



**-100V 37mΩ P-Ch Power MOSFET**

**Features**

- Low On-Resistance
- Excellent Gate Charge x  $R_{DS(ON)}$  Product (FOM)
- Pb-Free Lead Plating
- RoHS and Halogen-Free Compliant
- 100% UIS Tested, 100%  $R_g$  Tested

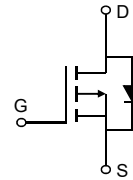
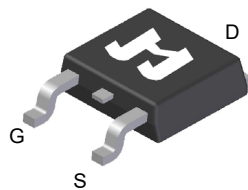
**Product Summary**

Parameter	Value	Unit
$V_{DS}$	-100	V
$V_{GS(th)}_{Typ}$	-2.0	V
$I_D$ (@ $V_{GS} = -10V$ ) <sup>(1)</sup>	-30	A
$R_{DS(ON)}_{Typ}$ (@ $V_{GS} = -10V$ )	37	mΩ
$R_{DS(ON)}_{Typ}$ (@ $V_{GS} = -4.5V$ )	50	mΩ

**Applications**

- Battery Management
- DC/DC in Telecoms and Industrial
- Hard Switching and High Speed Circuit

TO-252-3L Top View

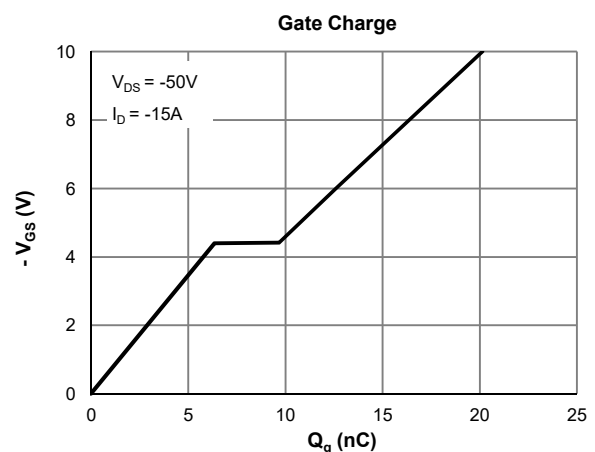
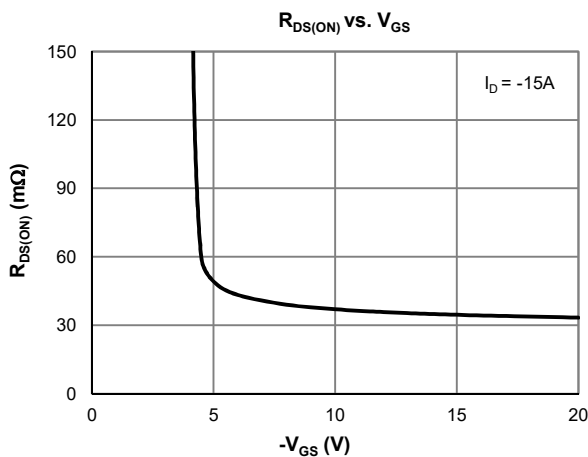


**Ordering Information**

Device	Package	# of Pins	Marking	MSL	$T_J$ (°C)	Media	Quantity (pcs)
JMPL1050AK-13	TO-252-3L	3	PL1050A	1	-55 to 150	13-inch Reel	2500

**Absolute Maximum Ratings** (@  $T_A = 25^\circ C$  unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DS}$	-100	V
Gate-to-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current <sup>(1)</sup>	$I_D$	$T_C = 25^\circ C$	-30
		$T_C = 100^\circ C$	-19
Pulsed Drain Current <sup>(2)</sup>	$I_{DM}$	-68	A
Avalanche Current <sup>(3)</sup>	$I_{AS}$	-27	A
Avalanche Energy <sup>(3)</sup>	$E_{AS}$	109	mJ
Power Dissipation <sup>(4)</sup>	$P_D$	$T_C = 25^\circ C$	96
		$T_C = 100^\circ C$	38
Junction & Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C





