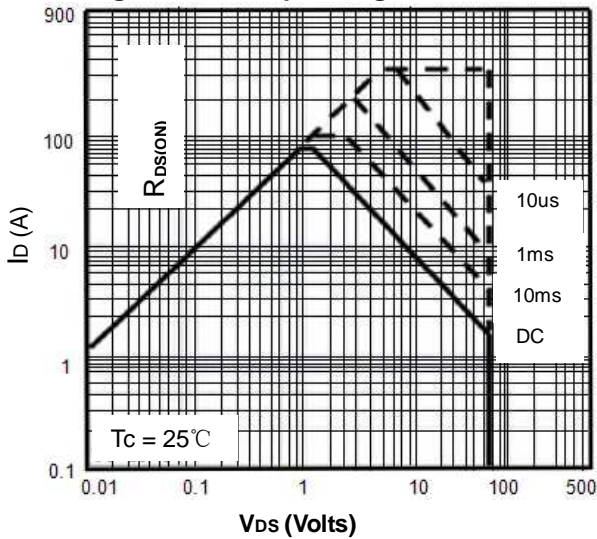


Figure2. Source-Drain Diode Forward Voltage

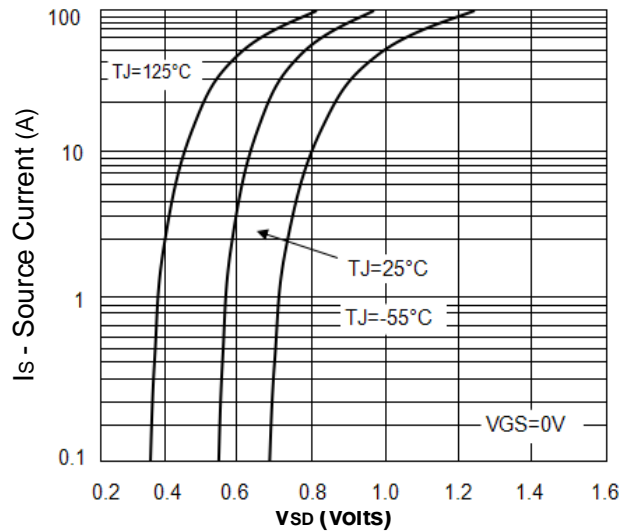


Figure3. Output Characteristics

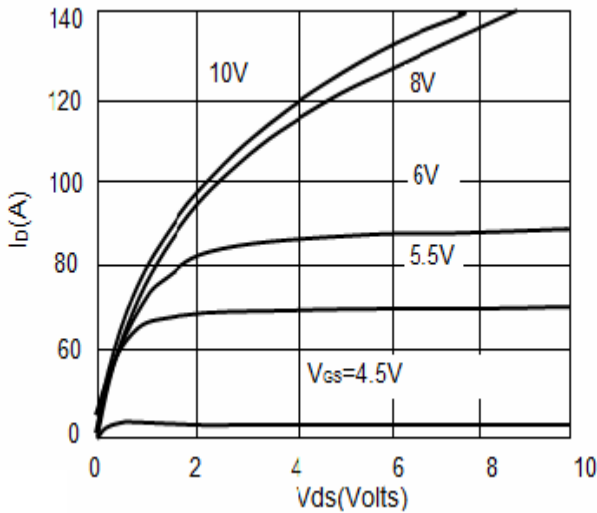


Figure4. Transfer Characteristics

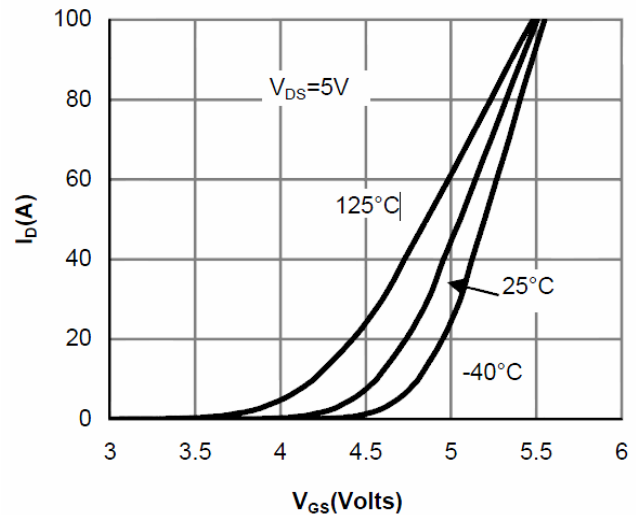


