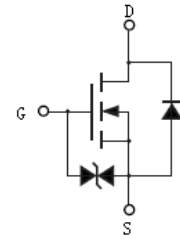


### Features

- Fast switching
- ESD improved capability
- Low gate charge
- Low reverse transfer capacitances
- JESD22-A114-B ESD rating of class 1C per human body model

HF

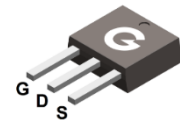


### Application

- Power switch circuit of adaptor and charger

### Mechanical Data

- Case: TO-251
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



TO-251

## Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL1N60KI	TO-251	80 pcs / Tube	1N60KI

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DSS}$	600	V
Gate-to-Source Voltage	$V_{GSS}$	$\pm 30$	V
Continuous Drain Current ( $T_C = 25^\circ\text{C}$ )	$I_D$	1.25	A
Continuous Drain Current ( $T_C = 100^\circ\text{C}$ )		0.8	A
Pulsed Drain Current ( $t_p = 10\mu\text{s}$ , $T_C = 25^\circ\text{C}$ )	$I_{DM}$	5	A
Single Pulse Avalanche Energy <sup>*3</sup>	$E_{AS}$	50	mJ
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	31	W
Operating Junction Temperature Range	$T_J$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

## Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	-	4	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air <sup>*1</sup>	$R_{\theta JA}$	-	-	40	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
$V_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	600	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 600V, V_{GS} = 0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 10$	$\mu A$
<b>On Characteristics</b>						
$R_{DS(ON)}$	Drain-Source On-resistance <sup>*2</sup>	$V_{GS} = 10V, I_D = 0.75A$	-	-	8	$\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
$R_G$	Gate Resistance	$V_{GS} = 0V, f = 1MHz$	-	11	-	$\Omega$
<b>Dynamic Characteristics</b>						
$C_{ISS}$	Input Capacitance	$V_{GS} = 0V$	-	178	-	pF
$C_{OSS}$	Output Capacitance	$V_{DS} = 25V$	-	20	-	
$C_{RSS}$	Reverse Transfer Capacitance	$f = 1.0MHz$	-	3	-	
<b>Switching Characteristics</b>						
$t_{d(ON)}$	Turn-on Delay Time <sup>*4</sup>	$V_{DD} = 300V$	-	8	-	ns
$t_r$	Turn-on Rise Time <sup>*4</sup>	$V_{GS} = 10V$	-	30	-	
$t_{d(OFF)}$	Turn-Off Delay Time <sup>*4</sup>	$R_G = 4.7\Omega$	-	22	-	
$t_f$	Turn-Off Fall Time <sup>*4</sup>	$I_D = 1.5A$	-	55	-	
$Q_G$	Total Gate-Charge	$V_{DD} = 480V$	-	7.7	-	nC
$Q_{GS}$	Gate to Source Charge	$V_{GS} = 10V$	-	0.9	-	
$Q_{GD}$	Gate to Drain (Miller) Charge	$I_D = 1.5A$	-	5.3	-	
<b>Source-Drain Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>*2</sup>	$I_{SD} = 1.5A, V_{GS} = 0V$	-	-	1.5	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 1.5A, V_{GS} = 0V$	-	245	-	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt = 100A/\mu s$	-	795	-	nC

Notes:

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
- The  $E_{AS}$  data shows Max. rating. The test condition is  $V_{DD} = 100V, V_{GS} = 10V, L = 50mH$
- Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

