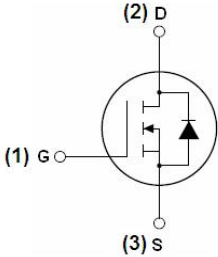
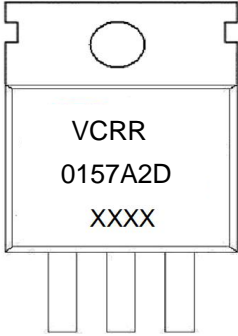



## QIAOXINN-Channel Enhancement Mode Power MOSFET

<p><b>Description</b></p> <p>The VCRR0157A2D uses advanced trench technology and design to provide excellent <math>R_{DS(ON)}</math> with low gate charge. It can be used in a wide variety of applications.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li>● <math>V_{DS} = 100V, I_D = 57A</math> <math>R_{DS(ON)} &lt; 12.5m\Omega @ V_{GS}=10V</math> (Typ: 14.5m<math>\Omega</math>)</li> <li>● Special process technology for high ESD capability</li> <li>● High density cell design for ultra low <math>R_{dson}</math></li> <li>● Fully characterized avalanche voltage and current</li> <li>● Good stability and uniformity with high <math>E_{AS}</math></li> <li>● Excellent package for good heat dissipation</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● Power switching application</li> <li>● Hard switched and high frequency circuits</li> <li>● Uninterruptible power supply</li> </ul>	<div style="text-align: center;">  <p><b>Schematic diagram</b></p>  <p><b>Marking and pin assignment</b></p>  <p><b>TO-263-2L top view</b></p> </div>
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### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
VCRR0157A2D		TO-263-2L	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	57	A
Drain Current-Continuous( $T_C=100^\circ C$ )	$I_D(100^\circ C)$	40	A
Pulsed Drain Current	$I_{DM}$	160	A
Maximum Power Dissipation	$P_D$	160	W
Derating factor	-	1.06	W/ $^\circ C$
Single pulse avalanche energy (Note 5)	$E_{AS}$	580	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 175	$^\circ C$

## Thermal Characteristic

Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	$R_{\theta JC}$	0.94	$^{\circ}\text{C}/\text{W}$
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## Electrical Characteristics ( $T_c=25^{\circ}\text{C}$ unless otherwise noted)

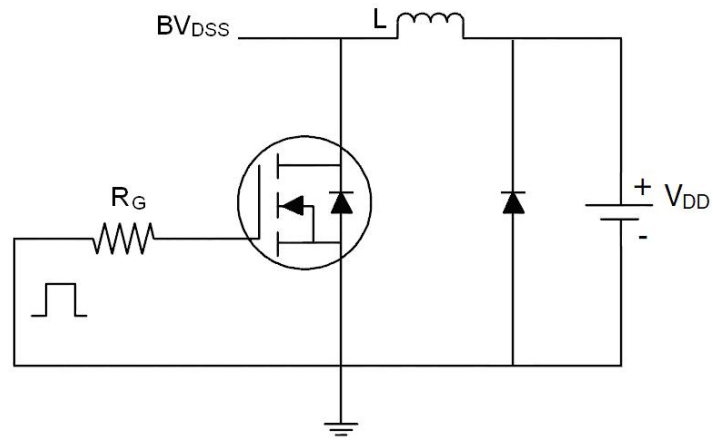
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	110	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> <sup>(Note 3)</sup>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=28A$	-	12.5	14.5	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=25V, I_D=28A$	32	-	-	S
<b>Dynamic Characteristics</b> <sup>(Note 4)</sup>						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	3969	-	PF
Output Capacitance	$C_{oss}$		-	182.5	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	160.2	-	PF
<b>Switching Characteristics</b> <sup>(Note 4)</sup>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$	-	17	-	nS
Turn-on Rise Time	$t_r$		-	13	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	55	-	nS
Turn-Off Fall Time	$t_f$		-	16	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=30V, I_D=30A,$ $V_{GS}=10V$	-	146.1	-	nC
Gate-Source Charge	$Q_{gs}$		-	29.3	-	nC
Gate-Drain Charge	$Q_{gd}$		-	57.1	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=28A$	-	0.85	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	$I_S$		-	-	57	A
Reverse Recovery Time	$t_{rr}$	$T_J = 25^{\circ}\text{C}, I_F = 28A$ $di/dt = 100A/\mu s$ <sup>(Note 3)</sup>	-	35	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	58	-	nC
Forward Turn-On Time	$t_{on}$	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