Figure5. Static Drain-Source On Resistance

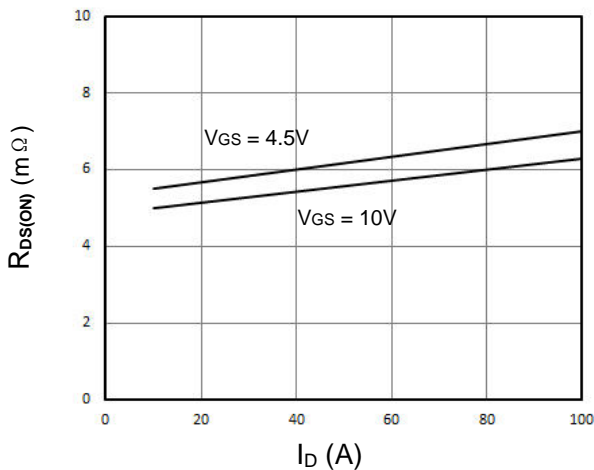


Figure6. RDS(ON) vs Junction Temperature

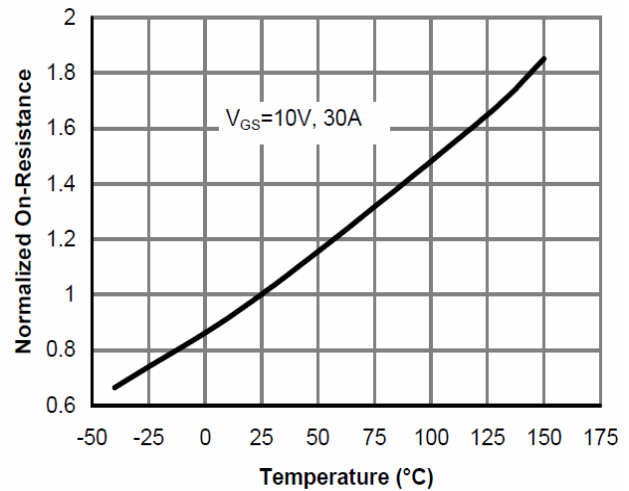
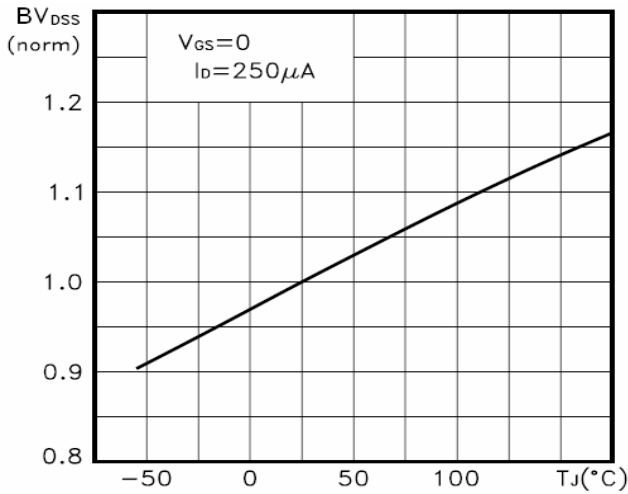
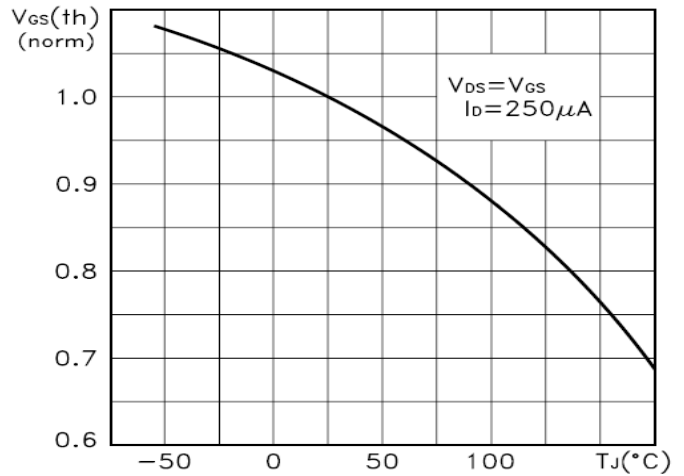