**Electrical Characteristics** (@  $T_J = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = -250\mu\text{A}, V_{GS} = 0\text{V}$	-100			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -80\text{V}, V_{GS} = 0\text{V}$			-1.0	$\mu\text{A}$
		$T_J = 55^\circ\text{C}$			-5.0	
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-1.0	-2.0	-3.0	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	$V_{GS} = -10\text{V}, I_D = -15\text{A}$		37	50	$\text{m}\Omega$
		$V_{GS} = -4.5\text{V}, I_D = -10\text{A}$		50	66	$\text{m}\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = -5\text{V}, I_D = -15\text{A}$		30		S
Diode Forward Voltage	$V_{SD}$	$I_S = -1\text{A}, V_{GS} = 0\text{V}$		-0.7	-1.0	V
Diode Continuous Current	$I_S$	$T_C = 25^\circ\text{C}$			-96	A

**DYNAMIC PARAMETERS** <sup>(5)</sup>

Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = -50\text{V}, f = 1\text{MHz}$		1412		pF
Output Capacitance	$C_{oss}$			222		pF
Reverse Transfer Capacitance	$C_{rss}$			2.6		pF
Gate Resistance	$R_g$	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$		10.2		$\Omega$

**SWITCHING PARAMETERS** <sup>(5)</sup>

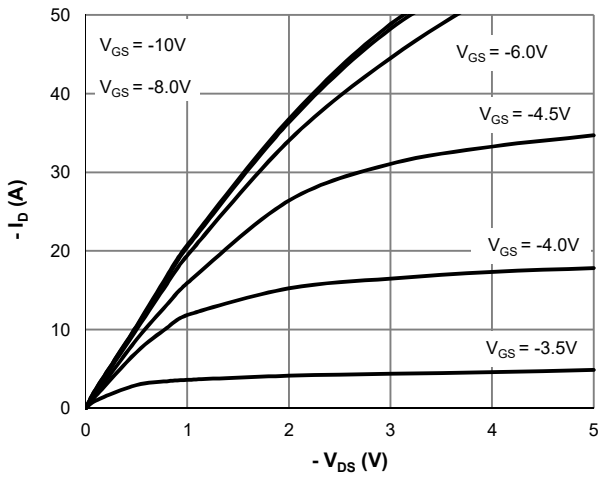
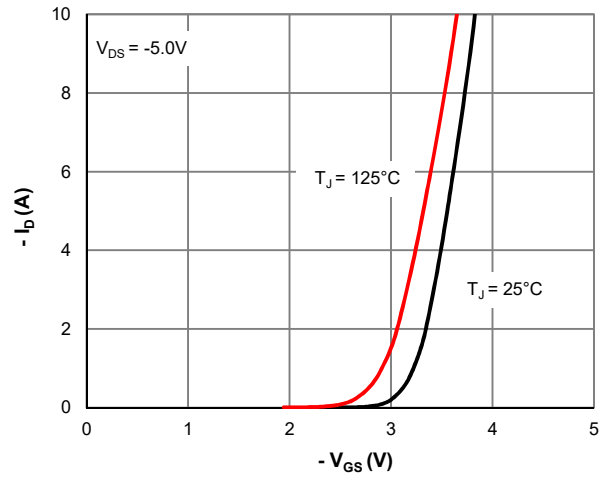
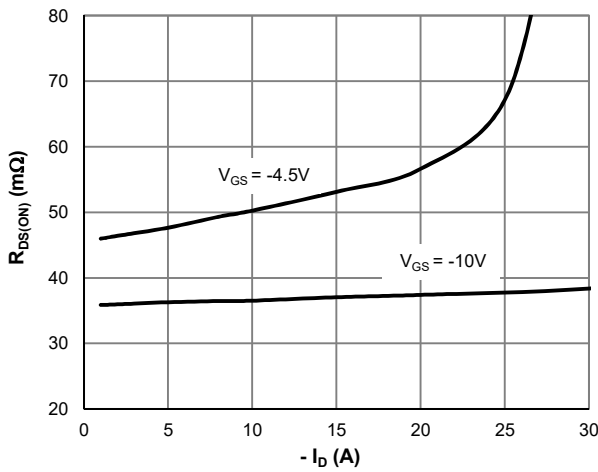
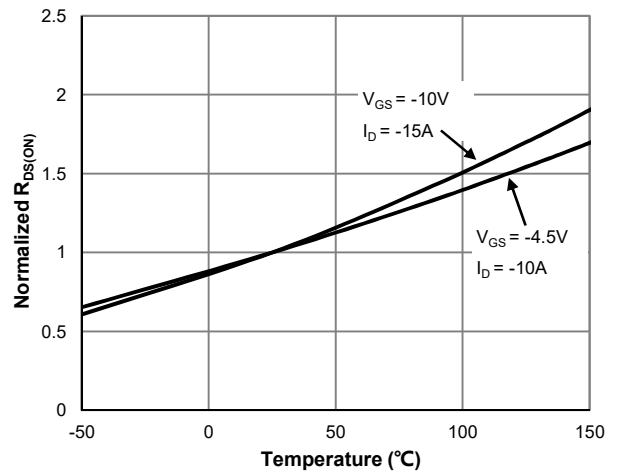
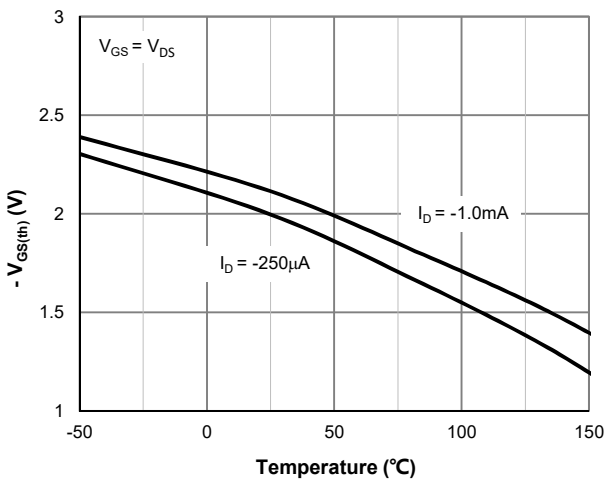
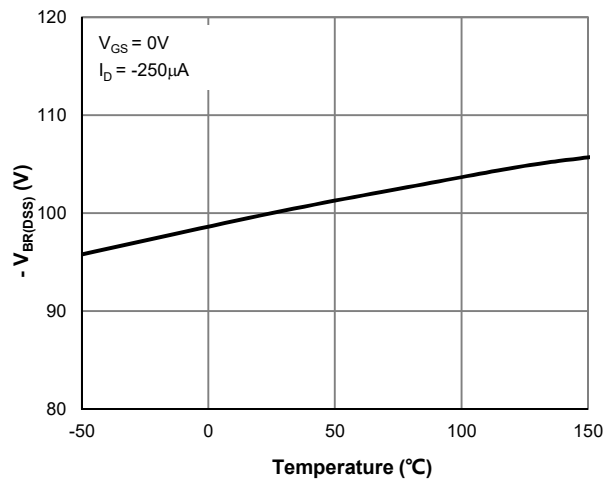
Total Gate Charge (@ $V_{GS} = -10\text{V}$ )	$Q_g$	$V_{GS} = 0 \text{ to } -10\text{V}$ $V_{DS} = -50\text{V}, I_D = -15\text{A}$		20		nC
Total Gate Charge (@ $V_{GS} = -6.0\text{V}$ )	$Q_g$			12.6		nC
Gate Source Charge	$Q_{gs}$			6.4		nC
Gate Drain Charge	$Q_{gd}$			3.3		nC
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = -10\text{V}, V_{DS} = -50\text{V}$ $R_L = 3.3\Omega, R_{GEN} = 6\Omega$		10.7		ns
Turn-On Rise Time	$t_r$			56		ns
Turn-Off DelayTime	$t_{D(off)}$			45		ns
Turn-Off Fall Time	$t_f$			81		ns
Body Diode Reverse Recovery Time	$t_{rr}$		$I_F = -15\text{A}, dI_F/dt = -100\text{A}/\mu\text{s}$		51	
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F = -15\text{A}, dI_F/dt = -100\text{A}/\mu\text{s}$		130		nC

