

## Product Summary

BV <sub>DSS</sub>	R <sub>DSON</sub> Max	I <sub>D</sub> T <sub>C</sub> = +25°C
120V	8.9mΩ @ V <sub>GS</sub> = 10V	86A

## Description and Applications

This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

- Power management functions
- DC-DC converters
- Backlighting

## Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Low R<sub>DSON</sub> – Minimizes Power Losses
- Low Q<sub>G</sub> – Minimizes Switching Losses
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative.

<https://www.diodes.com/quality/product-definitions/>

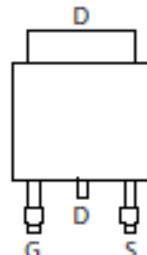
## Mechanical Data

- Package: TO252
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.33 grams (Approximate)

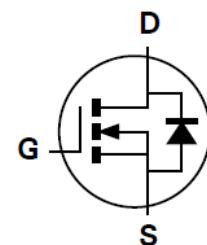
TO252 (DPAK)



Top View



Pin Out Top View



Equivalent Circuit

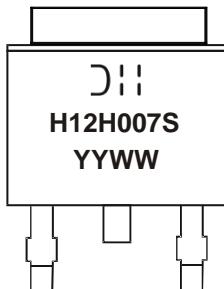
## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMTH12H007SK3-13	TO252 (DPAK)	2,500	Tape & Reel

Notes:

1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



DII = Manufacturer's Marking  
 H12H007S = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 22 = 2022)  
 WW = Week Code (01 to 53)

## Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	120	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 5)	$I_D$	86 61	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, $T_c = +25^\circ\text{C}$ , Package Limited)	$I_{DM}$	344	A
Maximum Continuous Body Diode Forward Current (Note 5)	$I_S$	86	A
Pulsed Body Diode Forward Current (10 $\mu\text{s}$ Pulse, $T_c = +25^\circ\text{C}$ , Package Limited)	$I_{SM}$	344	A
Avalanche Current, $L = 3\text{mH}$ (Note 6)	$I_{AS}$	15.5	A
Avalanche Energy, $L = 3\text{mH}$ (Note 6)	$E_{AS}$	360.4	mJ
$V_{DS}$ Spike, $L = 0.1\text{mH}$	$t = 10\mu\text{s}$	$V_{SPIKE}$	130
			V

## Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 7)	$P_D$	2	W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	75	$^\circ\text{C/W}$
Total Power Dissipation (Note 8)	$P_D$	3.3	W
Thermal Resistance, Junction to Ambient (Note 8)	$R_{\theta JA}$	45	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	1.1	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +175	$^\circ\text{C}$

Notes:  
 5. Thermal resistance from junction to soldering point (on the exposed drain pad).  
 6.  $I_{AS}$  and  $E_{AS}$  ratings are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .  
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.  
 8. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	120	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_D = 10\text{mA}$
Zero Gate Voltage Drain Current	$\text{I}_{\text{DSS}}$	—	—	1	$\mu\text{A}$	$\text{V}_{\text{DS}} = 96\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	$\text{I}_{\text{GSS}}$	—	—	$\pm 100$	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$ , $\text{V}_{\text{DS}} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	$\text{V}_{\text{GS(TH)}}$	2	—	4	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$ , $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(ON)}}$	—	7.5	8.9	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 10\text{V}$ , $\text{I}_D = 30\text{A}$
Diode Forward Voltage	$\text{V}_{\text{SD}}$	—	0.8	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_S = 30\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	$\text{C}_{\text{iss}}$	—	3142	—	pF	$\text{V}_{\text{DS}} = 60\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$\text{C}_{\text{oss}}$	—	665	—		
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$	—	29	—		
Gate Resistance	$\text{R}_g$	—	1.9	—	$\Omega$	$\text{V}_{\text{DS}} = 0\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1\text{MHz}$
Total Gate Charge	$\text{Q}_g$	—	44	—		
Gate-Source Charge	$\text{Q}_{\text{gs}}$	—	15	—		
Gate-Drain Charge	$\text{Q}_{\text{gd}}$	—	9	—	nC	$\text{V}_{\text{DD}} = 60\text{V}$ , $\text{I}_D = 25\text{A}$ $\text{V}_{\text{GS}} = 10\text{V}$
Turn-On Delay Time	$\text{t}_{\text{D(ON)}}$	—	12.5	—		
Turn-On Rise Time	$\text{t}_R$	—	13.7	—		
Turn-Off Delay Time	$\text{t}_{\text{D(OFF)}}$	—	24.4	—	ns	$\text{V}_{\text{DD}} = 60\text{V}$ , $\text{V}_{\text{GS}} = 10\text{V}$ $\text{I}_D = 25\text{A}$ , $\text{R}_g = 2.7\Omega$
Turn-Off Fall Time	$\text{t}_F$	—	10.9	—		
Reverse Recovery Time	$\text{t}_{\text{RR}}$	—	55	—	ns	$\text{I}_F = 25\text{A}$ , $\text{dI}/\text{dt} = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	$\text{Q}_{\text{RR}}$	—	105	—		

