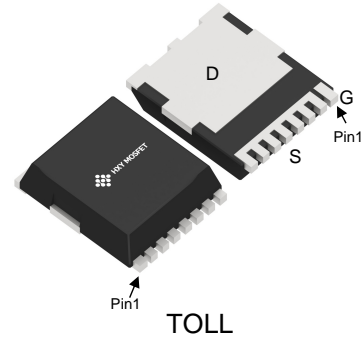




Description

The AP10NB2R0TL use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness.



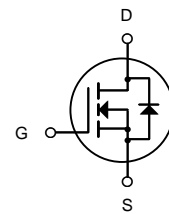
General Features

$V_{DS} = 100V$ $I_D = 350A$

$R_{DS(ON)} < 2m\ \Omega$ @ $V_{GS}=10V$

Applications

Battery Protection
Power Distribution



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
AP10NB2R0TL	TOLL	HXY MOSFET	2000

Absolute Maximum Ratings at $T_J=25^\circ C$ unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^\circ C$	I_D	350	A
	$T_C=100^\circ C$		200	
Pulsed Drain Current ¹		I_{DM}	1248	A
Single Pulse Avalanche Energy ²		EAS	1250	mJ
Total Power Dissipation	$T_C=25^\circ C$	P_D	390.6	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$
Thermal Resistance from Junction-to-Ambient ³		$R_{\theta JA}$	39	$^\circ C/W$
Thermal Resistance from Junction-to-Case		$R_{\theta JC}$	0.32	$^\circ C/W$



Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	100	-	-	V
Gate-body Leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	V _{DS} = 100V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C		-	-	100	
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
Drain-Source on-Resistance ⁴	R _{DS(on)}	V _{GS} = 10V, I _D = 20A	-	1.4	2.0	mΩ
Forward Transconductance ⁴	g _{fs}	V _{DS} = 10V, I _D = 20A	-	84	-	S
Dynamic Characteristics⁵						
Input Capacitance	C _{iss}	V _{DS} = 50V, V _{GS} = 0V, f = 1MHz	-	14300	-	pF
Output Capacitance	C _{oss}		-	2120	-	
Reverse Transfer Capacitance	C _{rss}		-	50	-	
Gate Resistance	R _g	f = 1MHz	-	2.8	-	Ω
Switching Characteristics⁵						
Total Gate Charge	Q _g	V _{GS} = 10V, V _{DS} = 50V, I _D = 20A	-	250	-	nC
Gate-Source Charge	Q _{gs}		-	53	-	
Gate-Drain Charge	Q _{gd}		-	77	-	
Turn-on Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DD} = 50V, R _G = 3Ω, I _D = 20A	-	41	-	ns
Rise Time	t _r		-	88	-	
Turn-off Delay Time	t _{d(off)}		-	163	-	
Fall Time	t _f		-	98	-	
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20A, di/dt = 100A/μs	-	106	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	245	-	nC
Drain-Source Body Diode Characteristics						
Diode Forward Voltage ⁴	V _{SD}	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current	T _C =25°C	I _S	-	-	350	A

Note:

1. The maximum current rating is package limited.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. V_{DD} = 32 V, R_G = 25 Ω, L = 0.5mH, starting T_J = 25°C.
4. P_D is based on max. junction temperature, using junction-case thermal resistance.
5. The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with Ta = 25°C.