### Notes:

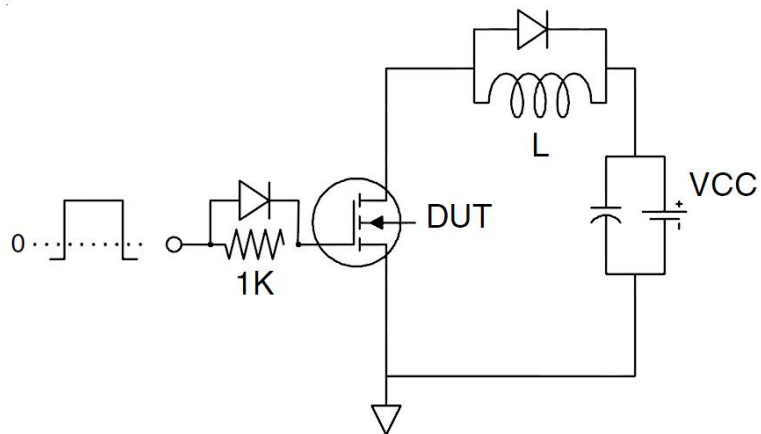
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, R_g=25\Omega, L=1\text{mH}, I_{AS}=35A$

## Test Circuit

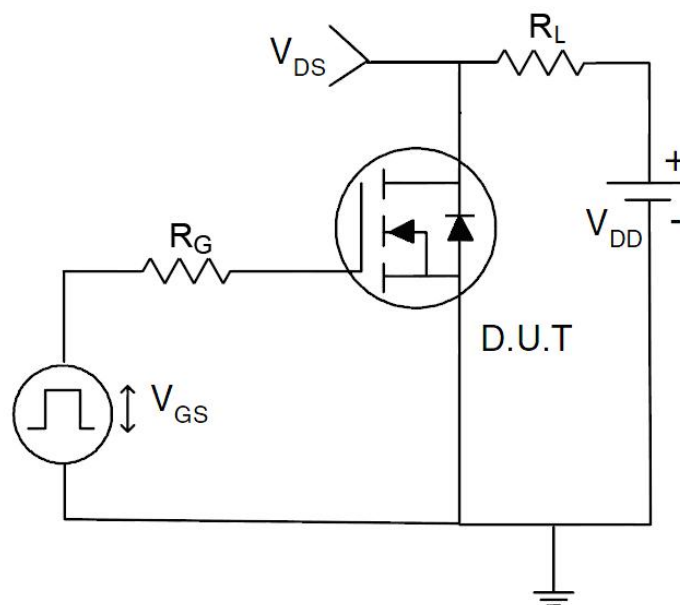
### 1) E<sub>AS</sub> test Circuit



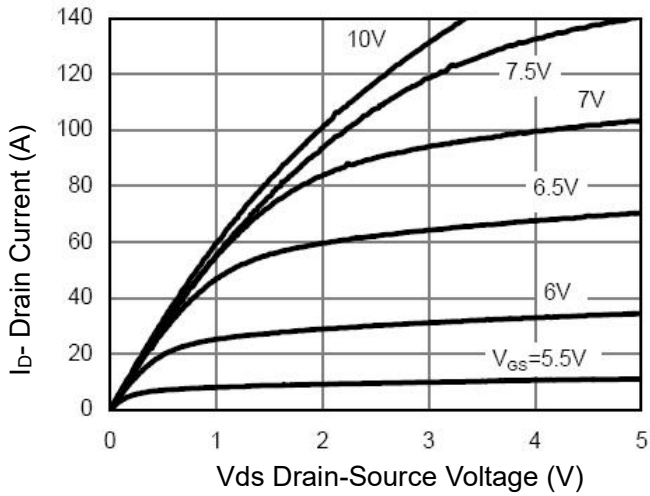
### 2) Gate charge test Circuit



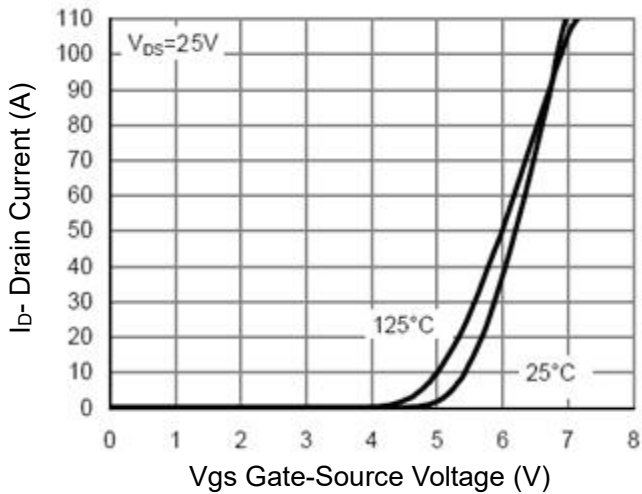
### 3) Switch Time Test Circuit



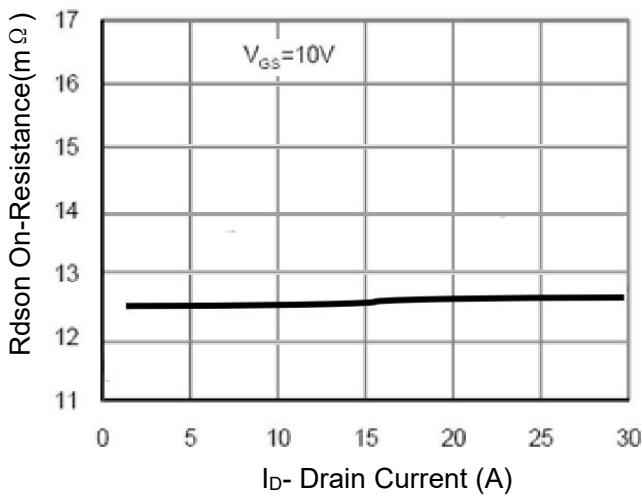
**Typical Electrical and Thermal Characteristics (Curves)**