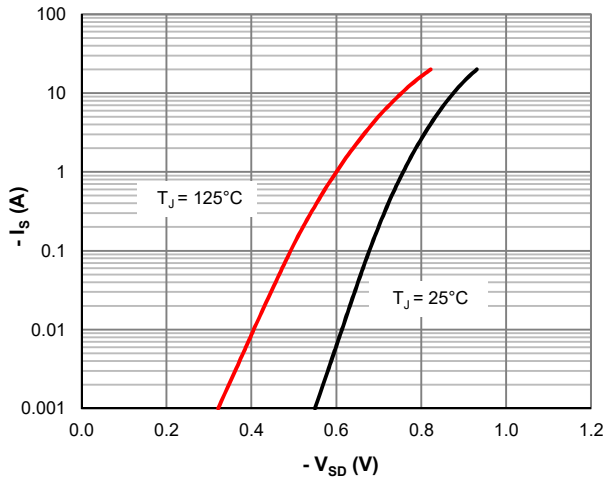
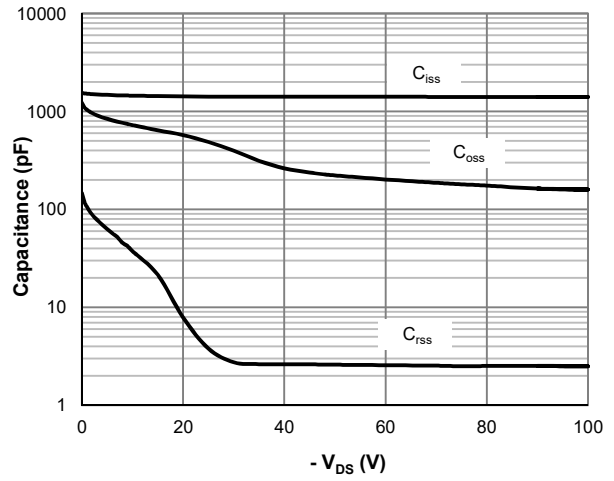
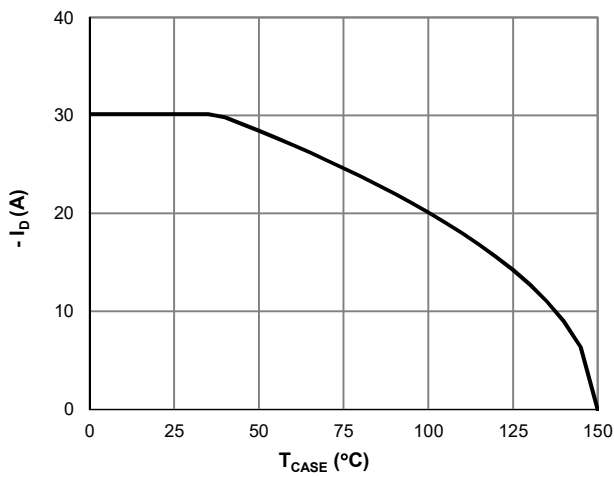
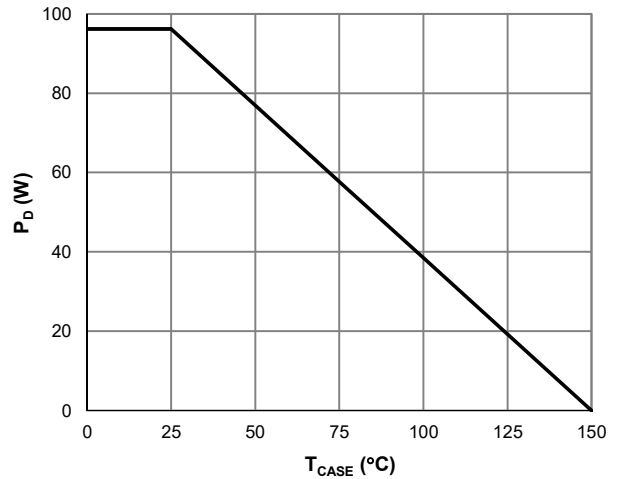
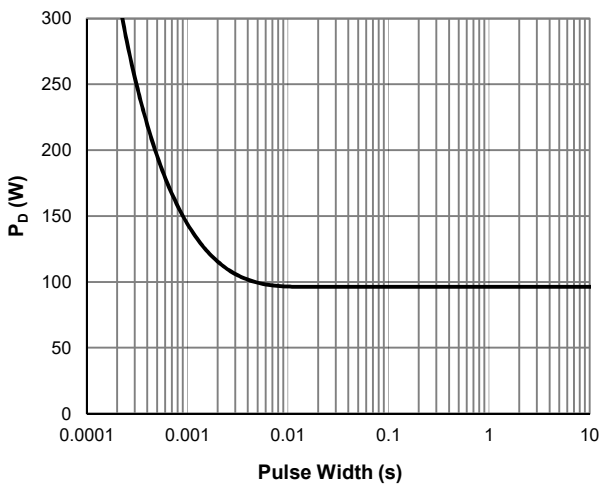
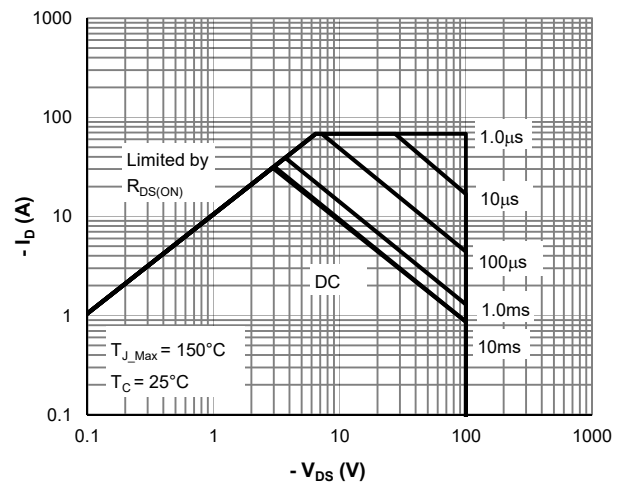
**Thermal Performance**

