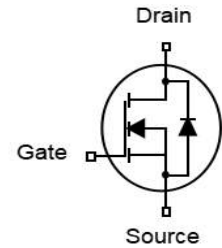


## Features

- N-Channel
- Fast Switching
- Low Gate Charge and  $R_{DS(ON)}$
- Low Reverse transfer capacitances
- 100% EAS Tested

$V_{DS}$	150	V
$R_{DS(on),TYP@ V_{GS}=10V}$	3.3	mΩ
$R_{DS(on),TYP@ V_{GS}=8V}$	3.5	mΩ
$I_D$	260	A

TO-247



Part ID	Package Type	Marking	Packing
ZTG033N15T	TO-247	ZTG033N15T	600pcs/Tape

## Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ , unless otherwise specified

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (<math>T_c=25^\circ\text{C}</math> Unless Otherwise Noted)</b>				
$V_{GS}$	Gate-Source Voltage	±20	V	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	150	V	
$T_J$	Maximum Junction Temperature	150	°C	
$T_{STG}$	Storage Temperature Range	-55 to 150	°C	
$I_{DM}$	Drain Current-Continuous@ Current-Pulsed (Note 2)	$T_c = 25^\circ\text{C}$ 960	A	
<b>Mounted on Large Heat Sink</b>				
$I_D$	Drain Current-Continuous (Note 1)	$T_c = 25^\circ\text{C}$	260	A
		$T_c = 100^\circ\text{C}$	151	A
$P_D$	Maximum Power Dissipation (Note 3)	500	W	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.25	°C/W	
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	50	°C/W	
<b>Drain-Source Avalanche Ratings</b>				
EAS	Avalanche Energy, Single Pulsed (Note 6)	1924	mJ	

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub>=25°C (unless otherwise stated)</b>						
V(BR)DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	150	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =150V, V <sub>GS</sub> =0V	--	--	1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	--	4.0	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =100A	--	3.3	3.8	mΩ
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =8V, I <sub>D</sub> =50A	--	3.5	4.0	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =75V, V <sub>GS</sub> =0V, f=1MHz	--	9940	--	pF
C <sub>oss</sub>	Output Capacitance		--	1253	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	27	--	pF
R <sub>g</sub>	Gate Resistance f=1MHz	f=1MHz	--	3.6	--	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> =75V, I <sub>D</sub> =100A, V <sub>GS</sub> =10V	--	147	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	55	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	31	--	nC
<b>Switching Characteristics</b>						
T <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =75V, I <sub>D</sub> =100A, R <sub>G</sub> =1.6Ω, V <sub>GS</sub> =10V	--	35	--	ns
T <sub>r</sub>	Turn-on Rise Time		--	86	--	ns
T <sub>d(off)</sub>	Turn-Off Delay Time		--	96	--	ns
T <sub>f</sub>	Turn-Off Fall Time		--	44	--	ns
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
I <sub>SD</sub>	Source-Drain Current (Body Diode)		--	--	260	A
V <sub>SD</sub>	Forward on voltage	I <sub>S</sub> =100A, V <sub>GS</sub> =0V	--	--	1.4	V
T <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>S</sub> =100A, V <sub>R</sub> =75V,	--	143	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	--	620	--	nC

**Notes:**

- The rating only refers to the maximum absolute value of 25 °C in the specification. If the shell temperature is higher than 25 °C, it needs to be derated according to the actual environmental conditions.
- Pulse time 5us, pulse width is limited by the maximum junction temperature.
- The dissipated power value will change with the change of temperature, when greater than 25 °C, the dissipated power value will decrease by 4.0 W/°C with the increase of 1°C of temperature.
- Pulse test: pulse width ≤ 300μs, Duty Cycle ≤ 2%.
- Basically unaffected by operating temperature.
- EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=80V, L=1mH, R<sub>g</sub>=25Ω

Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

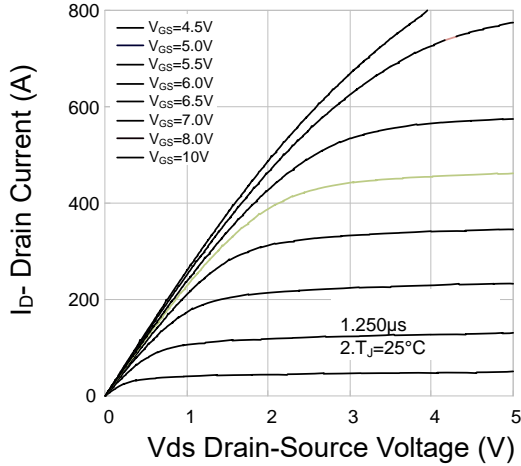


Figure 1 Output Characteristics

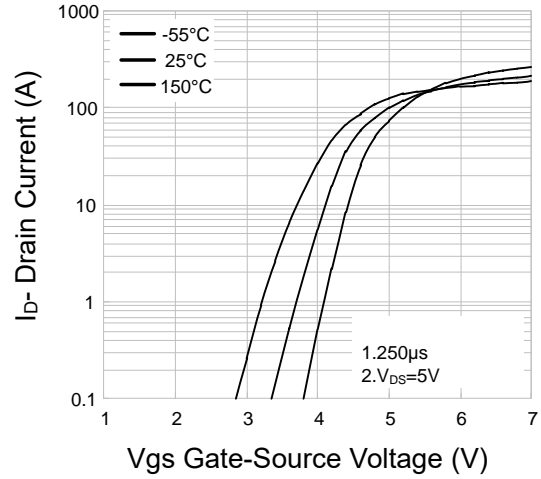


Figure 4 Transfer Characteristics

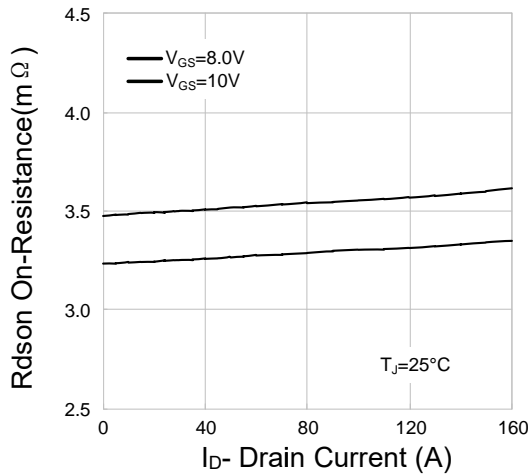


Figure 2 Rdson- Drain Current

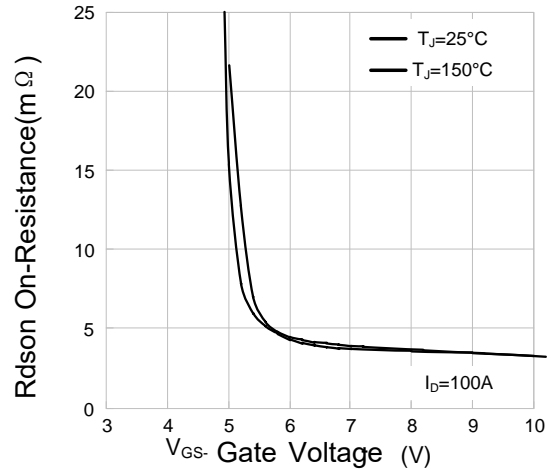


Figure 5 Rdson- Gate Voltage

