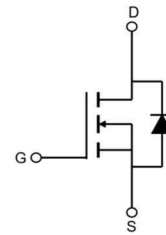


**Features**

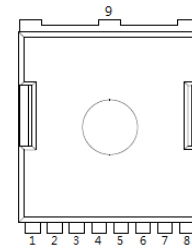
- 85V,280A  
 $R_{DS(on)} < 2.0m\ \Omega @ V_{GS}=10V$  TYP:1.8m  $\Omega$
- Surface-mounted package
- Super Trench
- Advanced trench cell design
- MSL1



Schematic Diagram

**Applications**

- E-Tool appliances
- BMS appliances
- High power inverter system
- Inverter appliances



**TOLL-8L**

1	Gate(G)
2,3,4,5,6,7,8	Source(S)
9	Drain(D)

**Package Marking and Ordering Information**

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G020N08T	APG020N08T	TOLL-8L	-	-	2000

**ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	85	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current (T <sub>C</sub> =25°C) <sup>(1)</sup>	I <sub>D</sub>	280	A
Continuous Drain Current (T <sub>C</sub> =100°C) <sup>(1)</sup>	I <sub>D</sub>	186	A
Pulsed Drain Current <sup>(1,2,3)</sup>	I <sub>DM</sub>	1000	A
Single Pulsed Avalanche Energy (V <sub>DD</sub> =40V,L=0.1mH)	E <sub>AS</sub>	1605	mJ
Drain Power Dissipation	P <sub>D</sub>	227	W
Thermal Resistance from Junction to Case <sup>(2)</sup>	R <sub>θJC</sub>	0.55	°C/W
Thermal Resistance- Junction to Ambient <sup>(3)</sup>	R <sub>θJA</sub>	40	°C/W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55~ +150	°C

**Notes:**

1. Pulse width ≤ 300 μs, duty cycle ≤ 2 %
2. Surface Mounted on minimum footprint pad area.
3. Limited by bonding wire

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>J</sub>=25°C unless otherwise noted)**

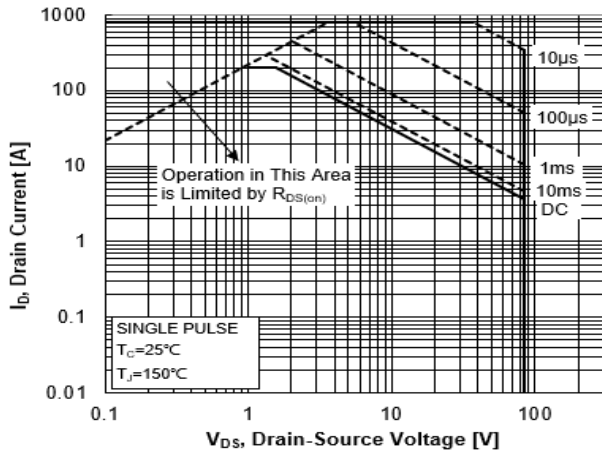
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	85	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =85V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	-	4.0	V
Drain-source on-resistance <sup>(a)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	1.8	2.0	mΩ
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f =1.0MHz	-	7234	-	pF
Output Capacitance	C <sub>oss</sub>		-	1280	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	99	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =40V, I <sub>D</sub> =30A, R <sub>G</sub> =4.5Ω, R <sub>L</sub> =1.3Ω, V <sub>G</sub> =10V	-	41	-	ns
Turn-on rise time	t <sub>r</sub>		-	68	-	
Turn-off delay time	t <sub>d(off)</sub>		-	76	-	
Turn-off fall time	t <sub>f</sub>		-	44	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =40V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V	-	124	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	31.2	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	39.2	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(a)</sup>	V <sub>SD</sub>	T <sub>J</sub> =25°C, V <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1.2	V
Diode Forward current	I <sub>S</sub>	T <sub>C</sub> =25°C	-	-	280	A
Body Diode Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =30A, di/dt=100A/us	-	78	-	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =30A, di/dt=100A/us	-	110	-	uc