Notes: 9. Short duration pulse test used to minimize self-heating effect.  
 10. Guaranteed by design. Not subject to product testing.

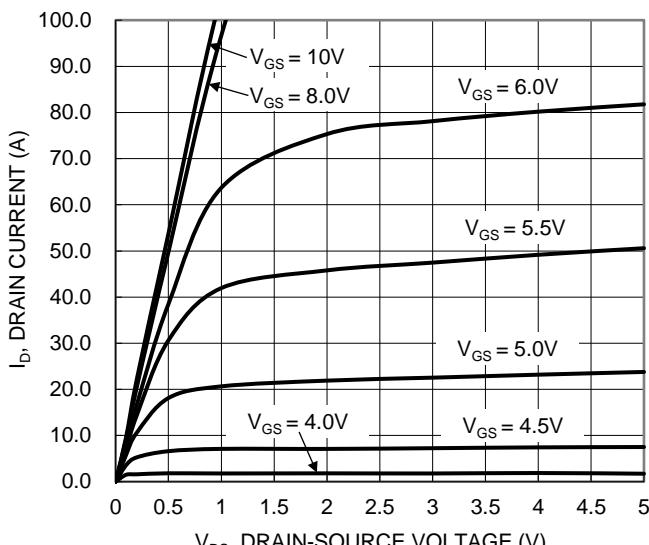


Figure 1. Typical Output Characteristic

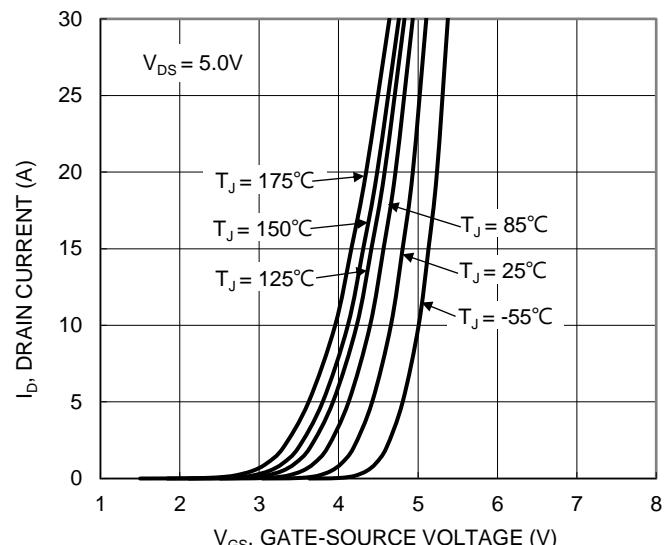


Figure 2. Typical Transfer Characteristic

