

**Features**

- High blocking voltage with low on-resistance
- High speed switching
- Low switching losses
- Fast intrinsic diode with low reverse recovery

Bvdss**800V****Rdson****1000mΩ****ID****5.3A****Application**

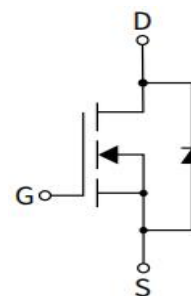
- Uninterruptable power supplies
- Switch mode power supplies
- High voltage DC/DC converters

RoHS**Package**

Marking and pin assignment



TO252-3L top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
800R1KT	HLC800R1K	TO252-3L	2500

Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain Source Voltage	V_{DS}	800	V
Gate Source Voltage	$V_{GS,max}$	-8 ~ 22	V
Gate Source Voltage	$V_{GS,op}$	-4 ~ 18	V
Continuous Drain Current	I_D	5.3	A
Pulsed Drain Current	$I_{D(pulse)}$	16	A
Power Dissipation	P_D	28	W
Operating Junction Temperature	T_{Jmax}	-55 ~ 150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55 ~ 150	$^{\circ}\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Case	R_{thJC}	4.5	$^{\circ}\text{C}/\text{W}$



Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HLC800R1K	TO252-3L	1	2	3	Tape Reel

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=100\mu A$	800	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=750V, V_{GS}=0V$	-	1	50	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=22V$	-	-	100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=0.3mA$	-	3.1	-	V
		$V_{DS}=V_{GS}, I_D=0.3mA, T_J=150^{\circ}\text{C}$	-	2.2	-	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=18V, I_D=1.8A$	-	1000	1100	m Ω
		$V_{GS}=18V, I_D=1.8A, T_J=150^{\circ}\text{C}$	-	1060	-	
Transconductance	gfs	$V_{DS}=18V, I_{DS}=1.8A$	-	0.78	-	S
		$V_{DS}=18V, I_{DS}=1.8A, T_J=150^{\circ}\text{C}$	-	0.72	-	
Internal Gate Resistance	R_g	$V_{AC}=25mV, f=1MHz$	-	9	-	Ω
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=400V,$ $f=1MHz, V_{AC}=25mV$	-	67.9	-	pF
Output Capacitance	C_{oss}		-	8.9	-	
Reverse Transfer Capacitance	C_{rss}		-	1.1	-	
Coss Stored Energy	E_{oss}			0.8		μJ
Total Gate Charge	Q_g	$V_{DD}=400V, I_D=1.8A,$ $V_{GS}=-4/18V$	-	5.8	-	nC
Gate to Source Charge	Q_{gs}		-	1.1	-	
Gate to Drain Charge	Q_{gd}		-	3.2	-	
Turn-On Switching Energy	E_{ON}	$V_{DD}=400V, I_D=5A,$ $R_G=2.5\Omega, V_{GS}=-4/18V,$ $L=200\mu H$	-	5	-	μJ
Turn-Off Switching Energy	E_{OFF}		-	4	-	
Turn-On Delay Time	$t_{d(on)}$		-	6	-	ns
Rise Time	t_r		-	9	-	
Turn-Off Delay Time	$t_{d(off)}$		-	9	-	
Fall Time	t_f		-	10	-	

Reverse Diode Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{SD}	$V_{GS}=-4V, I_{SD}=1A, T_J=25^{\circ}\text{C}$	-	4.4	-	V
		$V_{GS}=-4V, I_{SD}=1A, T_J=150^{\circ}\text{C}$	-	4.1	-	V
Reverse Recover time	t_{rr}	$V_{GS}=-4V, I_{SD}=1.8A,$ $V_R=400V, di/dt=1050A/\mu s$	-	25	-	ns
Reverse Recovery Charge	Q_{rr}		-	20	-	nC
Peak Reverse Recovery Current	I_{rrm}		-	1.5	-	A