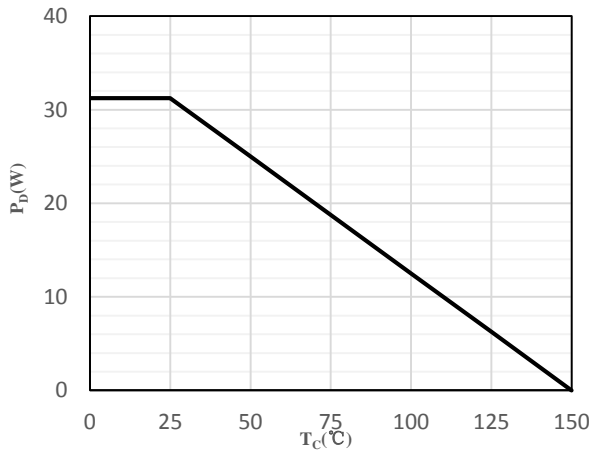


Fig 1 Power Dissipation

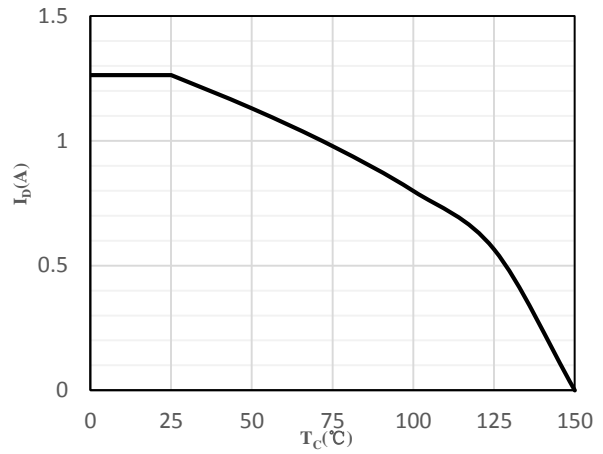


Fig 2 Drain Current

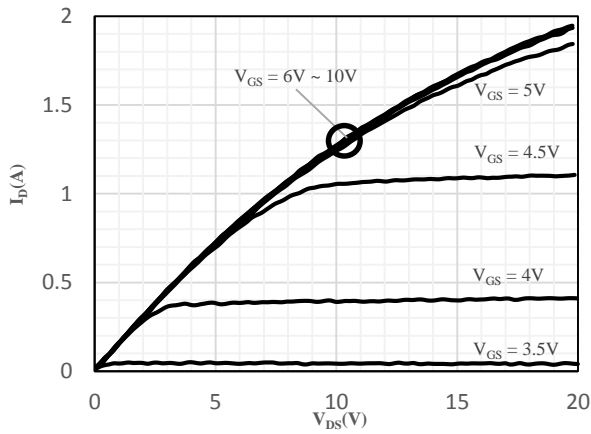


Fig 3 Typical Output Characteristics

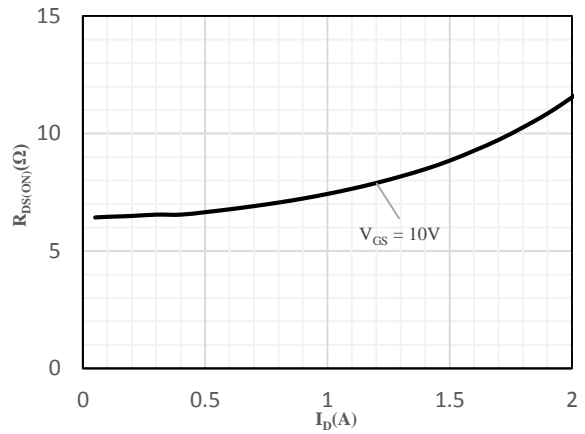


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

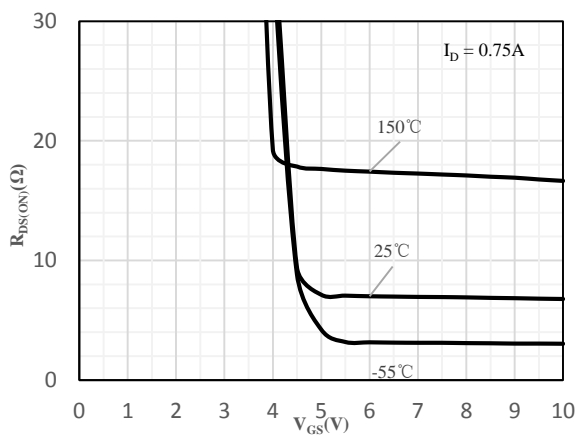


Fig 5 On-Resistance vs. Gate-Source Voltage

