

# 30H10K

# N-Channel Trench Power MOSFET

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### General Description

The 30H10K uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 5V. This device is suitable for use as a wide variety of applications.

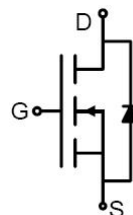
### Features

- $V_{DS} = 30V, I_D = 100A$   
 $R_{DS(ON)} < 4.2m\Omega @$   
 $V_{GS} = 10V$   $R_{DS(ON)} <$   
 $7m\Omega @ V_{GS} = 5V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

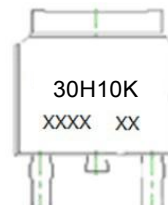
### Application

- PWM applications
- Load switch
- Power management

**100% UIS TESTED!**  
**100%  $\Delta V_{ds}$  TESTED!**



Schematic Diagram



Marking and pin Assignment



TO-252(DPAK) top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
30H10K	30H10K	TO-252	325mm	16mm	2500

**Table 1. Absolute Maximum Ratings ( $T_A=25^\circ C$ )**

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage ( $V_{GS}=0V$ )	30	V
VGS	Gate-Source Voltage ( $V_{DS}=0V$ )	$\pm 20$	V
ID	Drain Current-Continuous( $T_c=25^\circ C$ )	100	A
	Drain Current-Continuous( $T_c=100^\circ C$ )	70	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed <b>(Note 1)</b>	400	A
PD	Maximum Power Dissipation( $T_c=25^\circ C$ )	88	W
	Maximum Power Dissipation( $T_c=100^\circ C$ )	44	W
EAS	Avalanche energy <b>(Note 2)</b>	320	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ C$

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature Notes 2.EAS condition:  $T_J=25^\circ C, V_{DD}=20V, V_G=10V, R_G=25\Omega$

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**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
R $\theta$ JC	Thermal Resistance, Junction-to-Case	-	1.7	$^{\circ}$ C/W

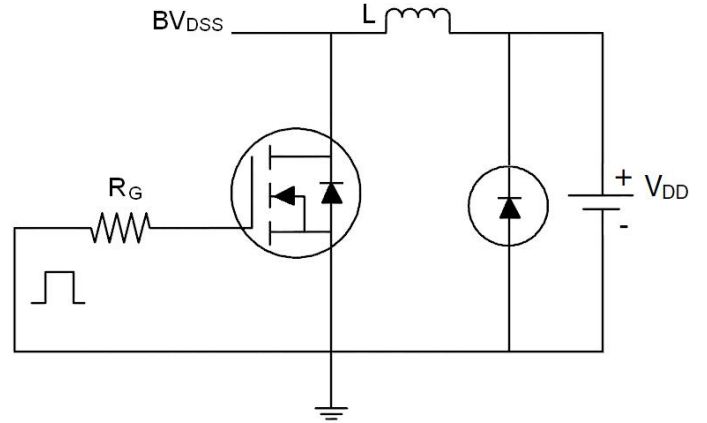
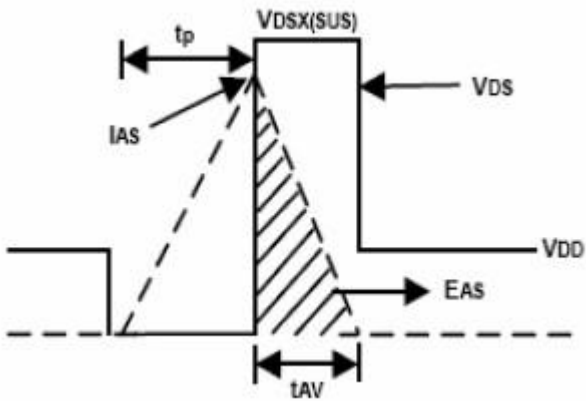
**Table 3. Electrical Characteristics (TA=25 $^{\circ}$ C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250 $\mu$ A	30			V
IDSS	Zero Gate Voltage Drain Current	VDS=30V,VGS=0V			1	$\mu$ A
IGSS	Gate-Body Leakage Current	VGS= $\pm$ 20V,VDS=0V			$\pm$ 100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250 $\mu$ A	1	1.5	2.5	V
gFS	Forward Transconductance	VDS=5V,ID=15A		30		S
RDS(ON)	Drain-Source On-State Resistance	VGS=10V, ID=20A		3.6	4.2	m $\Omega$
		VGS=5V, ID=15A		4.6	7	m $\Omega$
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=15V,VGS=0V, f=1.0MHz		2600		pF
Coss	Output Capacitance			412		pF
Crss	Reverse Transfer Capacitance			300		pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz		3.3		$\Omega$
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V, VDS=15V, RL=0.75 $\Omega$ ,RGEN=3 $\Omega$		13		nS
tr	Turn-on Rise Time			16		nS
td(off)	Turn-Off Delay Time			40		nS
tf	Turn-Off Fall Time			14		nS
Qg	Total Gate Charge	VGS=10V, VDS=15V, ID=14A		58		nC
Qgs	Gate-Source Charge			7		nC
Qgd	Gate-Drain Charge			18		nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)				100	A
VSD	Forward on Voltage <b>(Note 1)</b>	VGS=0V,IS=20A			1.2	V