Typical Performance Characteristics

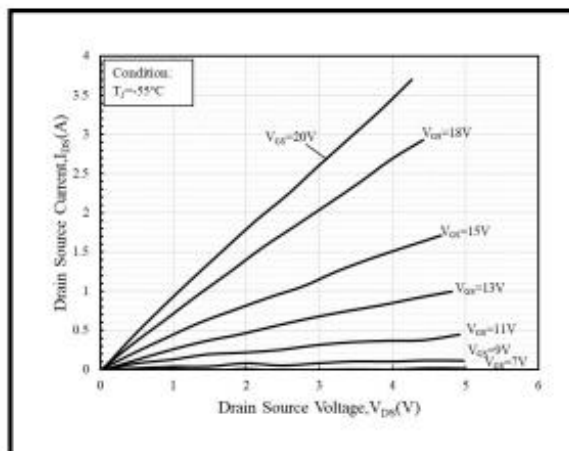
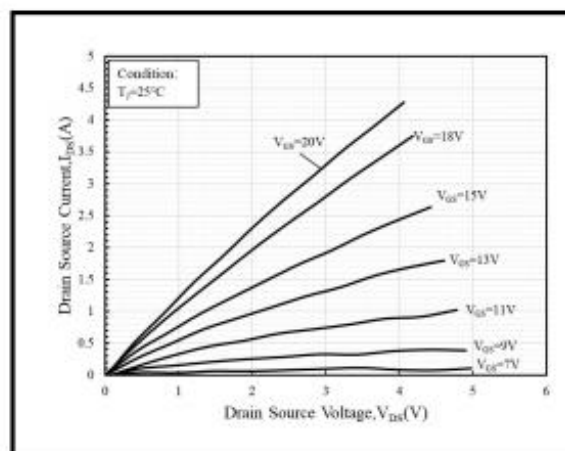
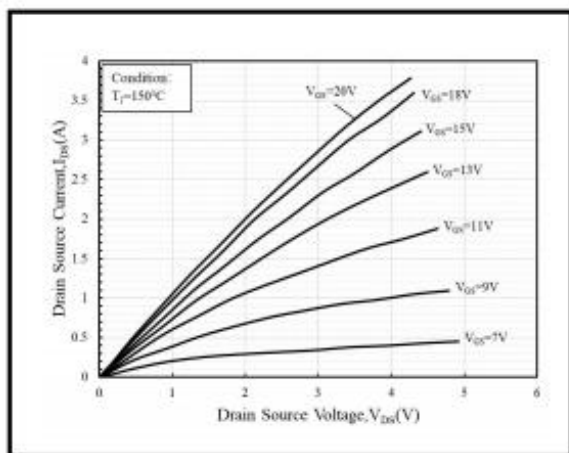
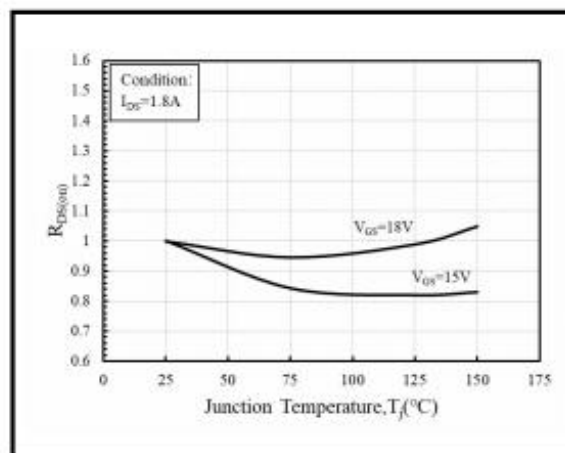
Fig.1 Typical Output Characteristics at $T_j = 55^\circ\text{C}$ Fig.2 Typical Output Characteristics at $T_j = 25^\circ\text{C}$ Fig.3 Typical Output Characteristics at $T_j = 150^\circ\text{C}$ 