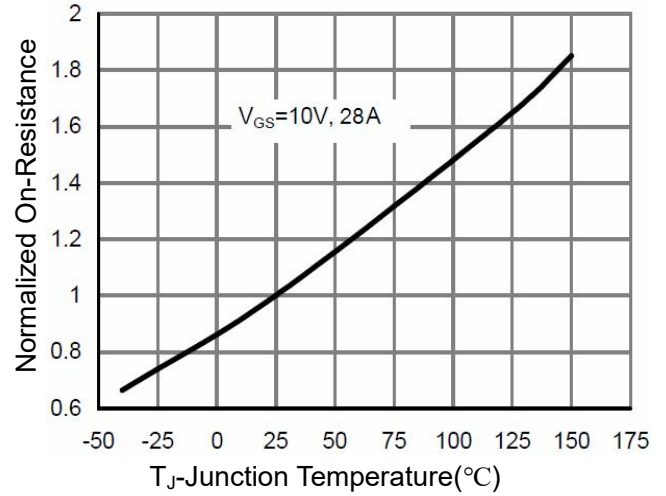
**Figure 1 Output Characteristics**



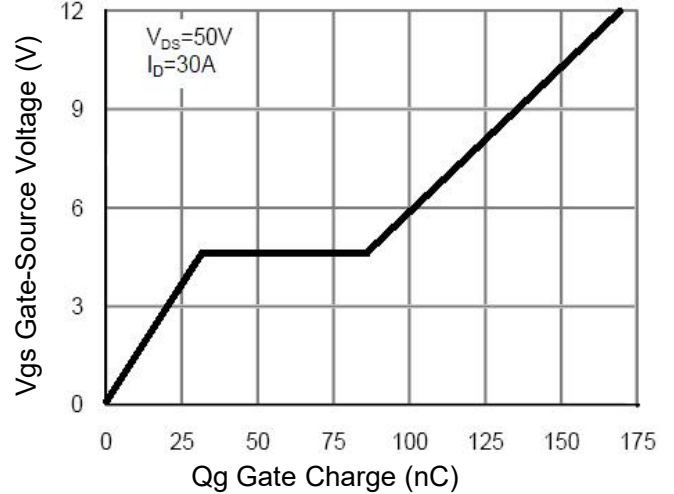
**Figure 2 Transfer Characteristics**



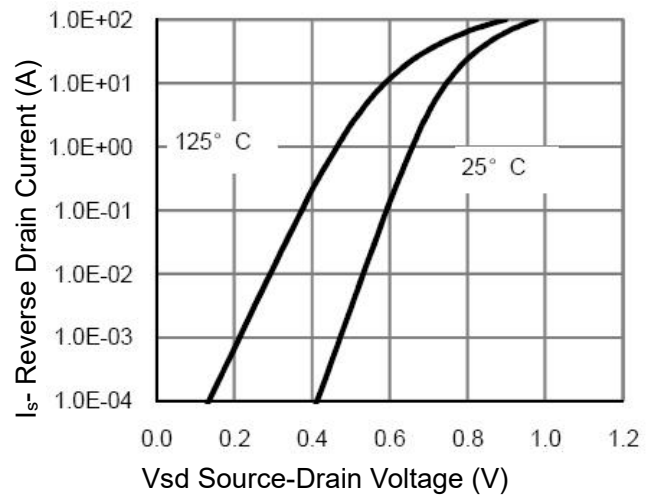