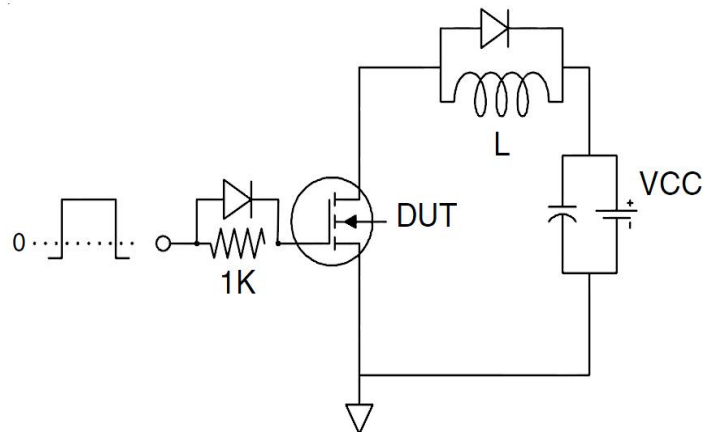
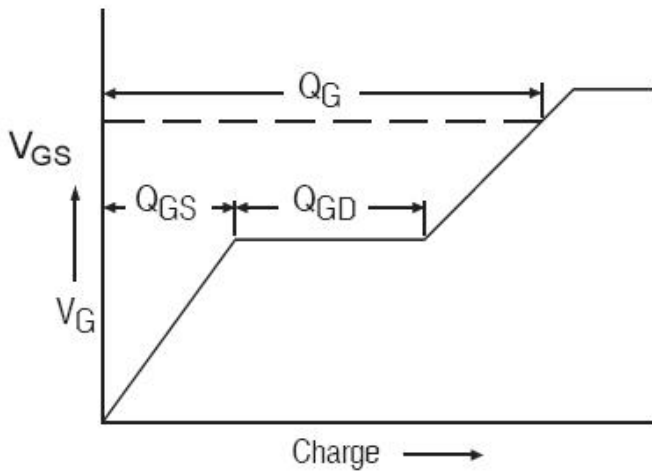
Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

### Test Circuit

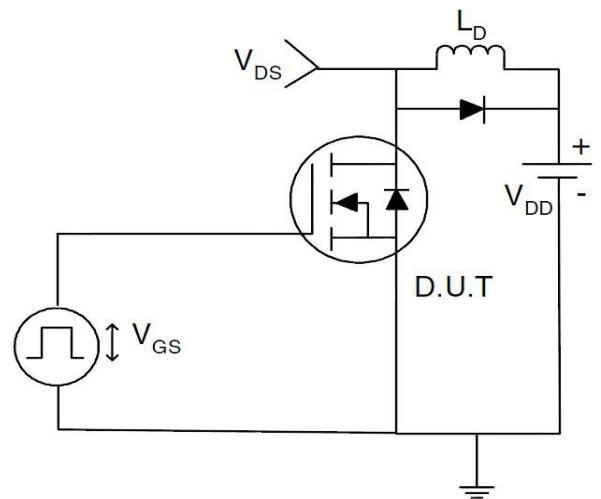
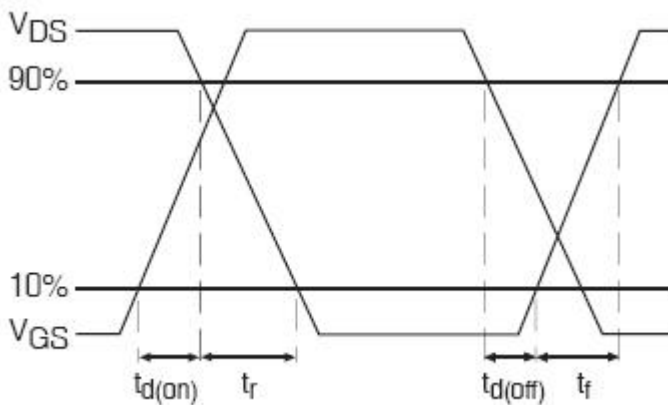
#### 1) EAS Test Circuits