Fig.4 Normalized On-Resistance vs Temperature

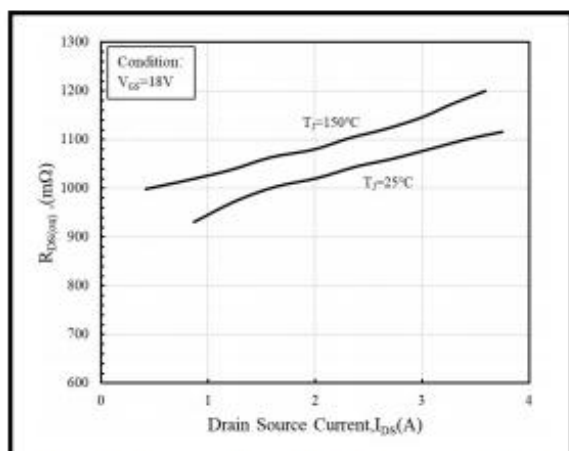


Fig.5 On-Resistance vs Drain Current For Various Temperatures

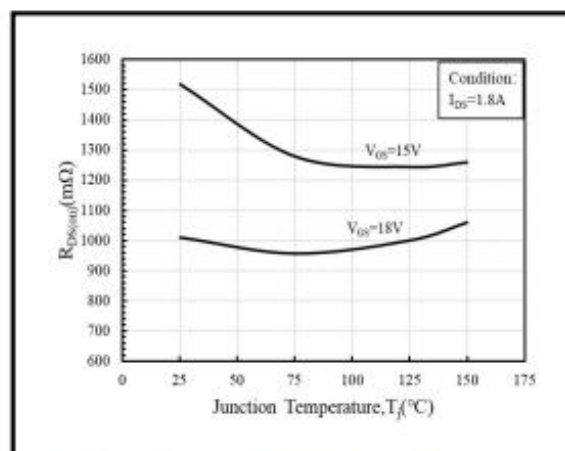


Fig.6 On-Resistance vs Temperature For Various Gate Voltage

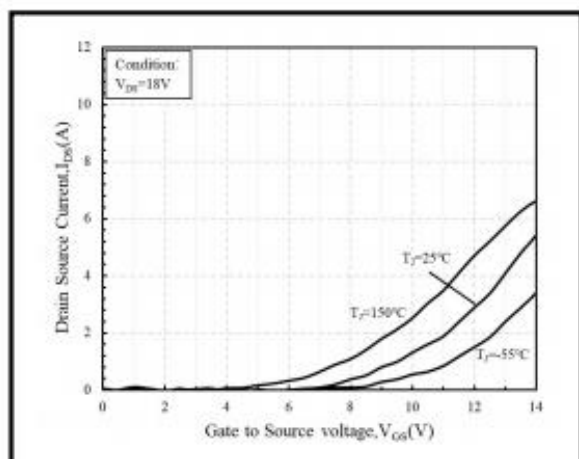
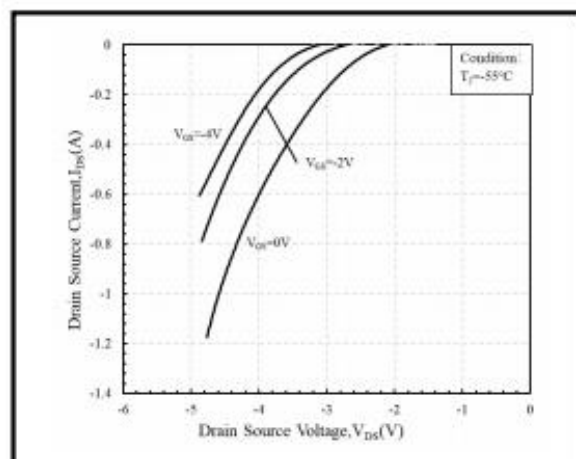
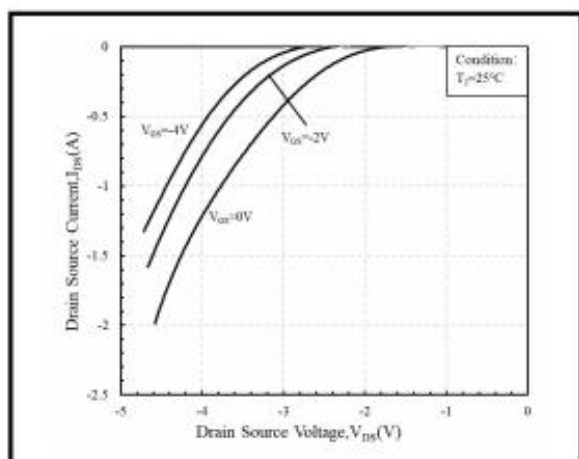
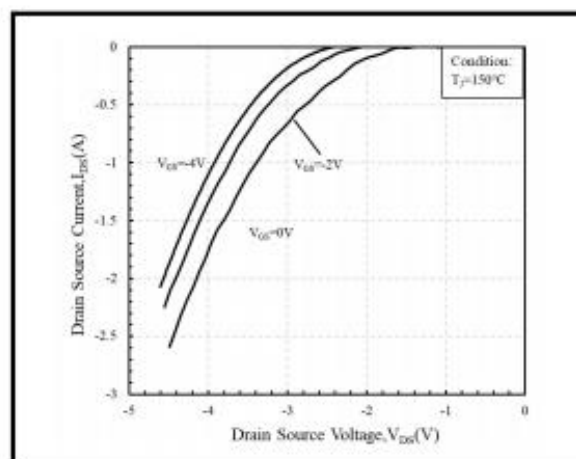