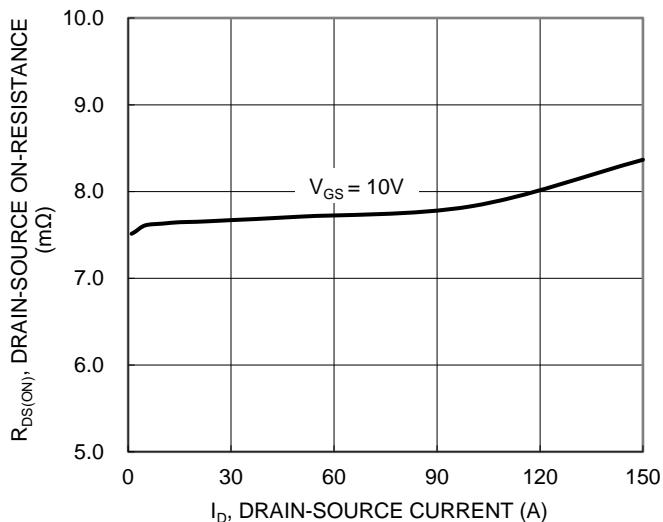


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

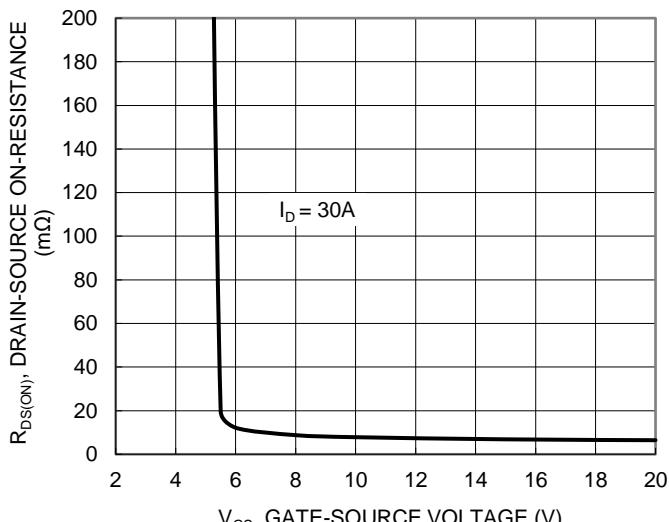


Figure 4. Typical Transfer Characteristic

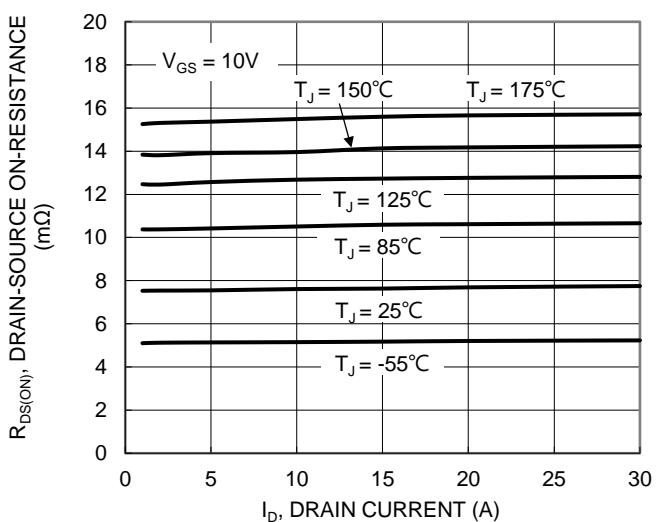


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