Figure7.  $BV_{DSS}$  vs Junction Temperature



Temperature (°C)

Figure8.  $V_{GS(th)}$  vs Junction Temperature



Temperature (°C)

Figure9. Gate Charge Waveforms

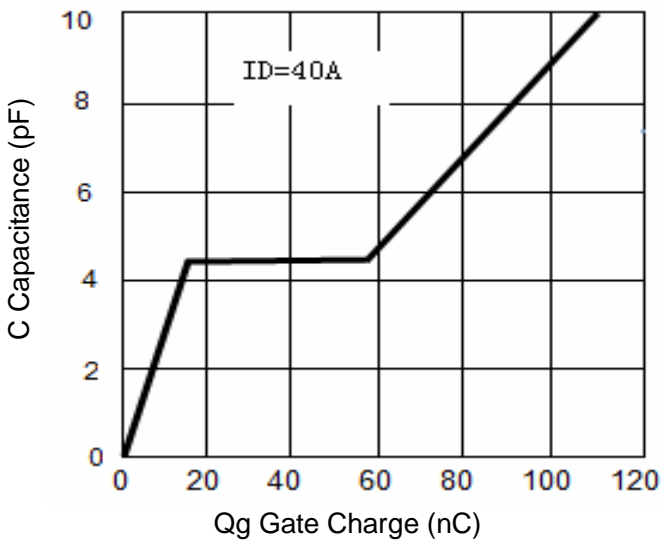


Figure10. Capacitance

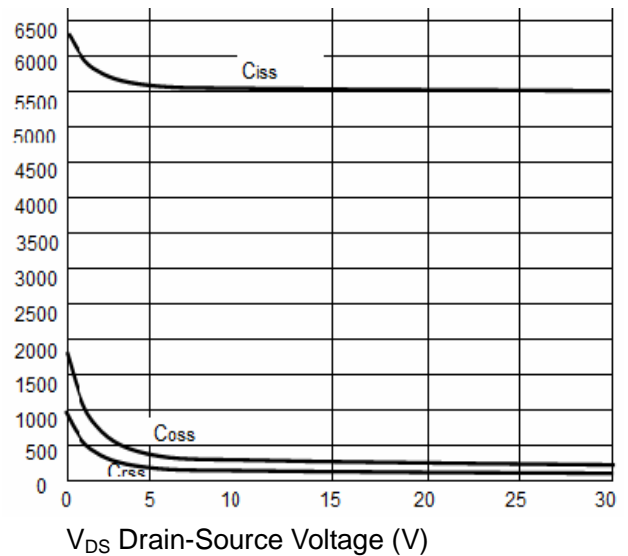
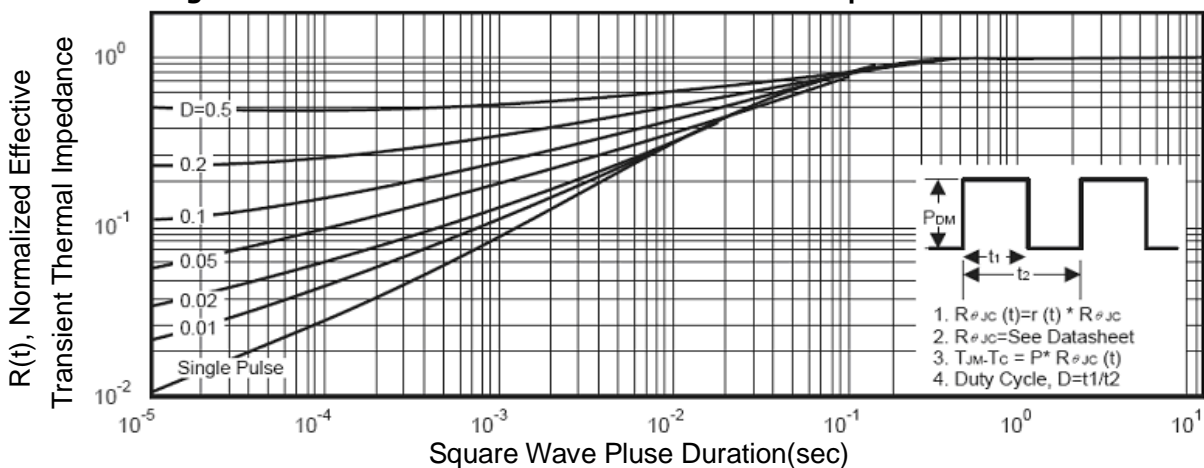
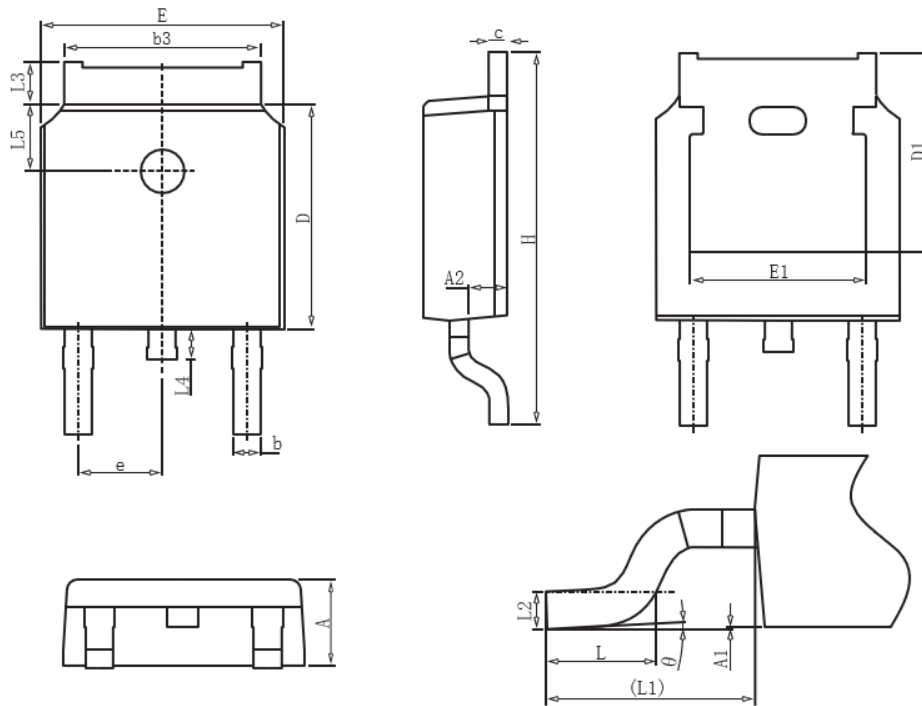


Figure11. Normalized Maximum Transient Thermal Impedance



TO-252 Package Information



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	2.2	2.3	2.4
A1	0		0.2
A2	0.97	1.07	1.17
b	0.68	0.78	0.9
b3	5.2	5.33	5.5
c	0.43	0.53	0.63
D	5.98	6.1	6.22
D1	5.30REF		
E	6.4	6.6	6.8
E1	4.63		
e	2.286BSC		
H	9.4	10.1	10.5
L	1.38	1.5	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88		1.28
L4	0.5		1
L5	1.65	1.8	1.95
θ	0°		8°