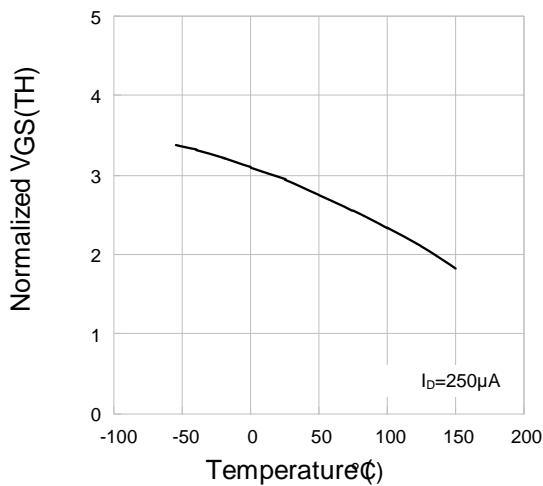


Figure 3 Threshold Voltage vs. Junction Temperature

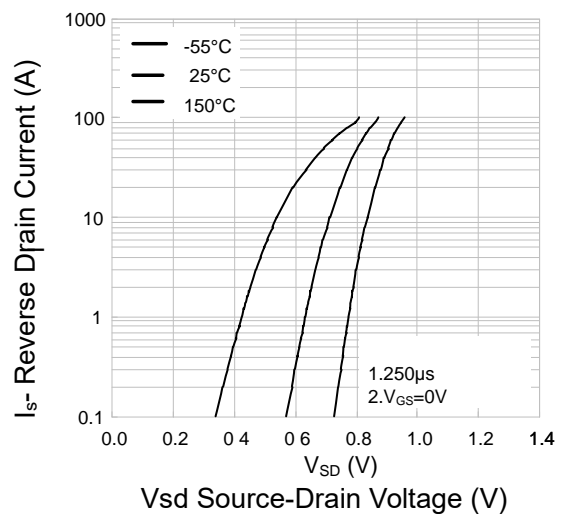


Figure 6 Source- Drain Diode Forward

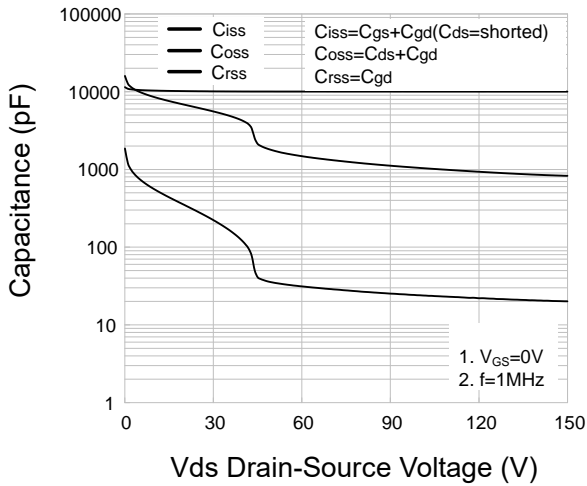


Figure 7 Capacitance vs Vds

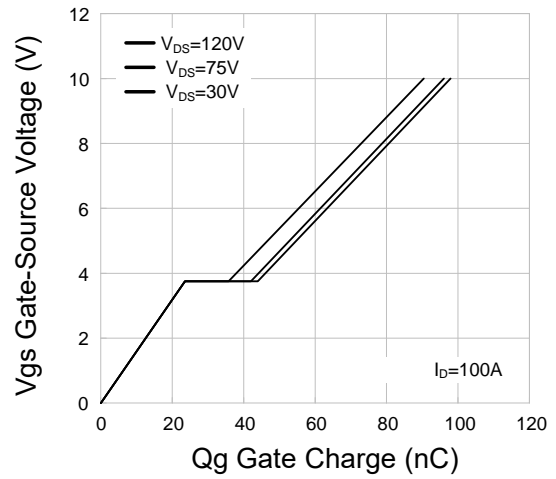


Figure 10 Gate Charge

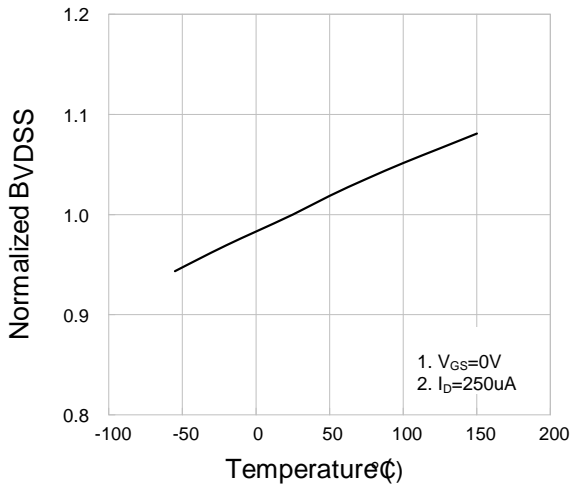