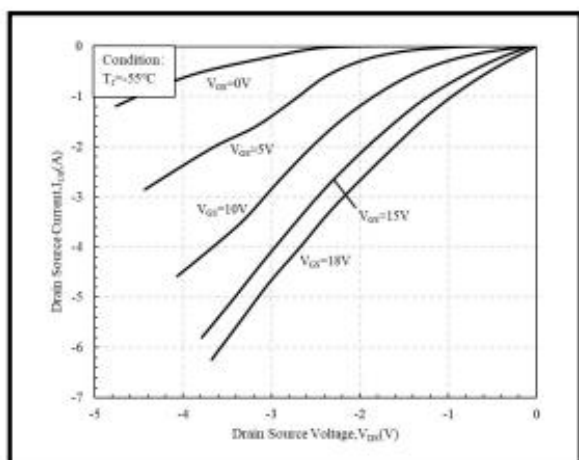
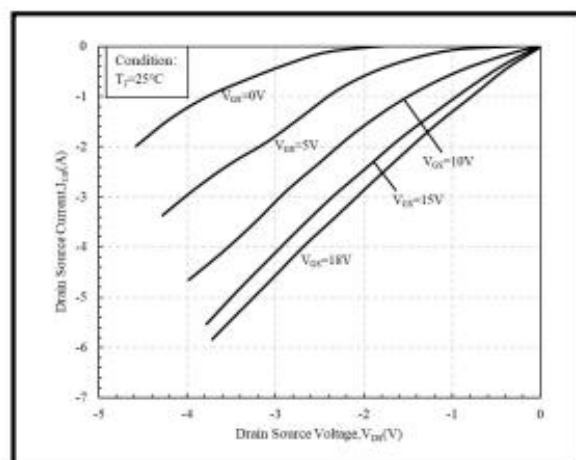


Fig. 7 Transfer Characteristics for Various Temperatures

Fig. 8 Body Diode Characteristics at $-55^\circ C$ Fig. 9 Body Diode Characteristics at $25^\circ C$ Fig. 10 Body Diode Characteristics at $175^\circ C$ Fig. 11 3rd Quadrant Characteristics at $-55^\circ C$ Fig. 12 3rd Quadrant Characteristics at $T_J = 25^\circ C$