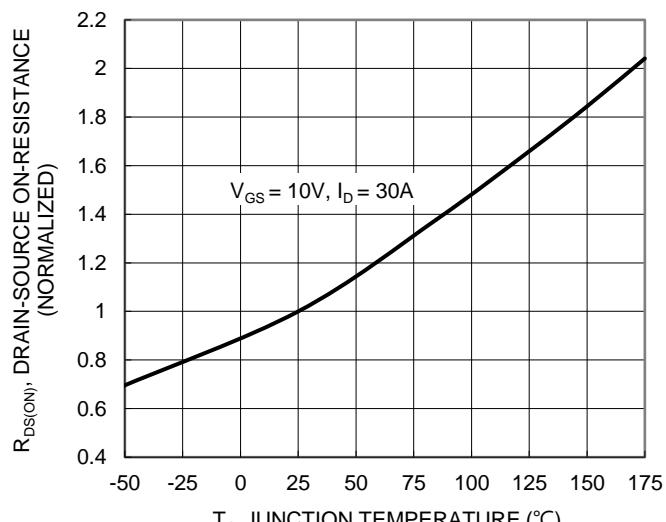
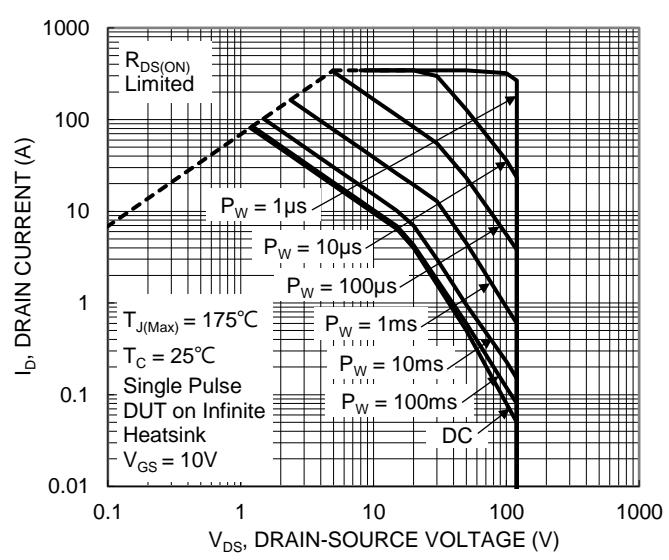
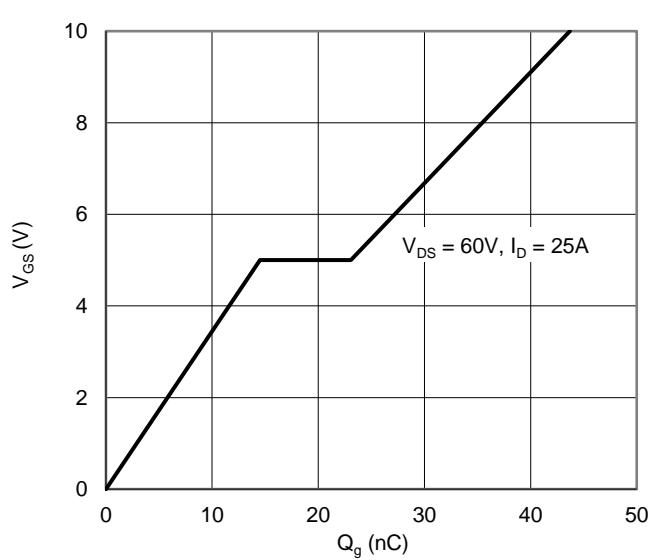
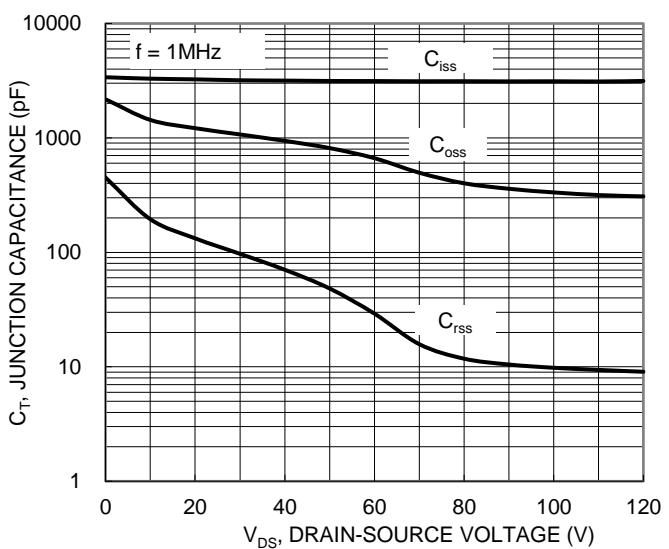
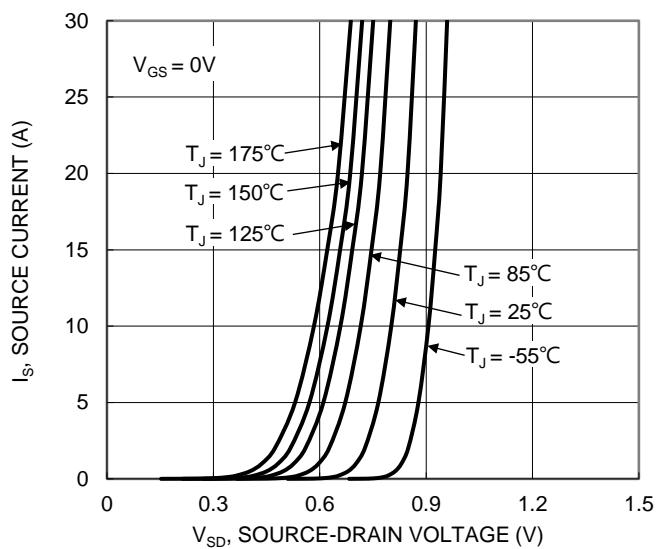
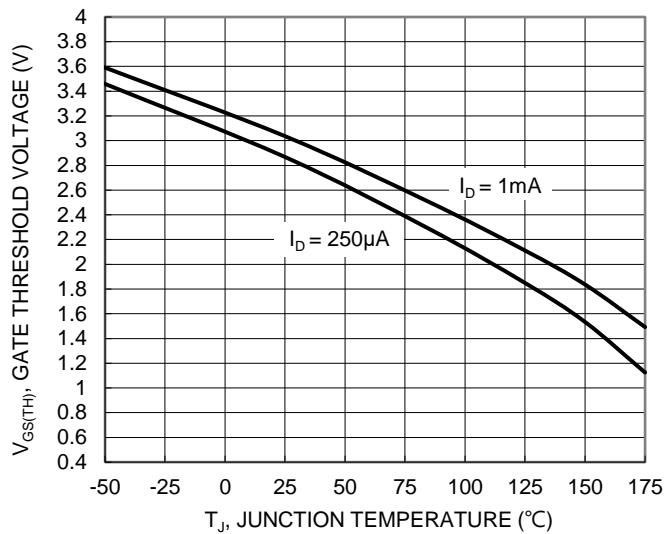
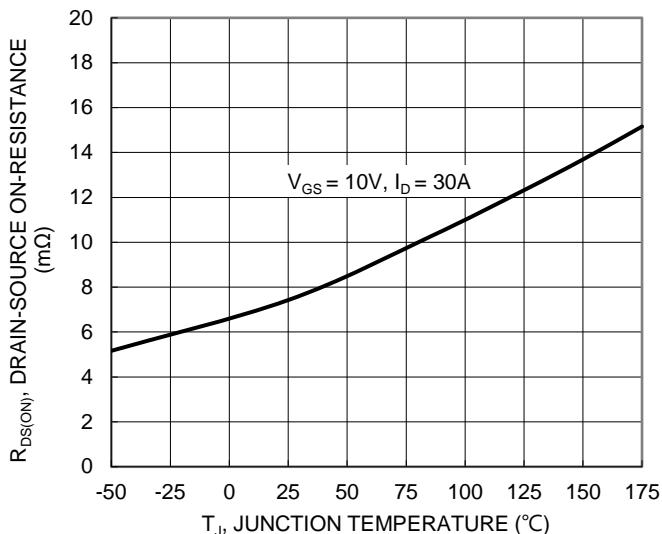