Typical Characteristics

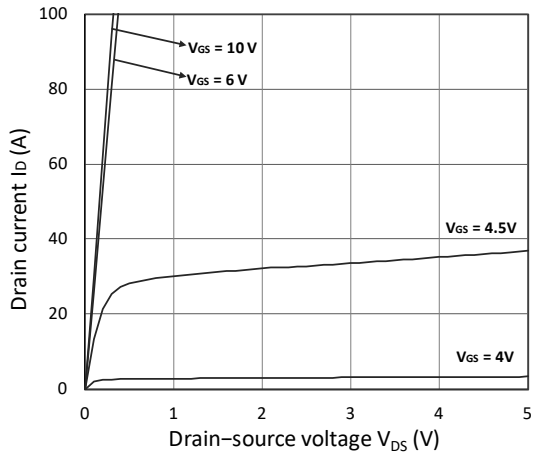


Figure 1. Output Characteristics

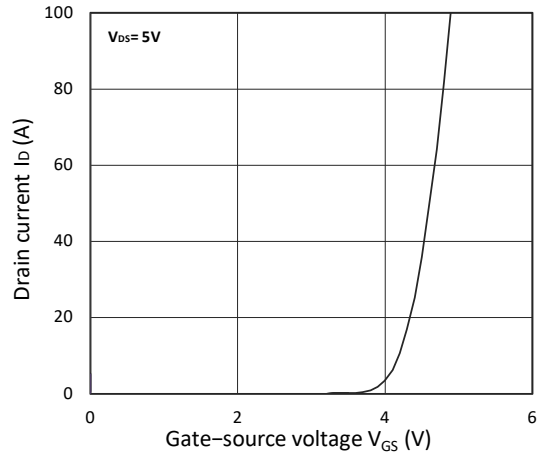


Figure 2. Transfer Characteristics

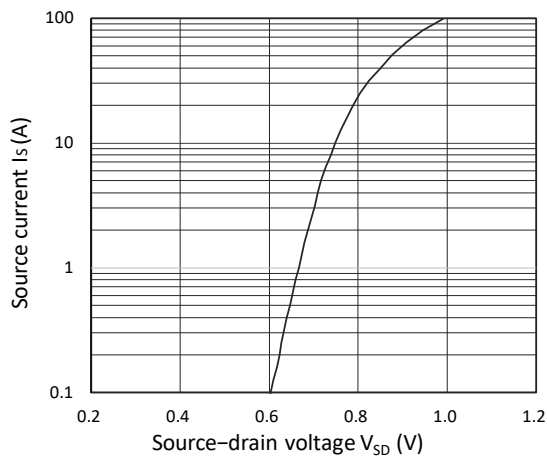


Figure 3. Forward Characteristics of Reverse

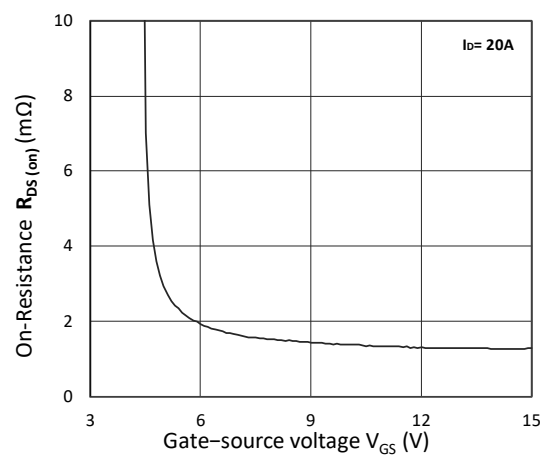


Figure 4. $R_{DS(on)}$ vs. V_{GS}

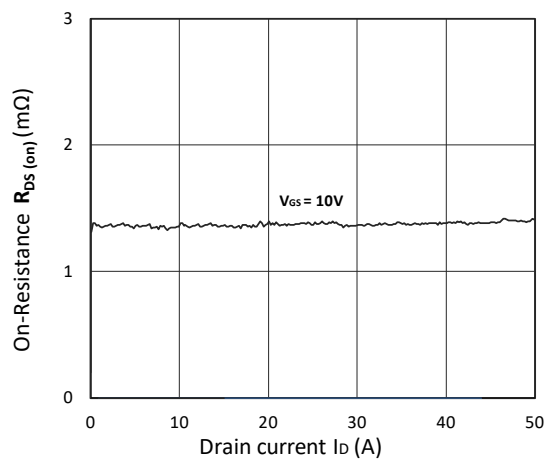


Figure 5. $R_{DS(on)}$ vs. I_D