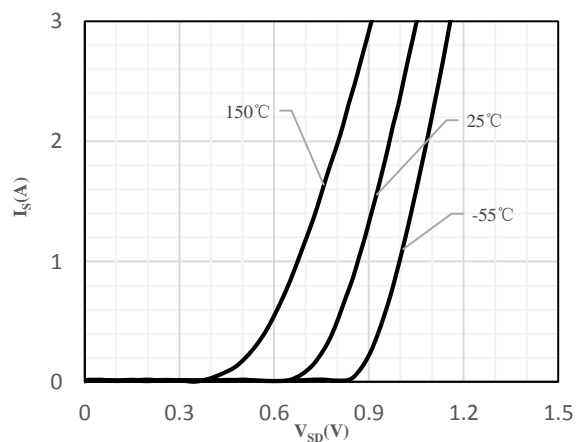


Fig 6 Body-Diode Characteristics

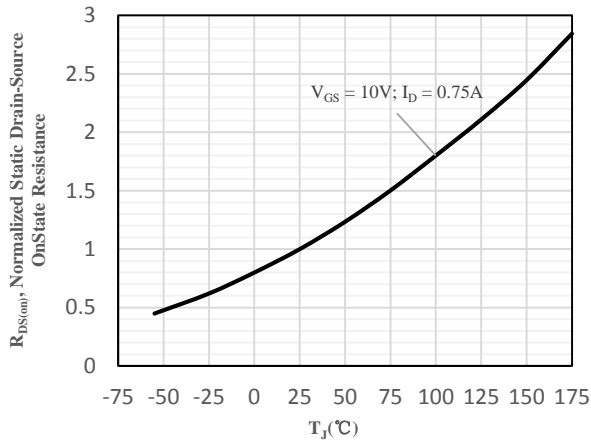


Fig 7 Normalized On-Resistance vs. Junction Temperature

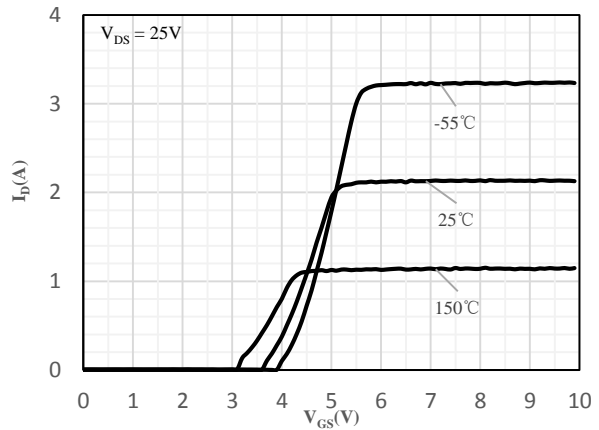


Fig 8 Transfer Characteristics

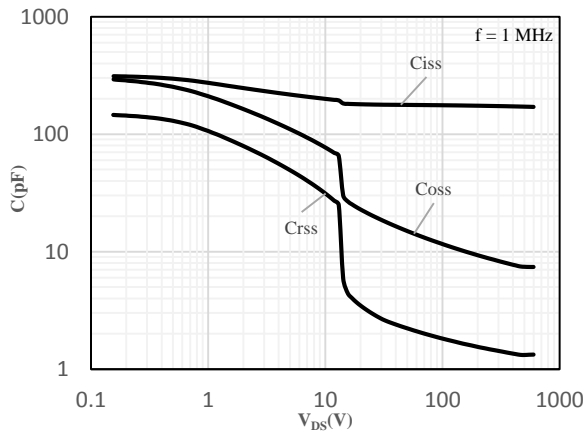


Fig 9 Capacitance Characteristics

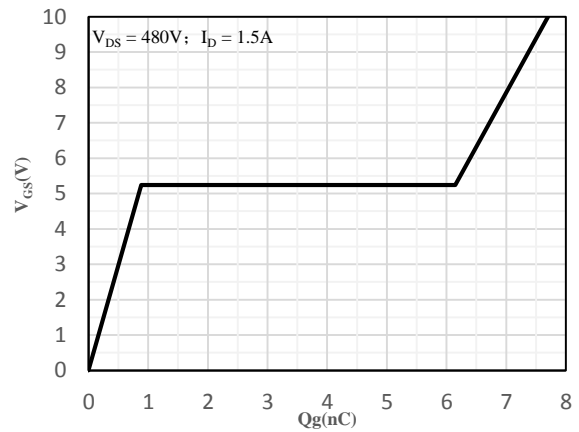