Figure 8 Breakdown Voltage vs. Junction Temperature

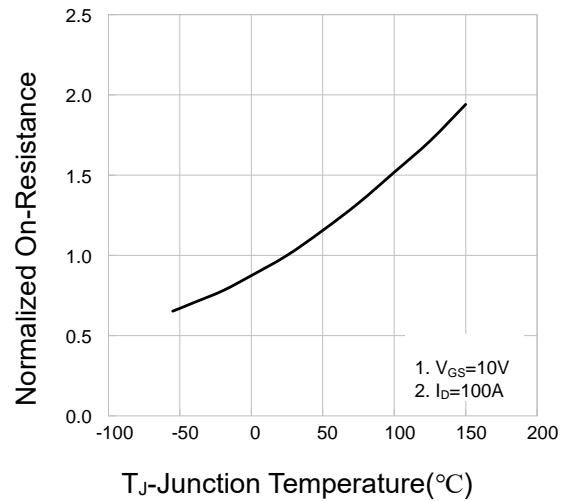


Figure 11 Rdson-Junction Temperature

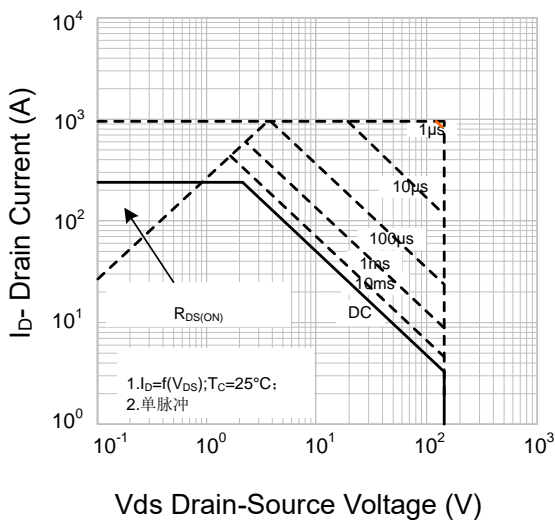


Figure 9 Safe Operation Area

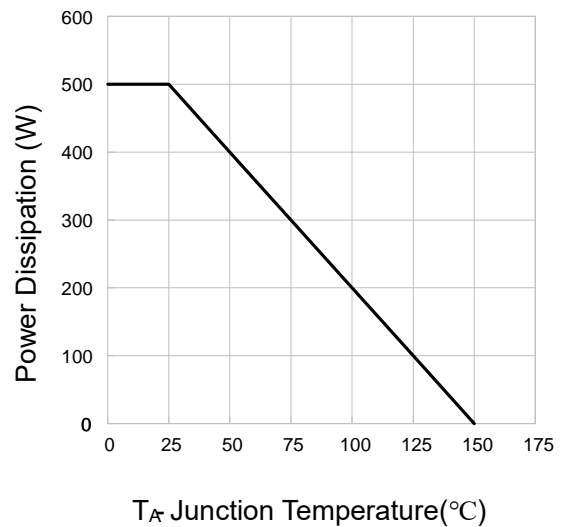
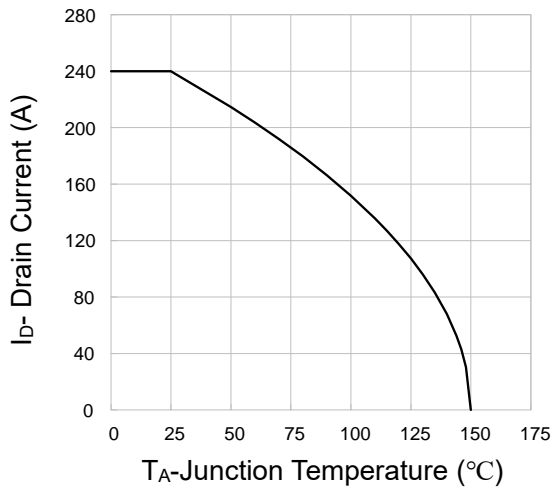
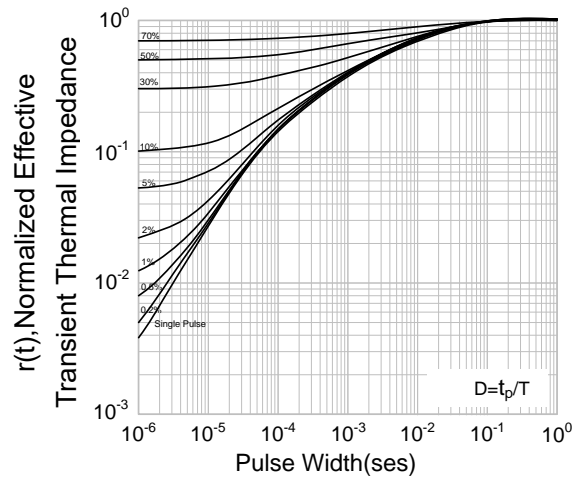


