



## Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive

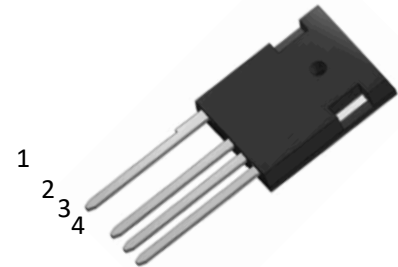
## Benefits

- Higher system efficiency
- Reduce cooling requirements
- Increase power density
- Increase system switching frequency

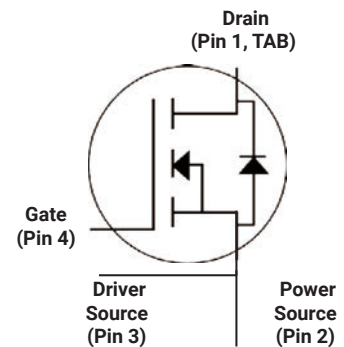
## Applications

- Renewable energy
- EV battery chargers
- High voltage DC/DC converters
- Switch Mode Power Supplies

Ordering Part Number	Package	Qty(PCS)
HAIMZH120R030M1T	TO-247-4L	30



TO-247-4L  
Package



## Maximum Ratings (T<sub>c</sub> = 25 °C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-source voltage	V <sub>DS</sub>	1200	V
Continuous drain current T <sub>c</sub> = 25°C T <sub>c</sub> = 100°C	I <sub>D</sub>	117 84	A
Pulsed drain current (T <sub>c</sub> = 25°C, t <sub>p</sub> limited by T <sub>jmax</sub> )	I <sub>D</sub> pulse	250	A
Gate-Source voltage	V <sub>GS</sub>	-4/+18	V
Gate-Source voltage (dynamic, Absolute maximum values)	V <sub>GSmax</sub>	-8/+22	V
Power dissipation (T <sub>c</sub> = 25°C)	P <sub>tot</sub>	556	W
Operating junction and storage temperature	T <sub>j</sub> , T <sub>stg</sub>	-55...+175	°C

- Example of acceptable V<sub>GS</sub> waveform





## Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal resistance, junction – case. Max	$R_{thJC}$	0.27	°C/W
Thermal resistance, junction – ambient. Max	$R_{thJA}$	40	

## Electrical Characteristic (at $T_j = 25^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV <sub>DSS</sub>	1200	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA
Gate threshold voltage	V <sub>GS(th)</sub>	2	-	4	V	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =25mA
Zero gate voltage drain current	I <sub>DSS</sub>	- -	1 10	50 -	μA	V <sub>DS</sub> =1200V,V <sub>GS</sub> =0V T <sub>j</sub> =25°C T <sub>j</sub> =175°C
Gate-source leakage current	I <sub>GSS</sub>	-		200	nA	V <sub>GS</sub> =18V,V <sub>DS</sub> =0V
Drain-source on-state resistance	R <sub>DS(on)</sub>	- -	33 50	49 -	m	V <sub>GS</sub> =20V, I <sub>D</sub> =80A, T <sub>j</sub> =25°C T <sub>j</sub> =175°C
Transconductance	g <sub>fs</sub>	-	27	-	S	V <sub>DS</sub> =20V,I <sub>D</sub> =40A
Dynamic Characteristic						
Input Capacitance	C <sub>iss</sub>	-	4508	-	pF	V <sub>DS</sub> = 1000V V <sub>GS</sub> = 0V T <sub>J</sub> = 25°C V <sub>AC</sub> = 25mV f = 1MHz
Output Capacitance	C <sub>oss</sub>	-	214	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	26	-		
Gate Total Charge	Q <sub>G</sub>	-	222	-	nC	V <sub>DS</sub> = 800V V <sub>GS</sub> = -0/18V I <sub>D</sub> = 80A
Gate-Source charge	Q <sub>gs</sub>	-	46.4	-		
Gate-Drain charge	Q <sub>gd</sub>	-	77.6	-		
Turn-On Switching Energy	E <sub>ON</sub>	-	2290	-	μJ	V <sub>DD</sub> = 800V V <sub>GS</sub> = -4/+18V I <sub>D</sub> = 80A R <sub>G</sub> = 5 L = 120uH
Turn-Off Switching Energy-	E <sub>OFF</sub>	-	630			
Turn-on delay time	t <sub>d(on)</sub>	-	49.2	-	ns	
Rise time	t <sub>r</sub>	-	14.2	-		
Turn-off delay time	t <sub>d(off)</sub>	-	21.7	-		
Fall time	t <sub>f</sub>	-	11.3	-		
Gate resistance	R <sub>G</sub>	-	0.9	-		V <sub>AC</sub> = 25mV, f=1MHz



### Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	$V_{SD}$		4.4		V	$V_{GS}=0V, I_{SD}=40A,$ $T_J=25^{\circ}C$
			3.9			$V_{GS}=0V, I_{SD}=40A,$ $T_J=175^{\circ}C$
Body Diode Reverse Recovery Time	$t_{rr}$	-	29.6	-	ns	$V_R = 400V,$ $I_D = 80A$ $di/dt = 1000A/\mu S$
Body Diode Reverse Recovery Charge	$Q_{rr}$	-	272	-	nC	



## Typical Performance Characteristics

Fig 1. Output Characteristic ( $T_J = -55^\circ\text{C}$ )

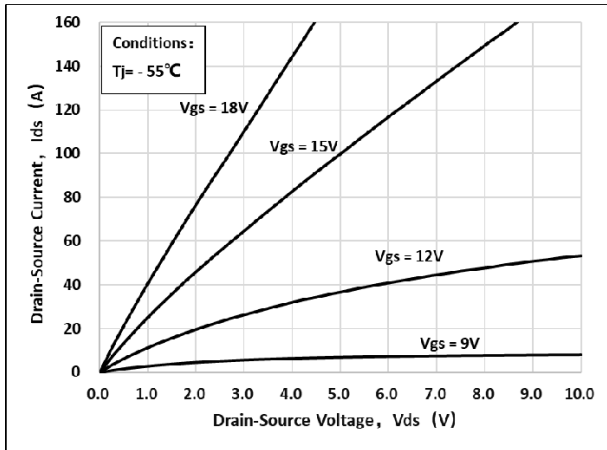


Fig 2. Output Characteristic ( $T_J = 25^\circ\text{C}$ )

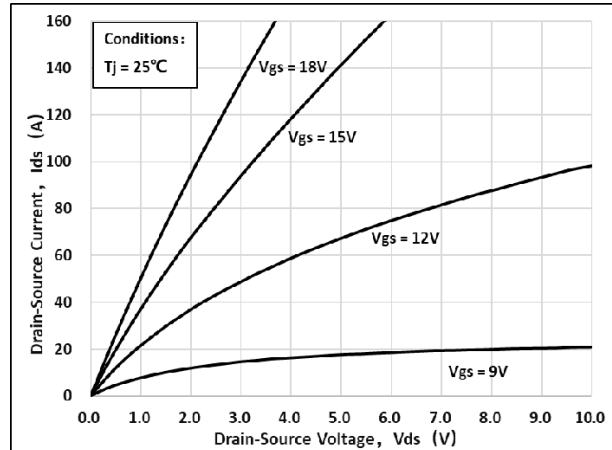


Fig 3. Output Characteristic ( $T_J = 175^\circ\text{C}$ )