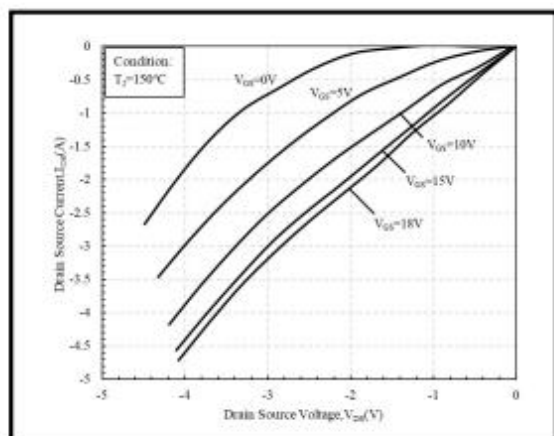
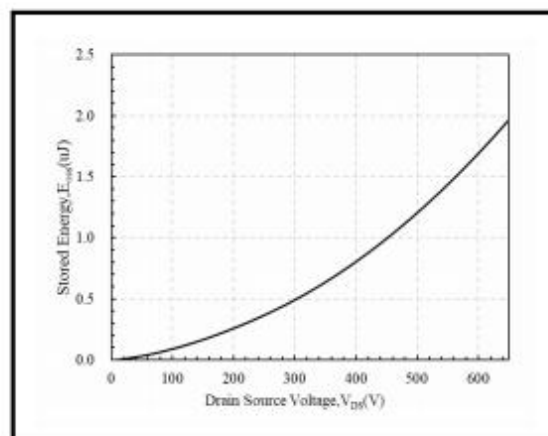
Fig.13 3rd Quadrant Characteristics at 150°C

Fig.14 Output Capacitor Stored Energy

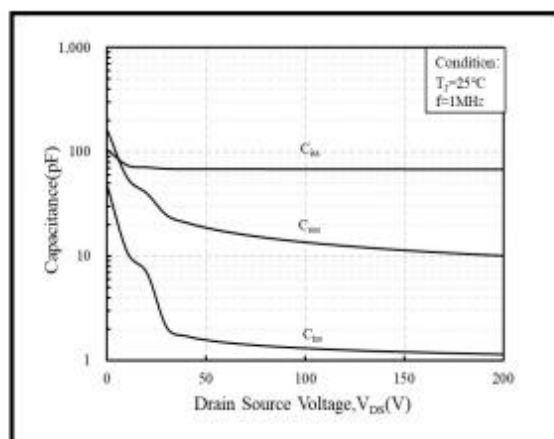


Fig.15 Capacitances vs Drain-Source Voltage (0-200V)

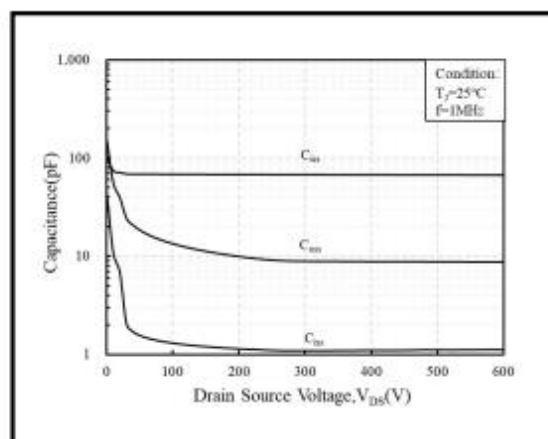


Fig.16 Capacitances vs Drain-Source Voltage (0-650V)