Figure 12 Power De-rating

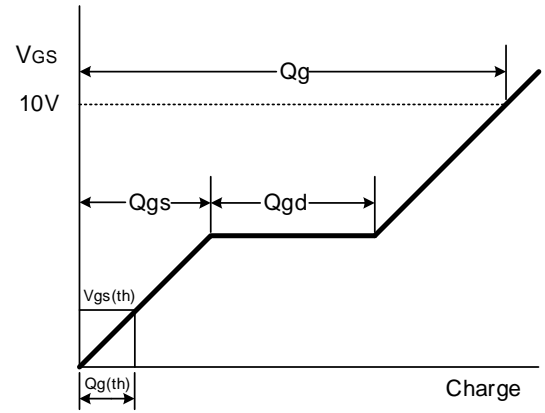
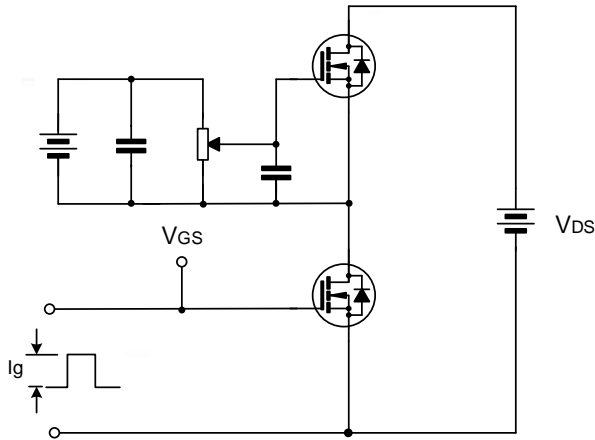


**Figure 13 Current De-rating**

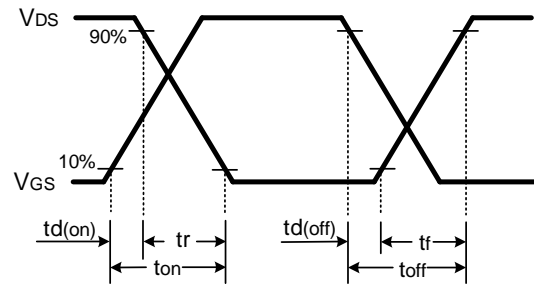
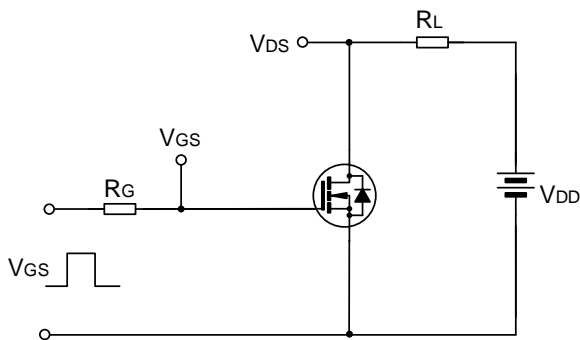