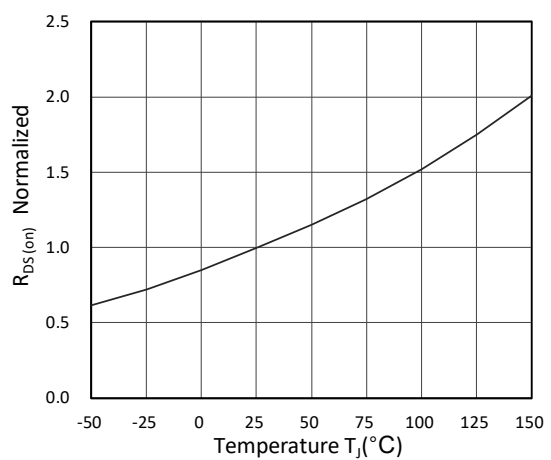


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

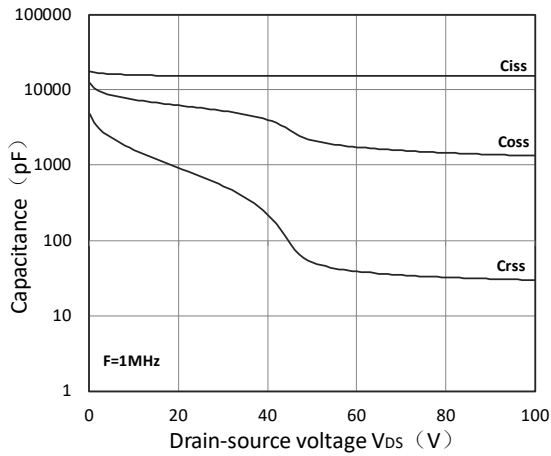


Figure 7. Capacitance Characteristics

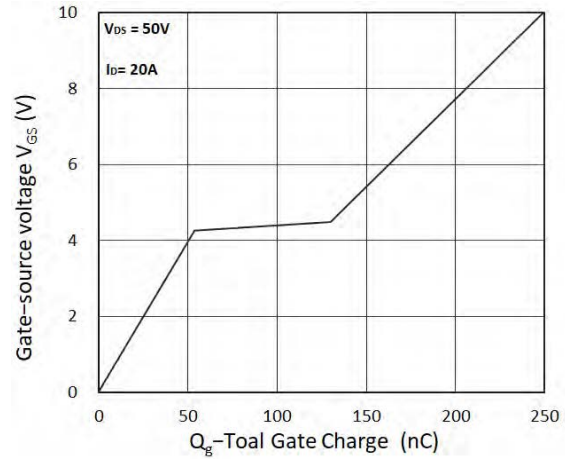


Figure 8. Gate Charge Characteristics

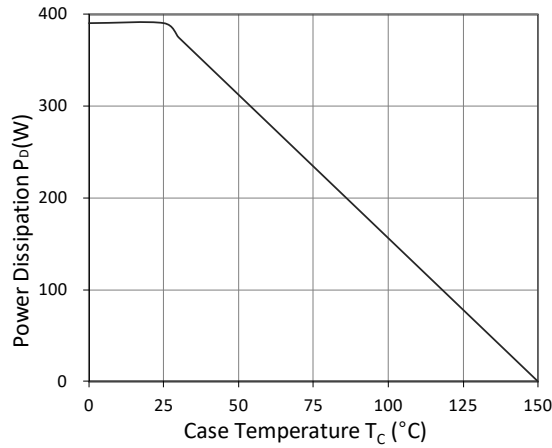


Figure 9. Power Dissipation

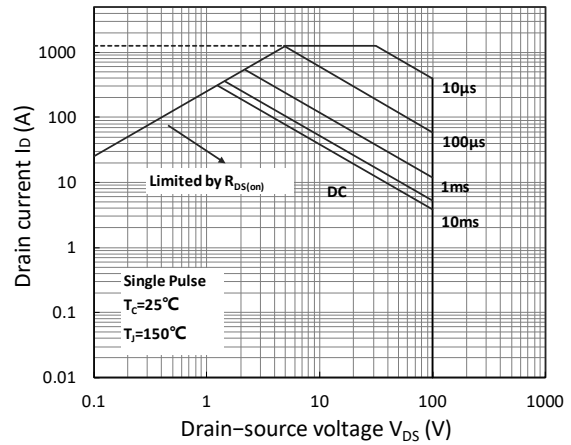


Figure 10. Safe Operating Area

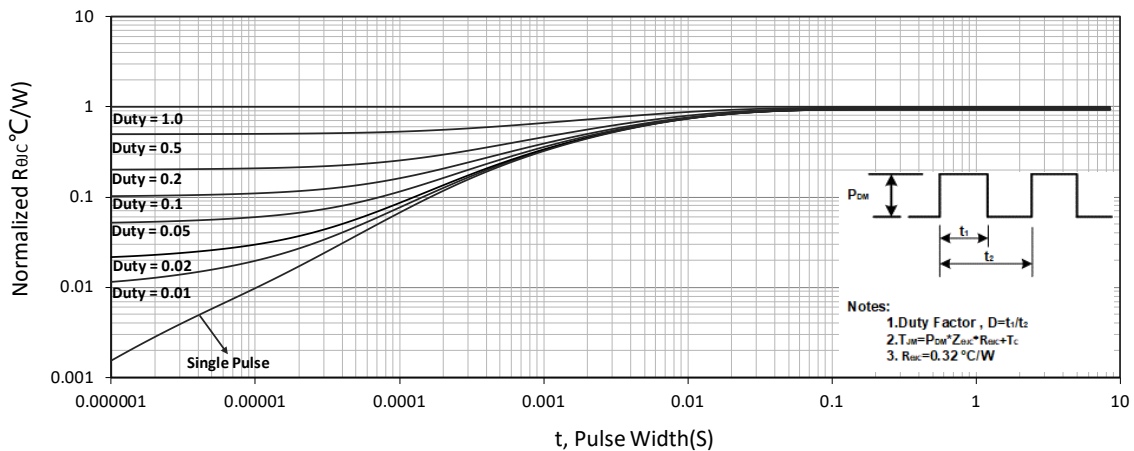