#### 2) Gate Charge Test Circuit:



#### 3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS(Curves)

Figure 1. Output Characteristics

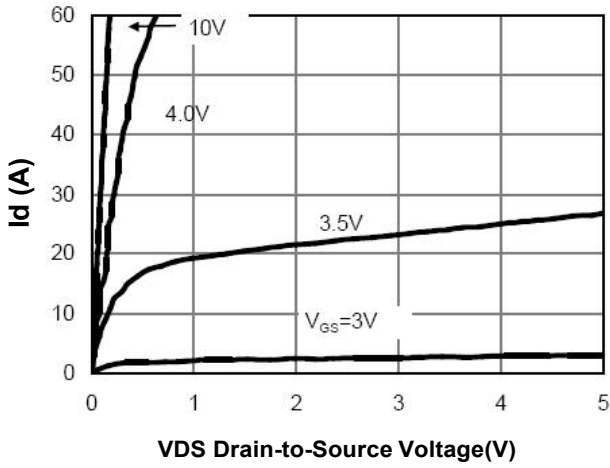


Figure 2. Transfer Characteristics

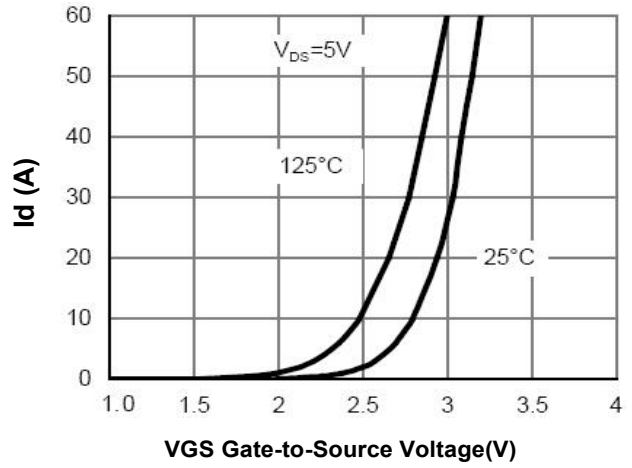


Figure 3. Max  $BV_{DSS}$  vs Junction Temperature

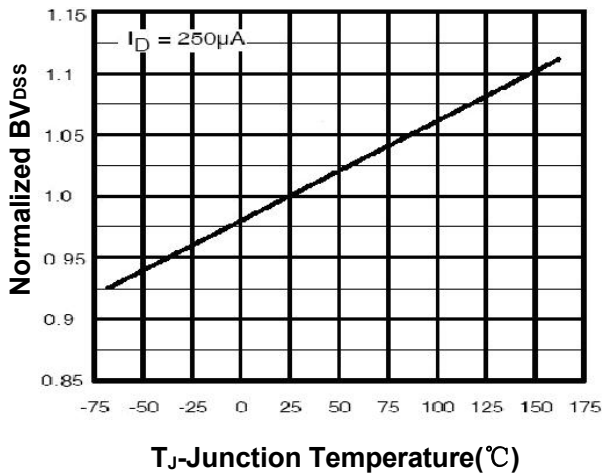