**Figure 14 Normalized Maximum Transient Thermal Impedance**

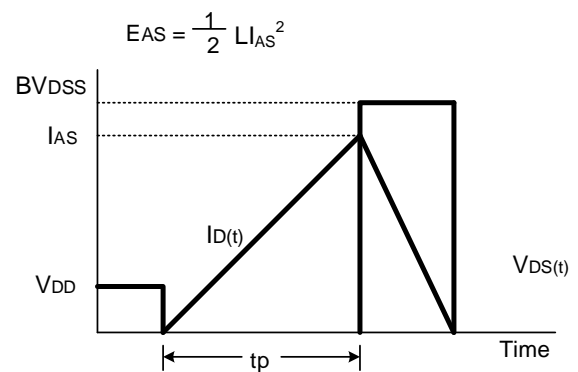
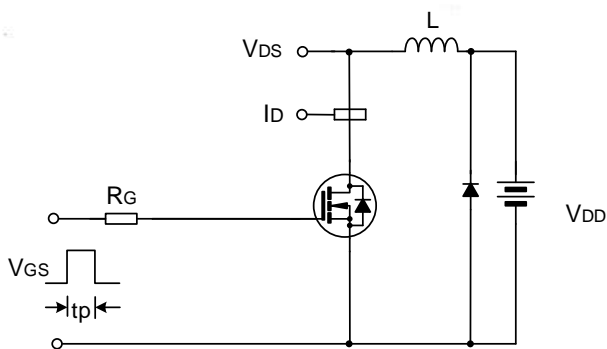
### Gate Charge Test Circuit & Waveform



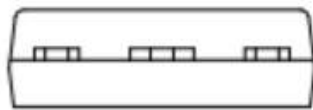
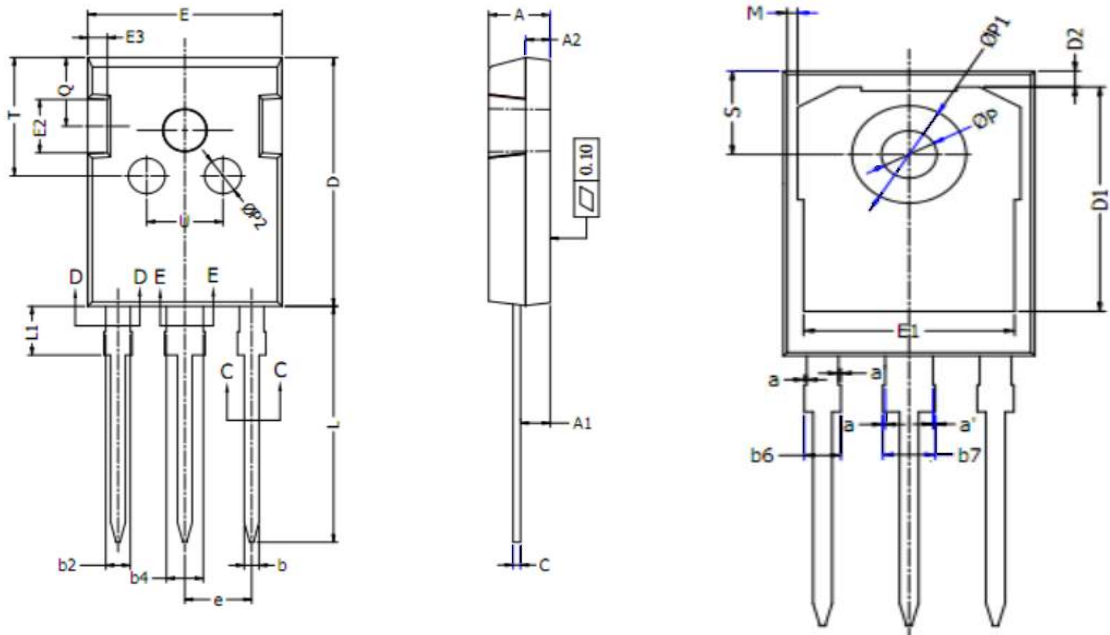
### Resistive Switching Test Circuit & Waveforms



### EAS Test Circuit & Waveforms



## TO-247 Package Information



SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0	---	0.15
a'	0	---	0.15
b	1.16	---	1.26
b1	1.15	1.2	1.22
b2	1.96	---	2.06
b3	1.95	2.00	2.02
b4	2.96	---	3.06
b5	2.96	3.00	3.02
b6	---	---	2.25
b7	---	---	3.25
c	0.59	---	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.40	4.50	4.60
E3	1.50	1.60	1.70
e	5.436 BSC		
L	19.80	19.92	20.10
L1	---	---	4.30
M	0.35	---	0.95
P	3.40	3.50	3.60
P1	7.00	---	7.40
P2	2.40	2.50	2.60
Q	5.60	---	6.00
S	6.05	6.15	6.25
T	9.80	---	10.20
U	6.00	---	6.40

## Customer Service

Sales and Service:

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