Figure 11. Normalized Maximum Transient Thermal Impedance



Test Circuit

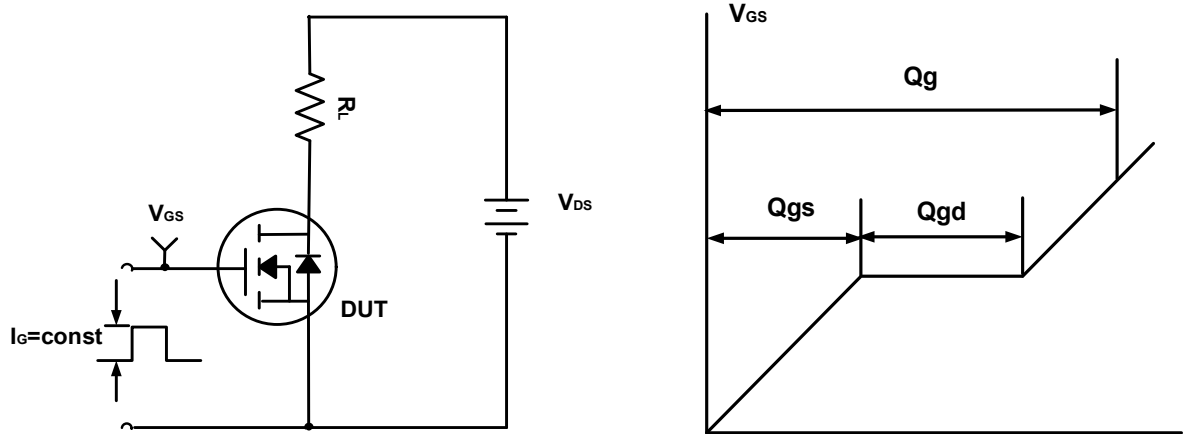


Figure A. Gate Charge Test Circuit & Waveforms

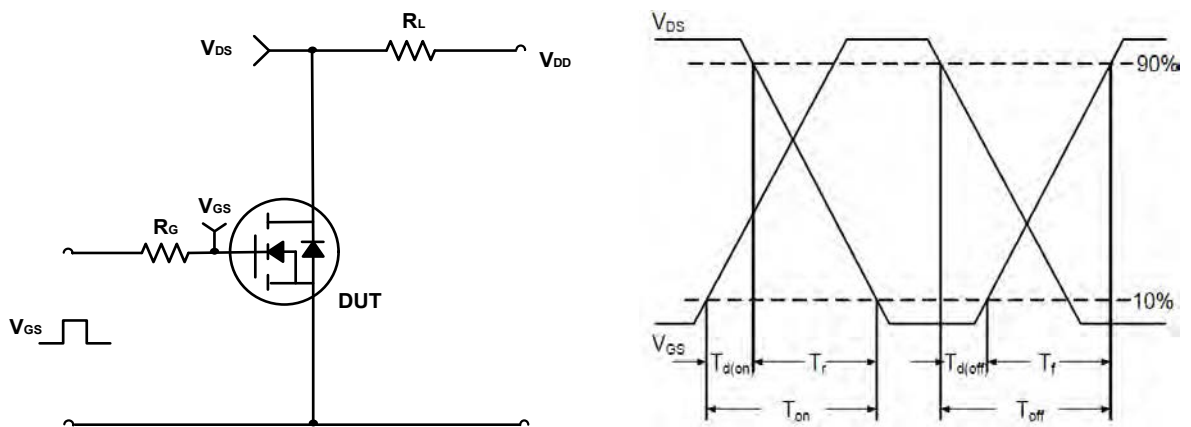


Figure B. Switching Test Circuit & Waveforms

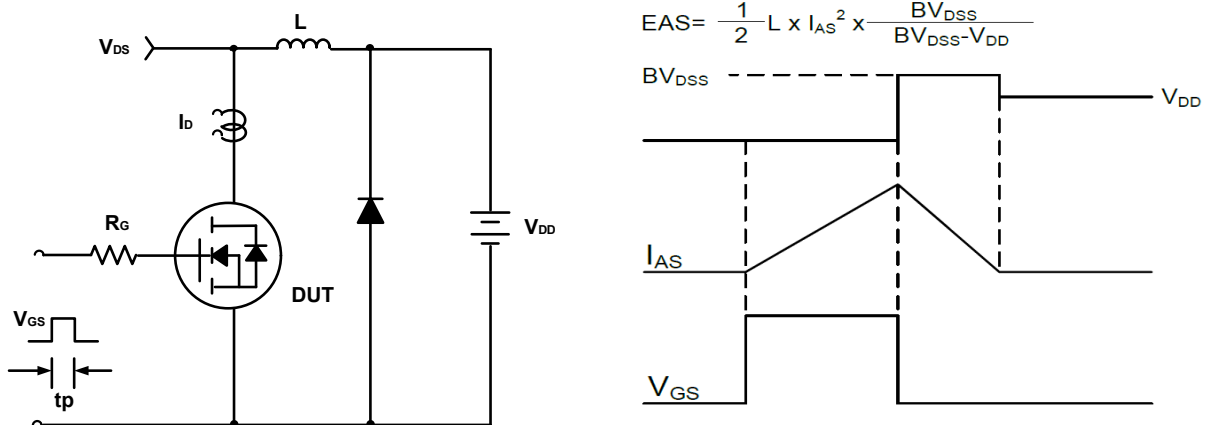
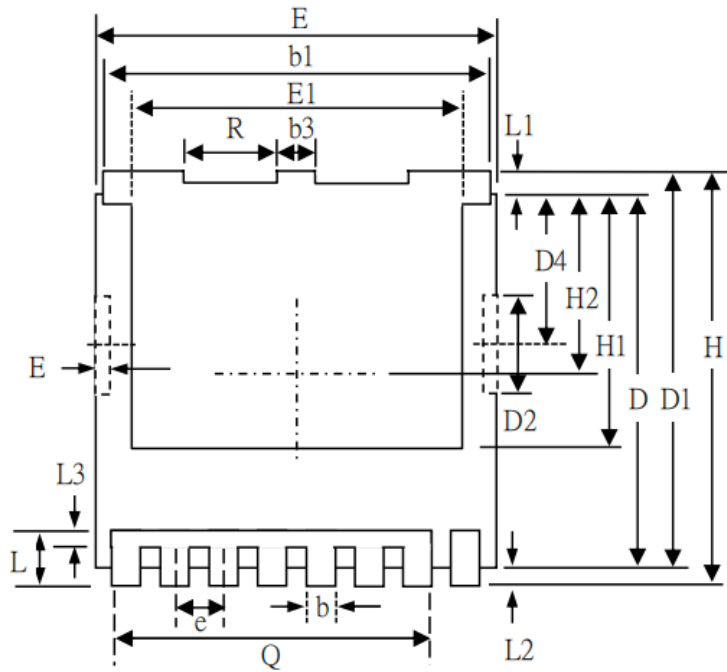


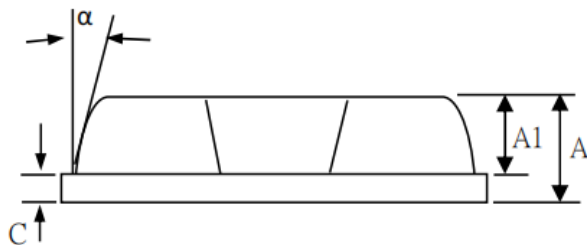
Figure C. Unclamped Inductive Switching Circuit & Waveforms



TOLL Package Information



BACKSIDE VIEW



Symbol	mm	
	Min	Max
A	2.20	2.40
b	0.60	0.90
b1	9.70	9.90
c	0.40	0.60
D	10.20	10.60
D1	3.10	3.50
D2	4.45	4.75
E	9.70	10.10
E1	7.80BSC	
E2	0.50	0.70
e	1.200 BSC	
H	11.45	11.90
H1	6.75 BSC	
K	3.10 REF	
L	1.70	2.10
L1	0.60	0.80
L2	0.50	0.70
θ	10° REF	

- 1.All Dimension Are In Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.



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