**Figure 3 Rdson- Drain Current**



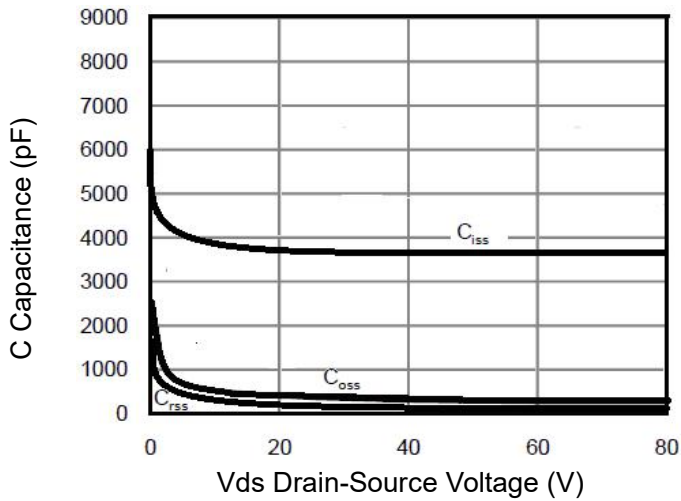
**Figure 4 Rdson-Junction Temperature**



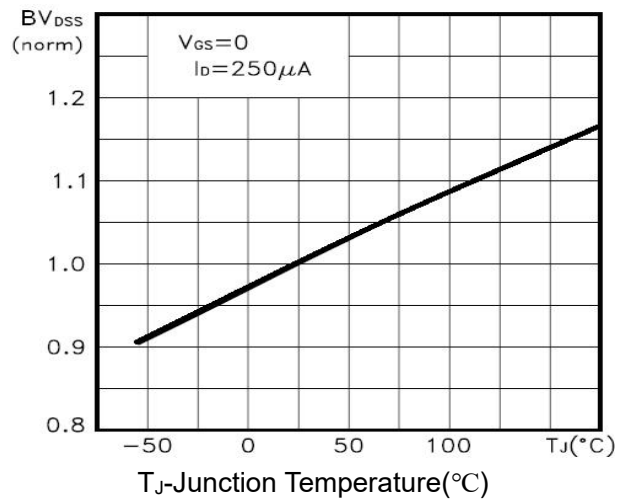
**Figure 5 Gate Charge**



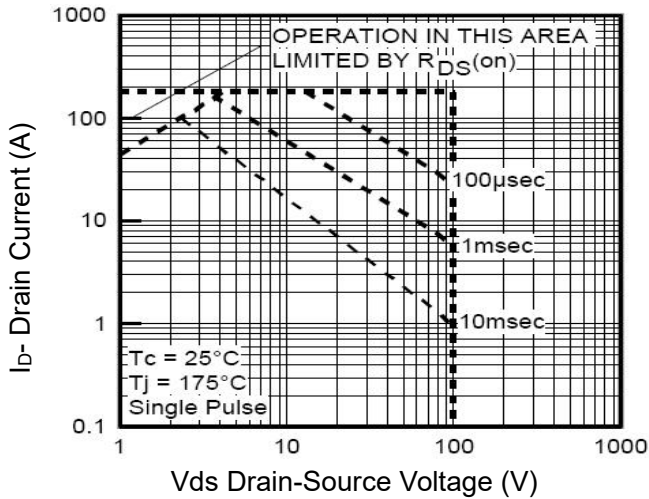