Fig 10 Gate-Charge Characteristics

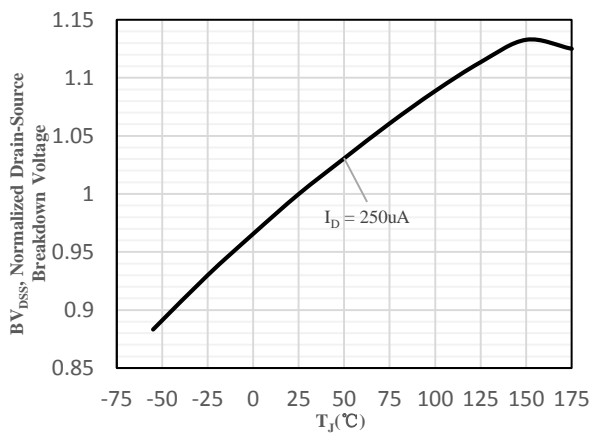


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

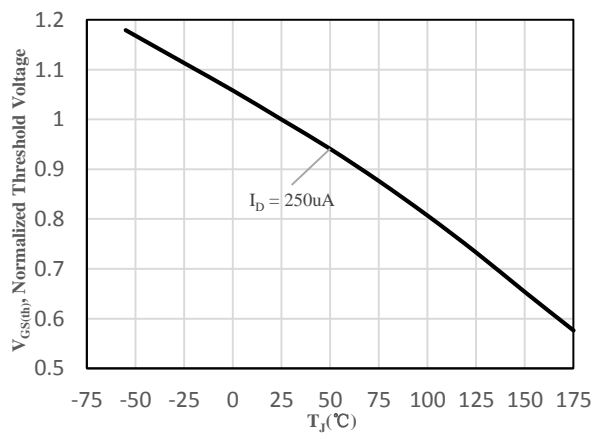
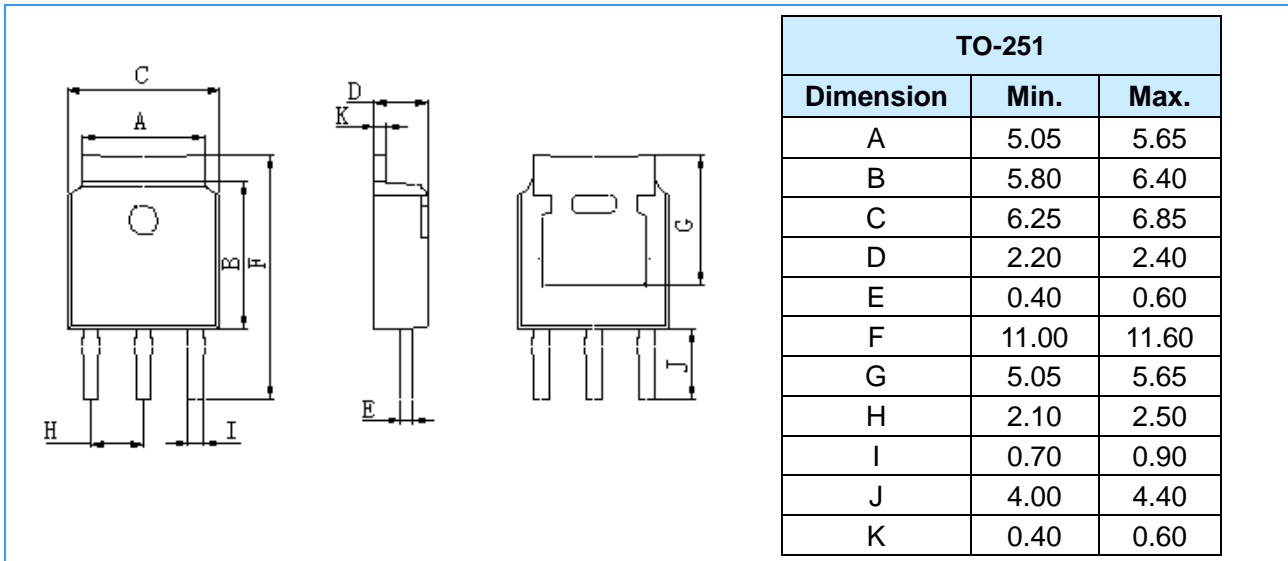


Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature

**Package Outline Dimensions** (Unit: mm)



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