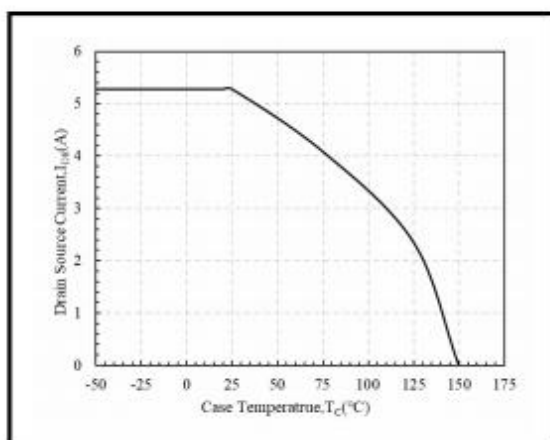


Figure 17. Continuous Drain Current Derating vs Case Temperature

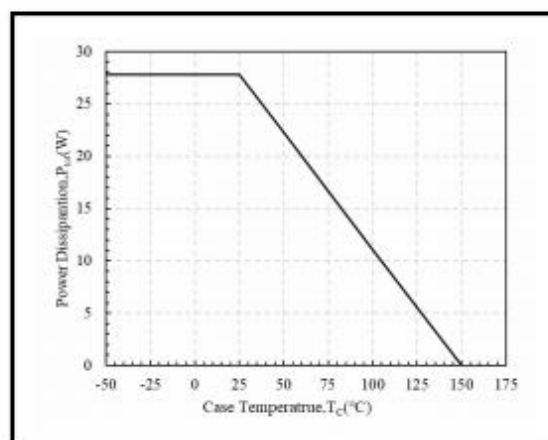


Figure 18. Maximum Power Dissipation Derating vs Case Temperature

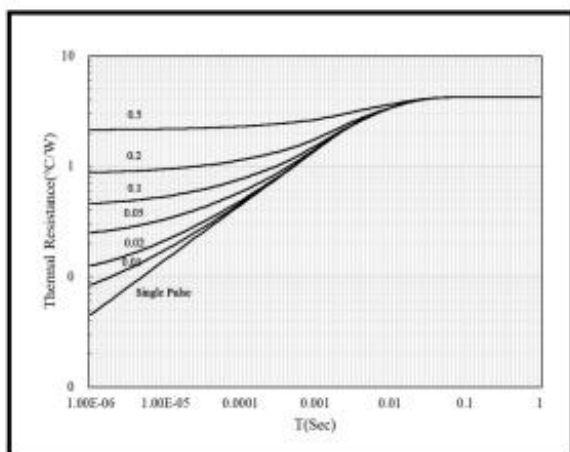


Figure 19. Transient Thermal Impedance (Junction-Case)