Figure 4. Drain Current

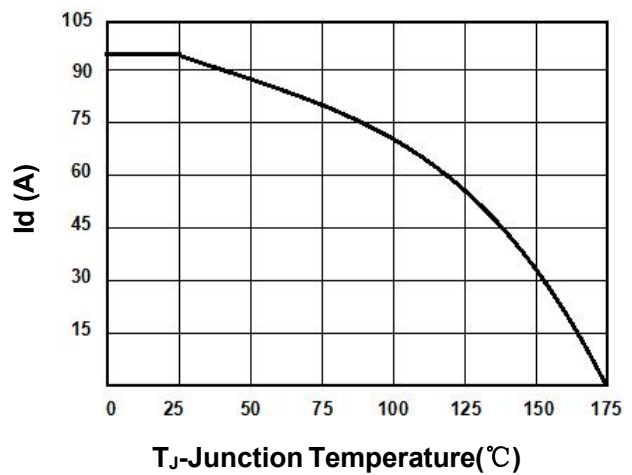


Figure 5.  $V_{GS(th)}$  vs Junction Temperature

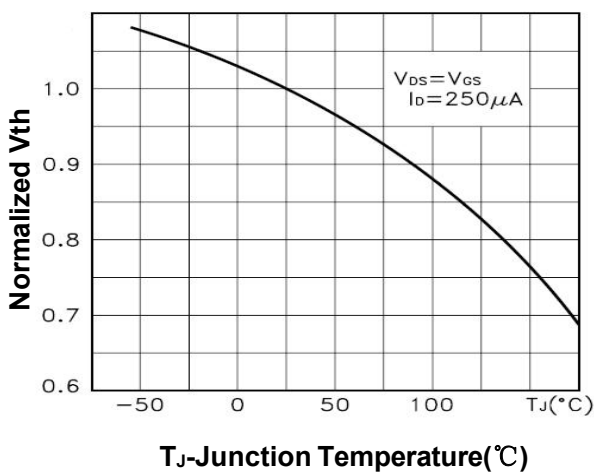


Figure 6.  $R_{DS(ON)}$  vs Junction Temperature

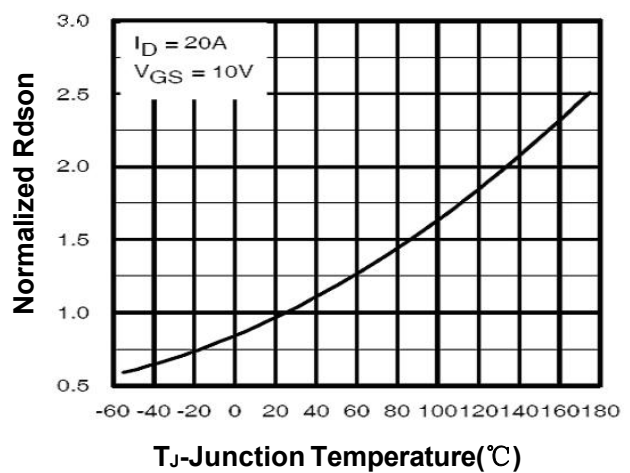


Figure 7. Gate Charge Waveforms

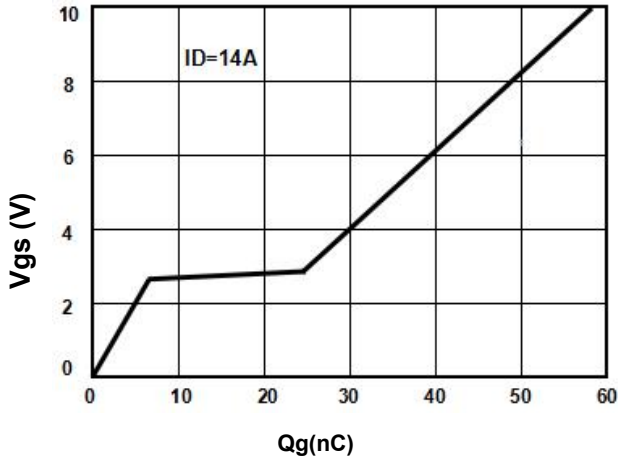