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	47	56	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.0	1.3	$^\circ\text{C}/\text{W}$

**Notes:**

1. Computed continuous current assumes the condition of  $T_{J\_Max}$  while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under  $T_{J\_Max} = 150^\circ\text{C}$ .
3. This single-pulse measurement was taken under the following condition [ $L = 300\mu\text{H}, V_{GS} = -10\text{V}, V_{DD} = -50\text{V}$ ] while its value is limited by  $T_{J\_Max} = 150^\circ\text{C}$ .
4. The power dissipation  $P_D$  is based on  $T_{J\_Max} = 150^\circ\text{C}$ .
5. This value is guaranteed by design hence it is not included in the production test.

**Typical Electrical & Thermal Characteristics**

**Figure 1: Saturation Characteristics**

**Figure 2: Transfer Characteristics**

**Figure 3:  $R_{DS(ON)}$  vs. Drain Current**

**Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature**

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

**Figure 6:  $V_{BR(DSS)}$  vs. Junction Temperature**

**Typical Electrical & Thermal Characteristics**

**Figure 7: Body-Diode Characteristics**

**Figure 8: Capacitance Characteristics**

**Figure 9: Current De-rating**

**Figure 10: Power De-rating**

**Figure 11: Single Pulse Power Rating, Junction-to-Case**

**Figure 12: Maximum Safe Operating Area**



### Typical Electrical & Thermal Characteristics

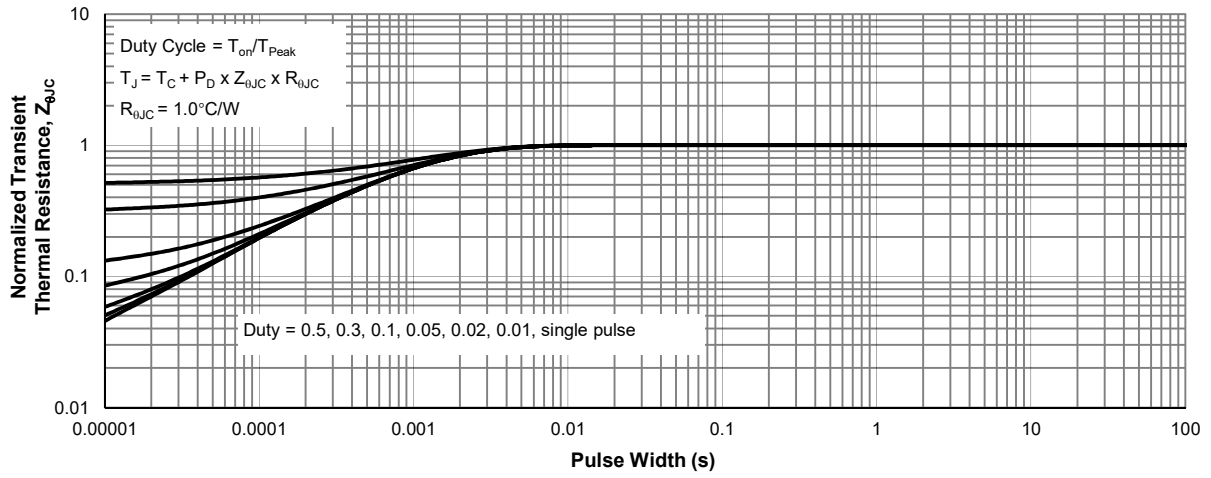
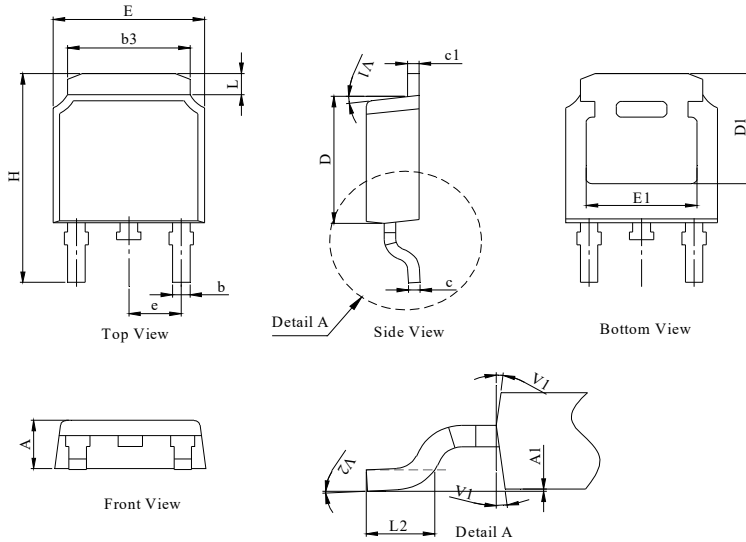
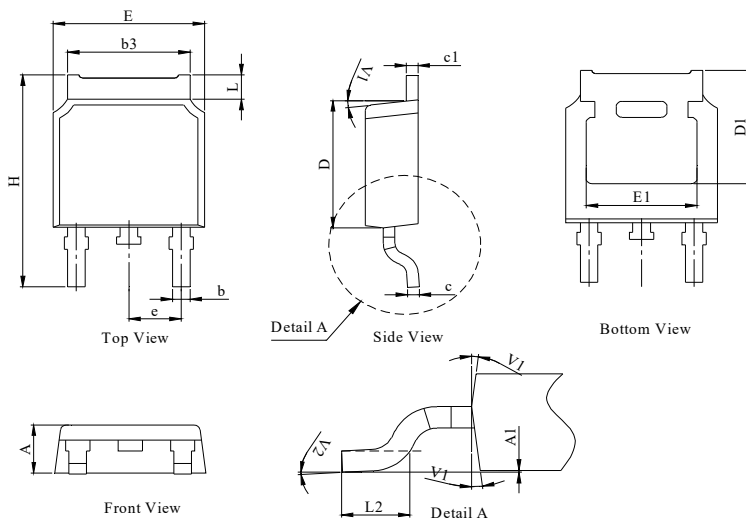


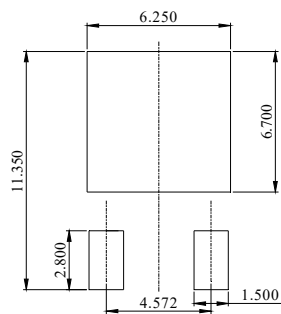
Figure 13: Normalized Maximum Transient Thermal Impedance

**TO-252-3L Package Information**
**Package Outline Type-A**


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.18	2.30	2.39
A1	0	--	0.13
b	0.64	0.76	0.89
c	0.40	0.50	0.61
c1	0.46	0.50	0.58
D	5.97	6.10	6.23
D1	5.05	--	--
E	6.35	6.60	6.73
E1	4.32	--	--
b3	5.21	5.38	5.55
e	2.29 BSC		
H	9.40	10.00	10.40
L	0.89	--	1.27
L2	1.40	--	1.78
V1	7° REF		
V2	0°	--	6°

**Package Outline Type-B**


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.10	2.30	2.40
A1	0	--	0.13
b	0.66	0.76	0.86
b3	5.21	5.38	5.55
c	0.40	0.50	0.60
c1	0.44	0.50	0.58
D	5.90	6.10	6.30
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.29 BSC		
H	9.50	10.00	10.70
L	1.09	--	1.21
L2	1.35	--	1.65
V1	7° REF		
V2	0°	--	6°

**Recommended Soldering Footprint**


DIMENSIONS: MILLIMETERS