**Figure 6 Source- Drain Diode Forward**



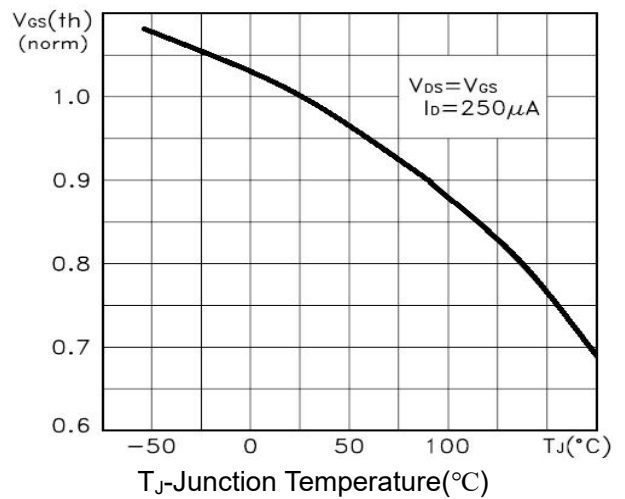
**Figure 7 Capacitance vs Vds**



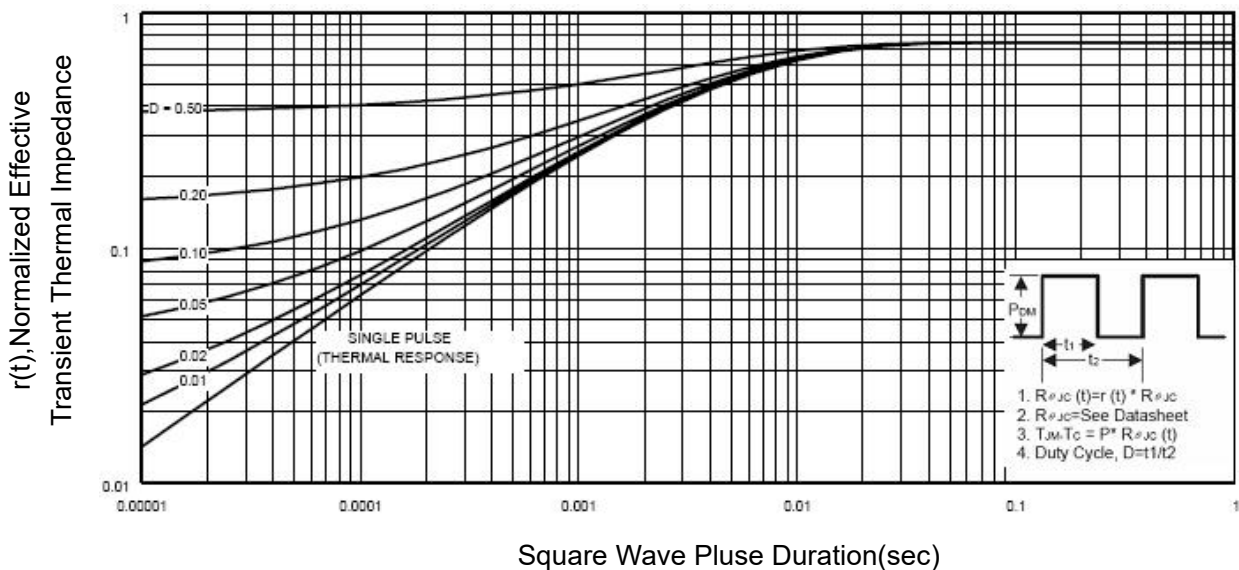
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**