**Notes:**

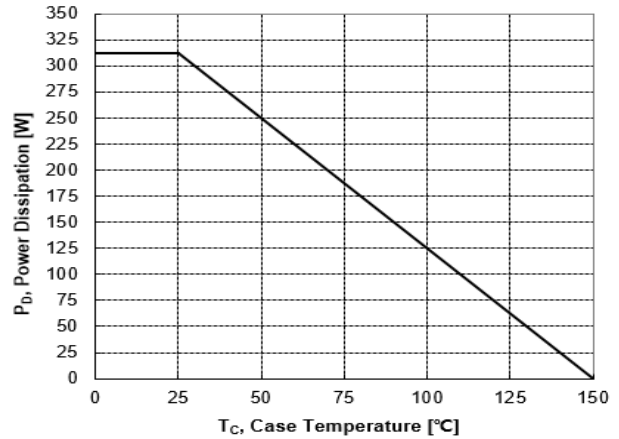
- a) Pulse width ≤ 300 μs, duty cycle ≤ 2%
- b) Guaranteed by design, not subject to production testing

## Typical Characteristics

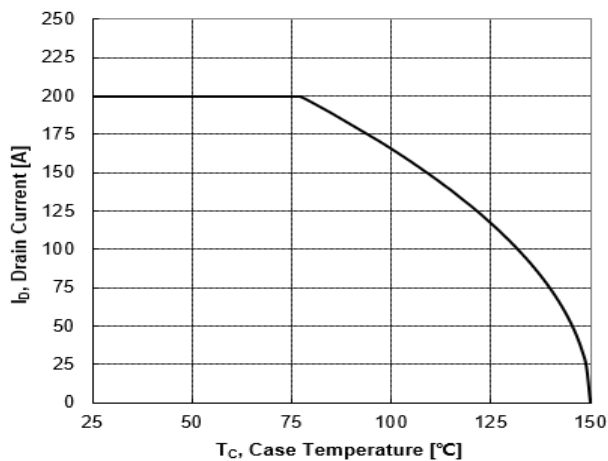
**Safe Operating Area**



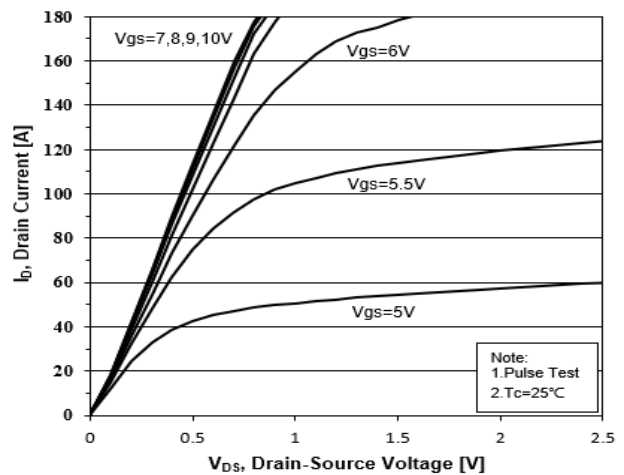
**Maximum Power Dissipation vs Case Temperature**



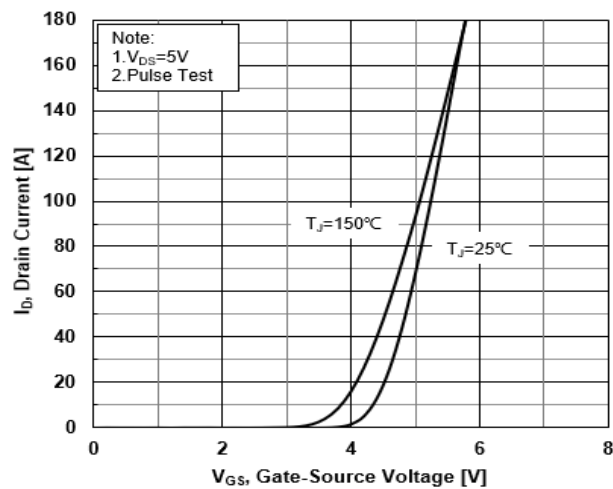
**Maximum Continuous Drain Current vs Case Temperature**