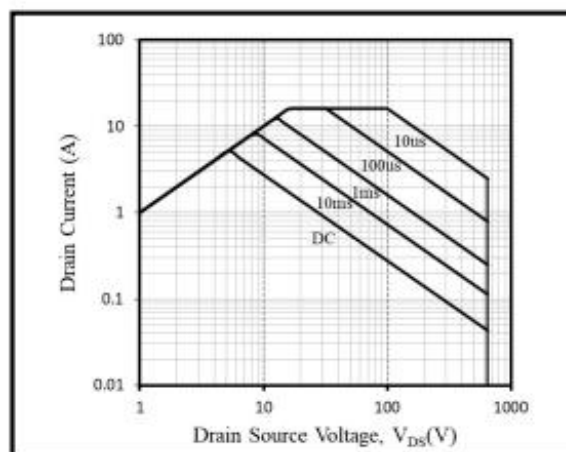


Figure 20. Safe Operating Area

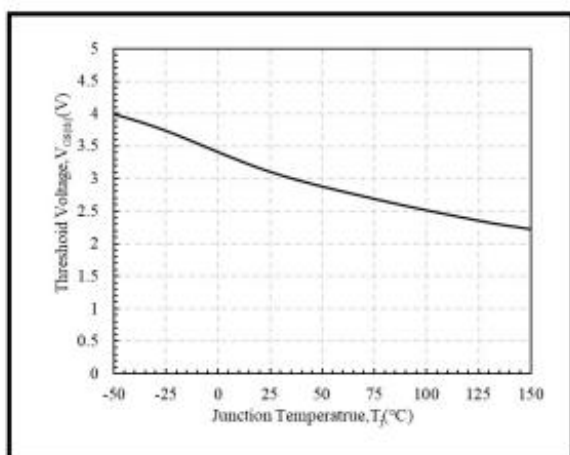


Figure 21. Gate Charge Characteristics

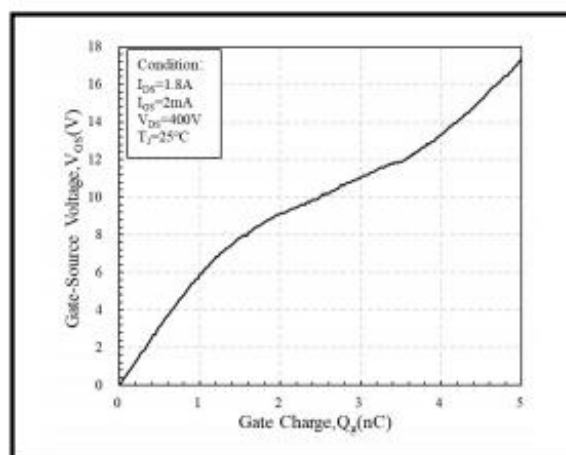
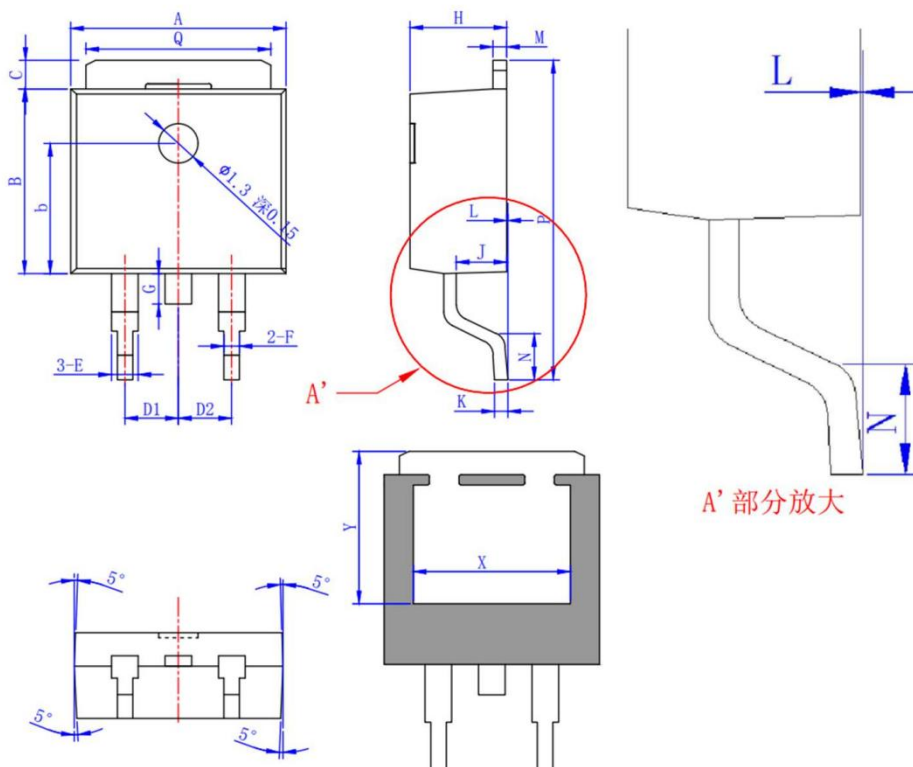


Figure 22. Threshold Voltage vs Temperature



Package Dimensions TO252-3L



SYMBOL	MM		
	MIN	NOM	MAX
*A	6.30	6.55	6.90
*B	5.90	6.10	6.30
b	4.10	4.30	4.50
C	0.90	1.00	1.10
*D1		2.29BSC	
*D2		2.29BSC	
*E	0.61	0.76	0.91
*F	0.50	0.60	0.70
G	0.60	0.80	1.00
*H	2.10	2.30	2.50
*J	0.90	1.00	1.10
*K	0.40	0.50	0.60
*L	0.00	0.05	0.127
*M	0.45	0.50	0.55
*N	1.39		1.77
*P	9.60	9.90	10.30
Q	5.10	5.30	5.50
X		4.77	
Y		5.08	



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