Figure 8. Capacitance

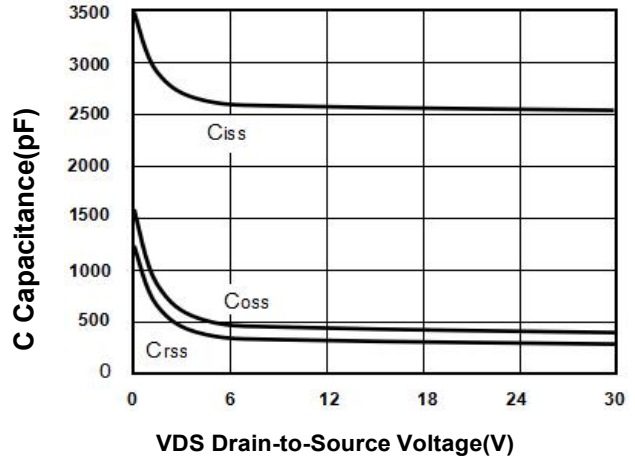


Figure 9. Body-Diode Characteristics

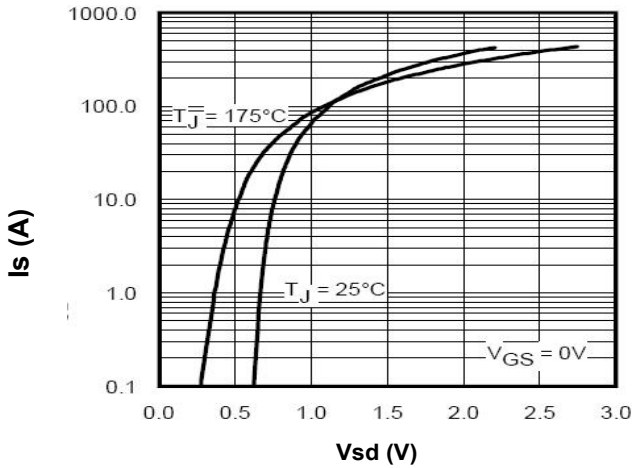


Figure 10. Maximum Safe Operating Area

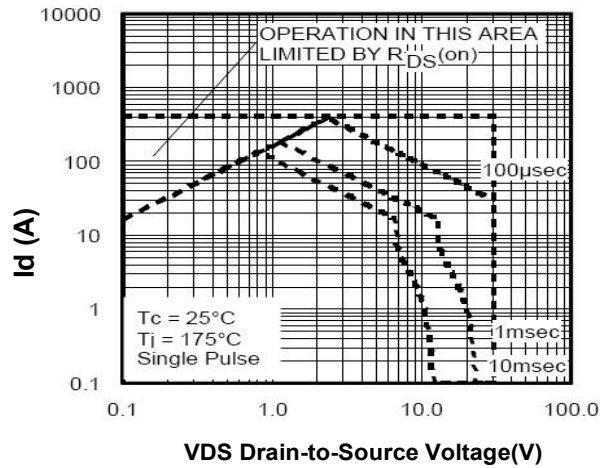
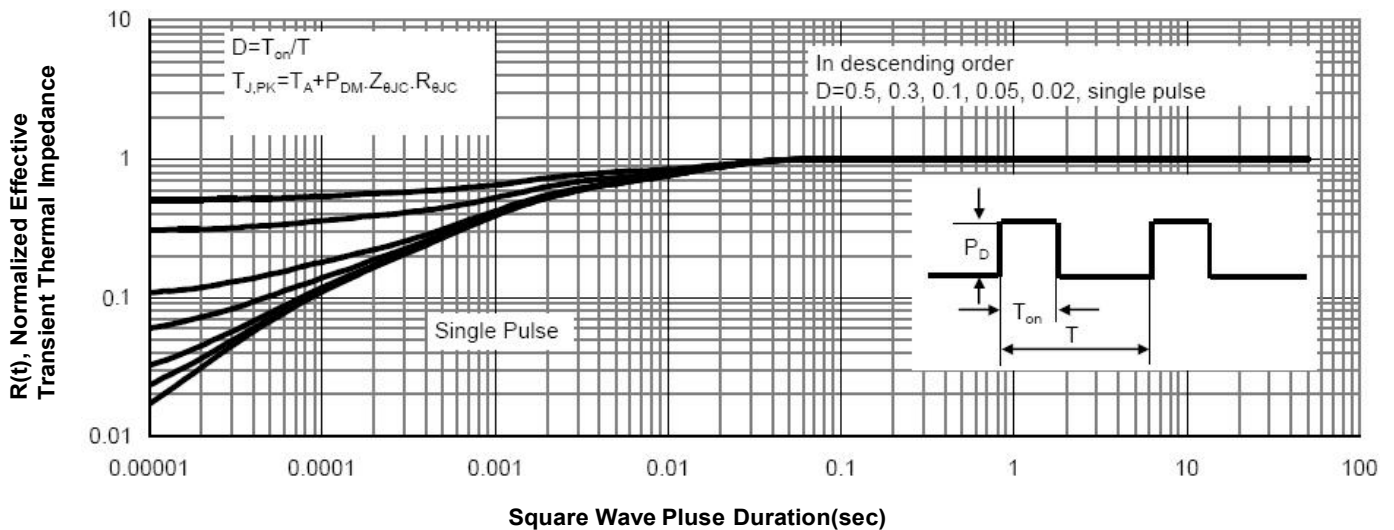
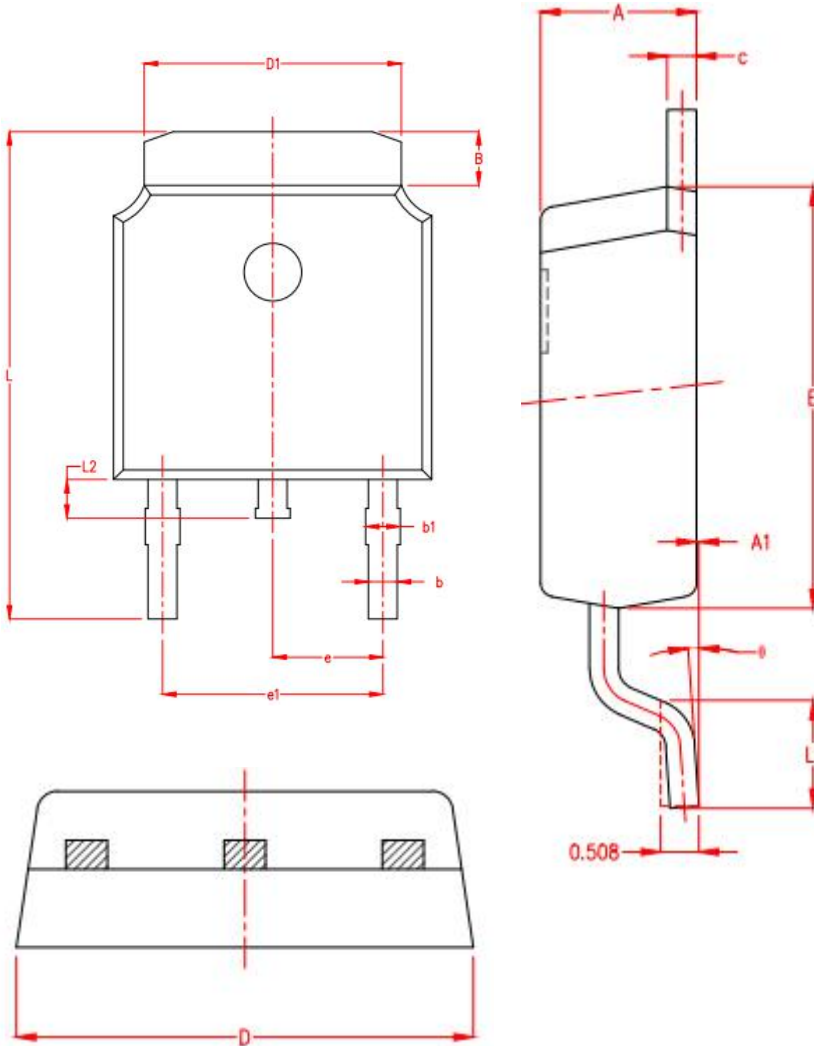


Figure 11. Normalized Maximum Transient Thermal Impedance



### TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.15	2.25	2.35
A1	0.00	0.06	0.12
B	0.96	1.11	1.26
b	0.59	0.69	0.79
b1	0.69	0.81	0.93
c	0.34	0.42	0.50
D	6.45	6.60	6.75
D1	5.23	5.33	5.43
E	5.95	6.10	6.25
e	2.286TYP.		
e1	4.47	4.57	4.67
L	9.90	10.10	10.30
L1	1.40	1.55	1.70
L2	0.60	0.80	1.00
θ	0°	4°	8°