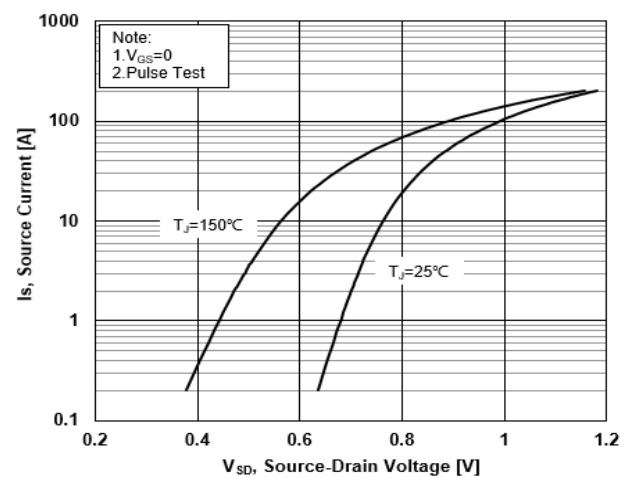
**Typical Output Characteristics**



**Typical Transfer Characteristics**

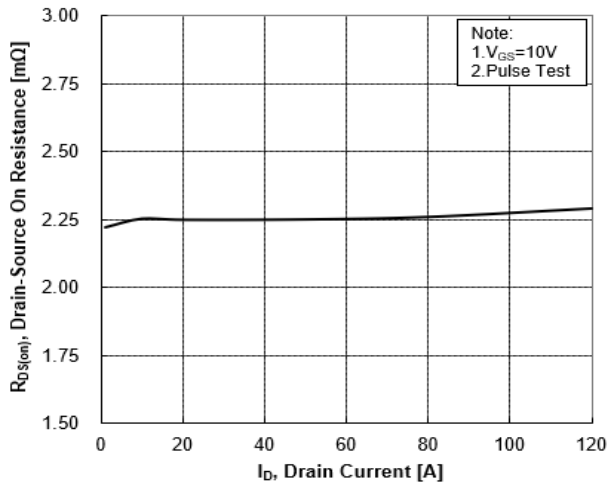


**Source-Drain Diode Forward Characteristics**

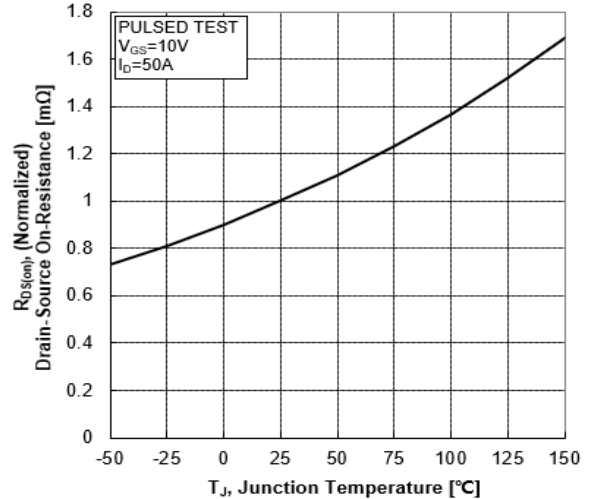


## Typical Characteristics

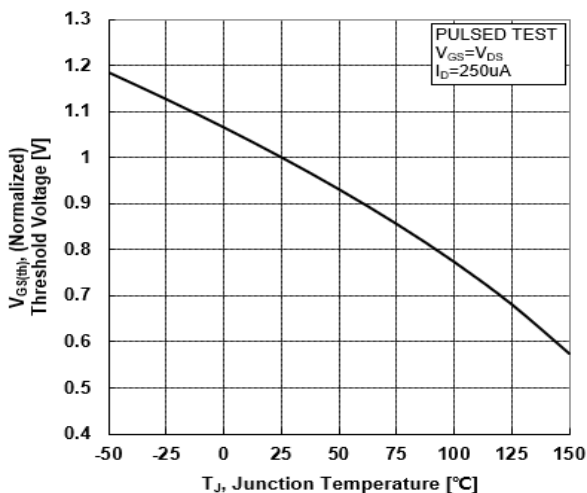
**Drain-Source On-Resistance vs Drain Current**