Figure 6. On-Resistance Variation with Temperature



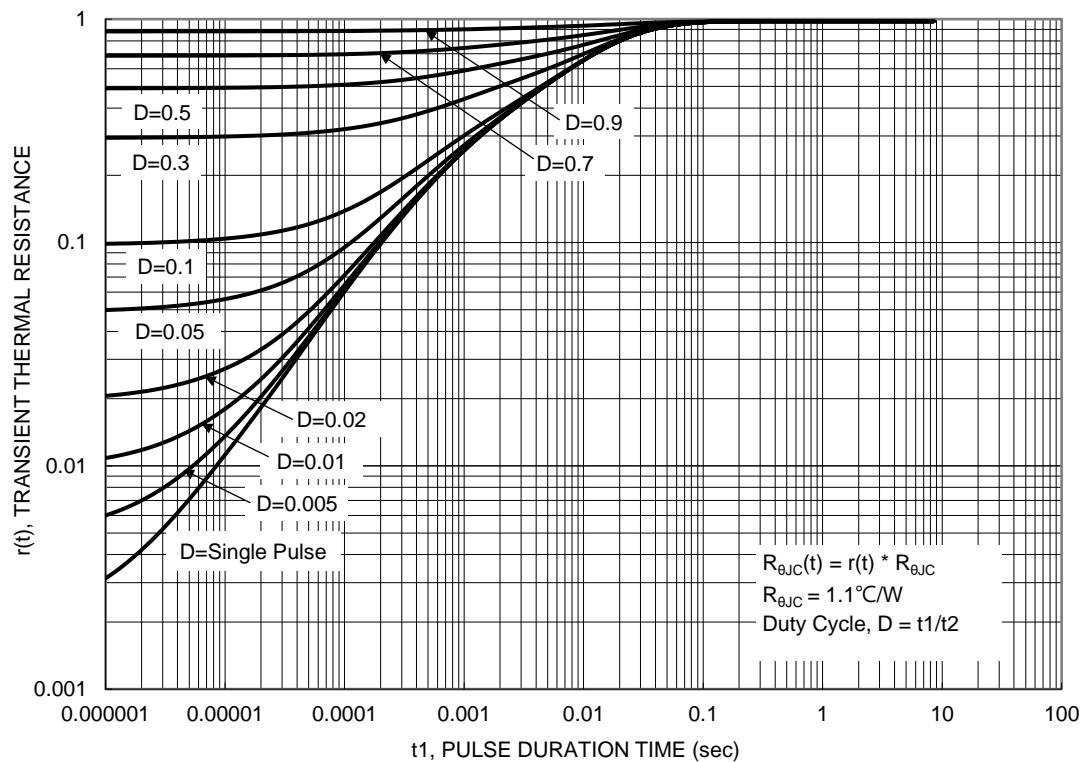
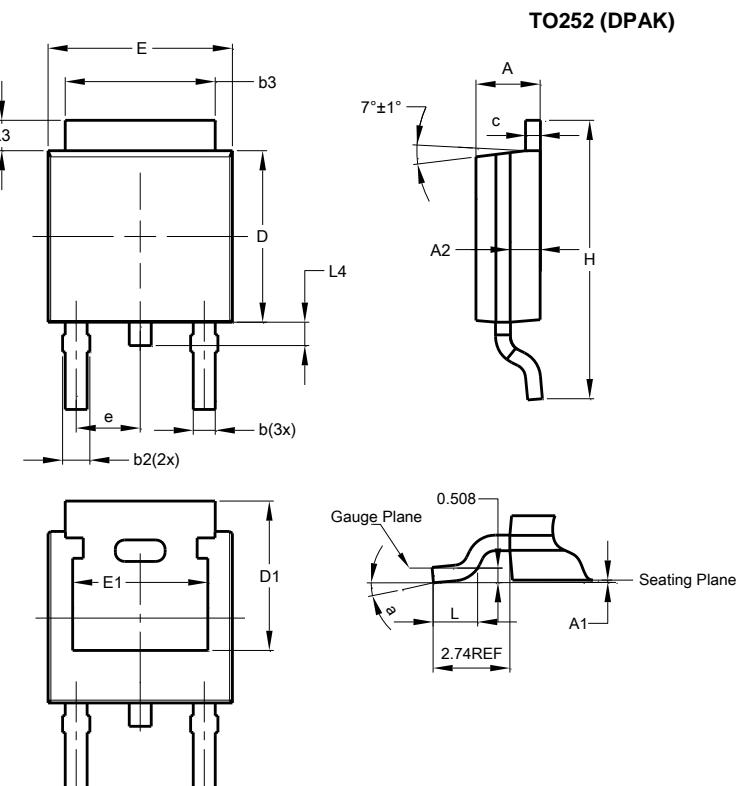


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

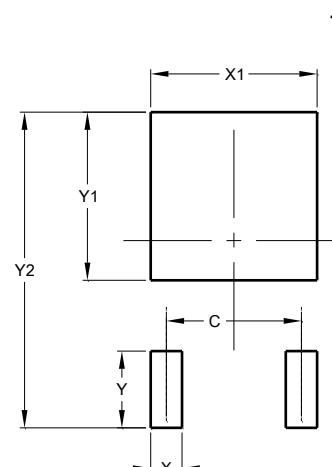
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



TO252 (DPAK)		
Dim	Min	Max
<b>A</b>	2.19	2.39
<b>A1</b>	0.00	0.13
<b>A2</b>	0.97	1.17
<b>b</b>	0.64	0.88
<b>b2</b>	0.76	1.14
<b>b3</b>	5.21	5.50
<b>c</b>	0.45	0.58
<b>D</b>	6.00	6.20
<b>D1</b>	5.21	--
<b>e</b>	2.286 BSC	
<b>E</b>	6.45	6.70
<b>E1</b>	4.32	--
<b>H</b>	9.40	10.41
<b>L</b>	1.40	1.78
<b>L3</b>	0.88	1.27
<b>L4</b>	0.64	1.02
<b>a</b>	0°	10°
All Dimensions in mm		

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



Dimensions	Value (in mm)
<b>C</b>	4.572
<b>X</b>	1.060
<b>X1</b>	5.632
<b>Y</b>	2.600
<b>Y1</b>	5.700
<b>Y2</b>	10.700

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