**Figure 8 Safe Operation Area**

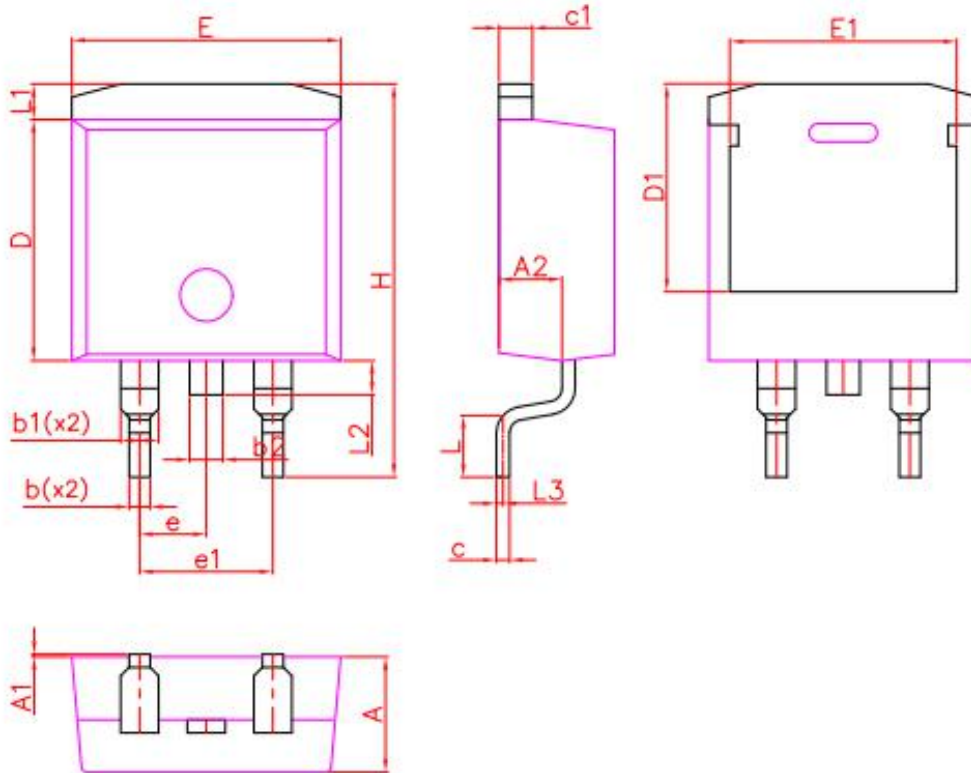


**Figure 10 V<sub>GS(th)</sub> vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

**TO-263-2L Package Information**



TO263			
DIM.	MIN.	NOM.	MAX.
A	4.20	4.40	4.60
A1	0.00	0.10	0.25
A2	2.20	2.40	2.60
b	0.70	0.80	0.90
b1	1.20	1.45	1.75
b2	1.17	1.27	1.37
c	0.40	0.50	0.60
c1	1.15	1.27	1.40
D	9.10	9.20	9.30
D1	7.63	7.93	8.23
E	10.05	10.25	10.45
E1	8.35	8.65	8.95
e	2.54BSC		
e1	5.08BSC		
H	14.61	15.00	15.88
L	1.78	2.35	2.79
L1	1.36REF		
L2	1.3REF		
L3	0.25REF		
All dimensions in millimeters			

### **Attention**

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