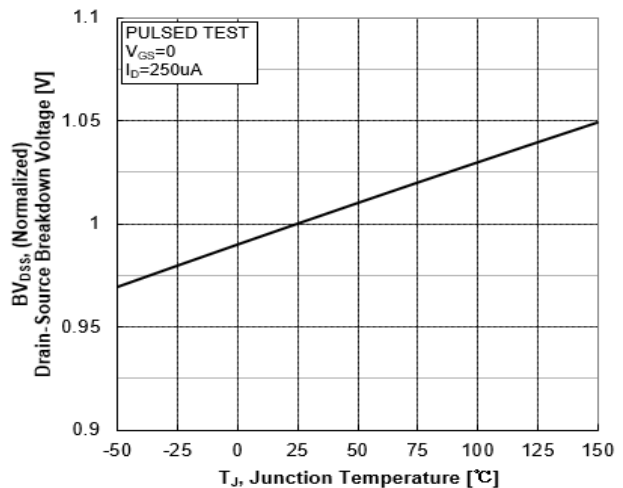
**Normalized On-Resistance vs Junction Temperature**



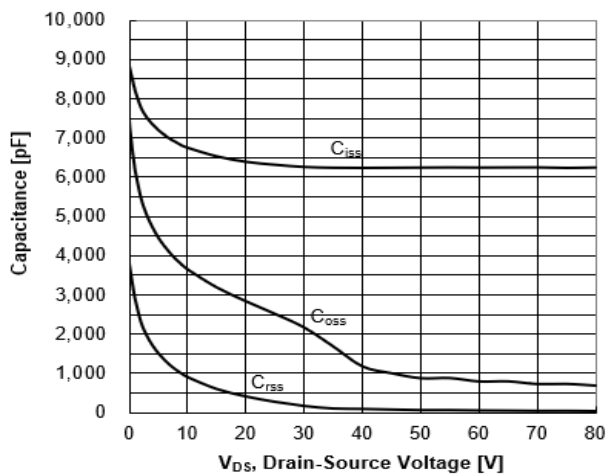
**Normalized Threshold Voltage vs Junction Temperature**



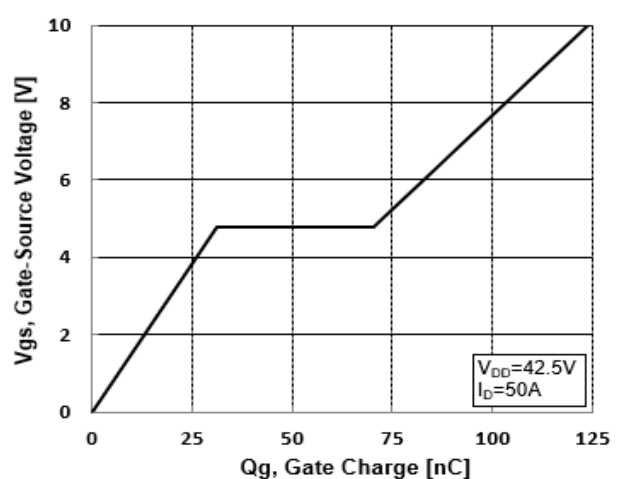
**Normalized Breakdown Voltage vs Junction Temperature**



**Capacitance Characteristics**

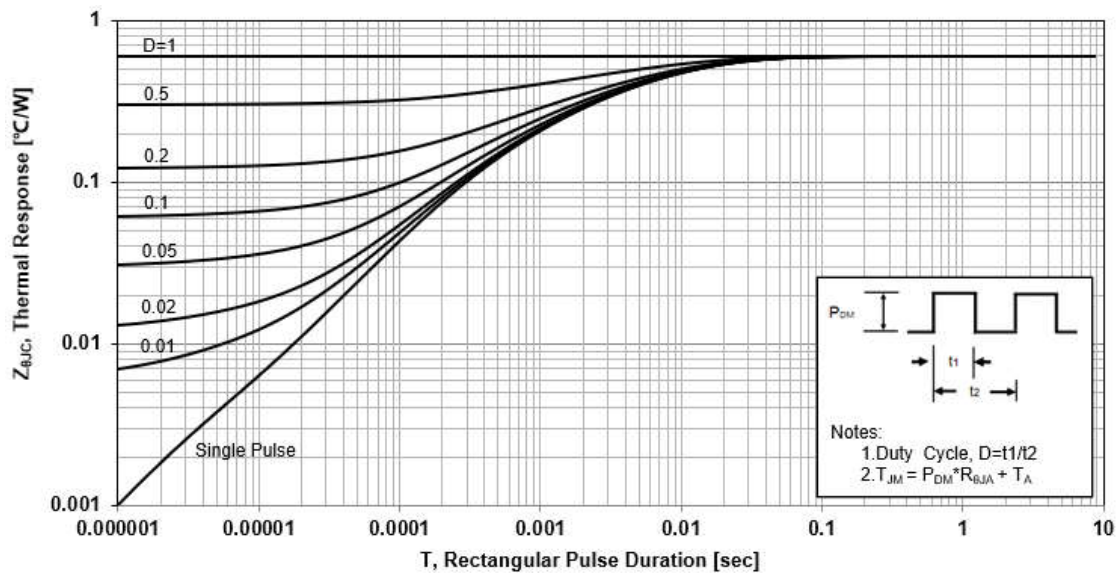


**Typical Gate Charge vs Gate-Source Voltage**



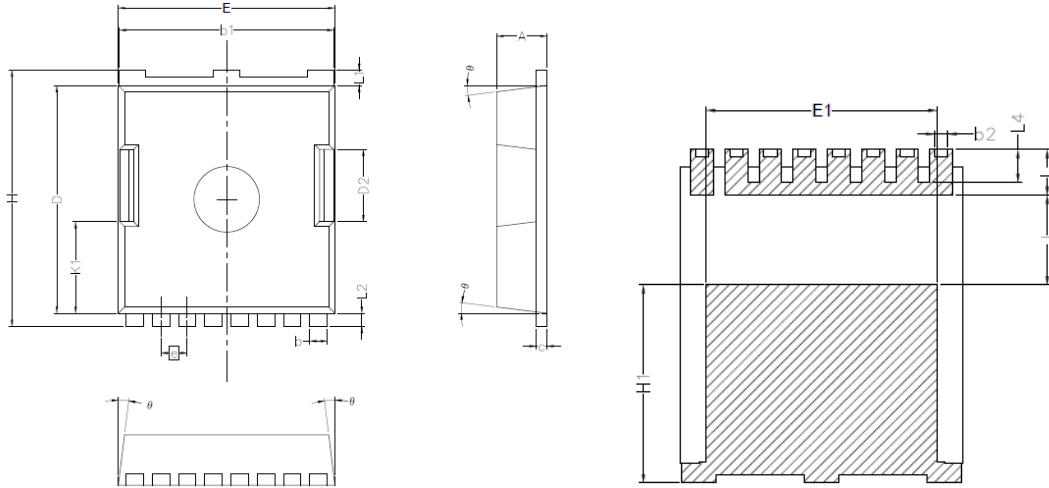
## Typical Characteristics

Transient Thermal Impedance



**Package Dimensions**

TOLL-8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.20	2.40
b	0.90	0.90
b1	9.70	9.90
b2	0.42	0.50
c	0.40	0.60
D	10.28	10.58
D2	3.10	3.50
E	9.70	10.10
E1	7.90	8.30
e	1.20BSC	
H	11.48	11.88
H1	6.75	7.15
N	8	
J	3.00	3.30
K1	3.98	4.38
L	1.40	1.80
L1	0.60	0.80
L2	0.50	0.70
L4	1.00	1.30
θ	4°	10°

## Revision History

Revision	Release	Remark
V1.0	2023/03/07	Initial Release

## Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements, the information described or contained herein may be changed without prior notice.