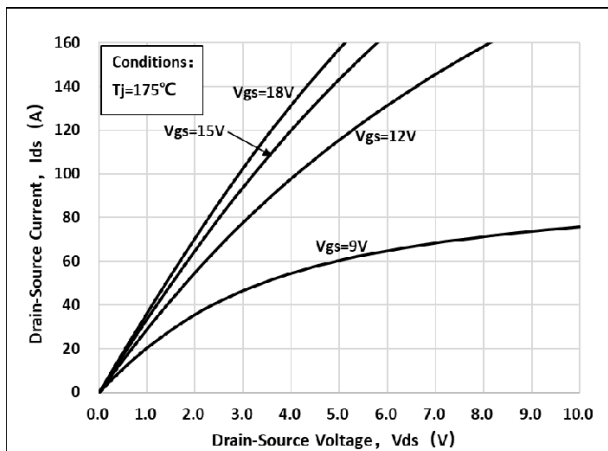


Fig 4:  $R_{DS(on)}$  Vs  $I_{DS}$  Characteristic

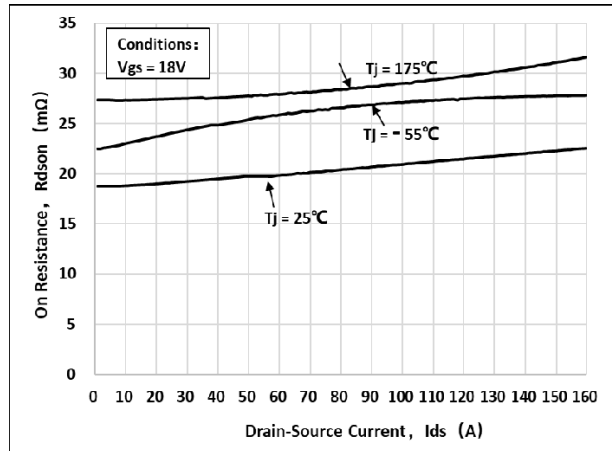


Fig 5:  $R_{DS(on)}$  vs. Temperature

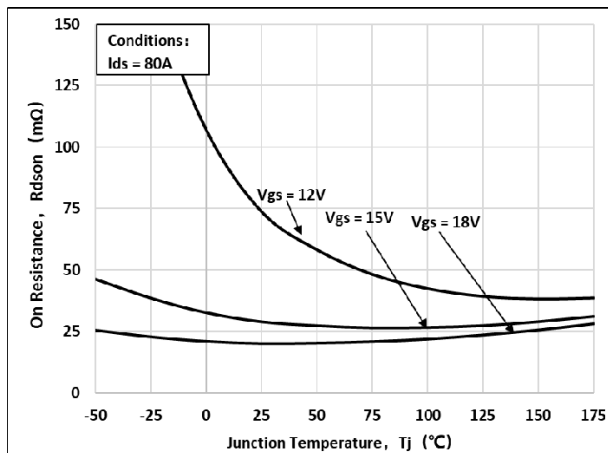


Fig 6: Transfer Characteristic

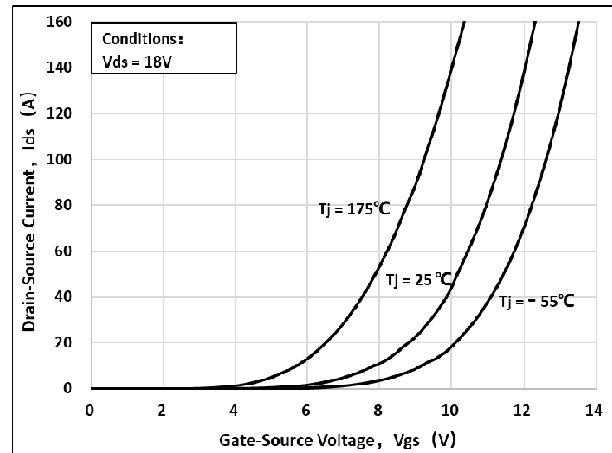




Fig 7: Body-diode Characteristic ( $T_J = -55^\circ\text{C}$ )

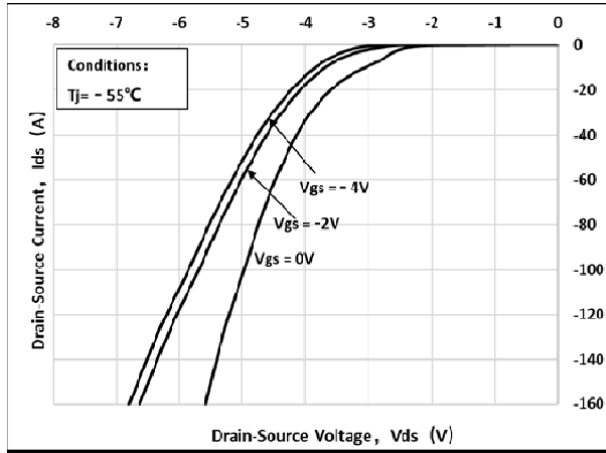


Fig 8: Body-diode Characteristic ( $T_J = 25^\circ\text{C}$ )

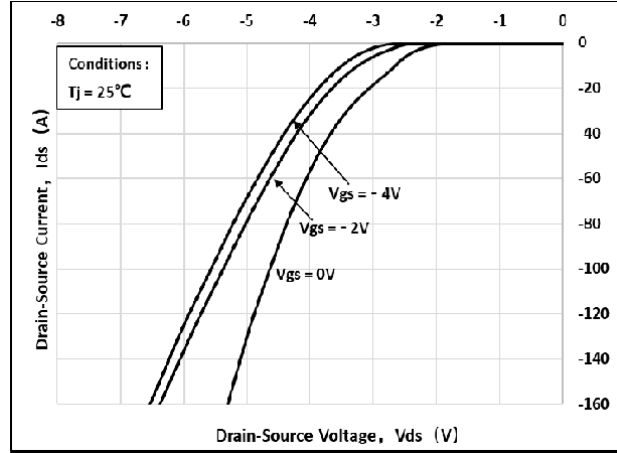


Fig 9: Body-diode Characteristic ( $T_J = 175^\circ\text{C}$ )

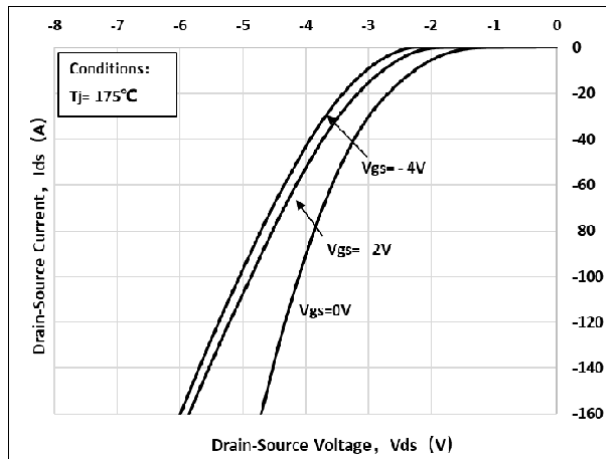


Fig 10:  $V_{th}$  Vs  $T_J$  Temperature Characteristic

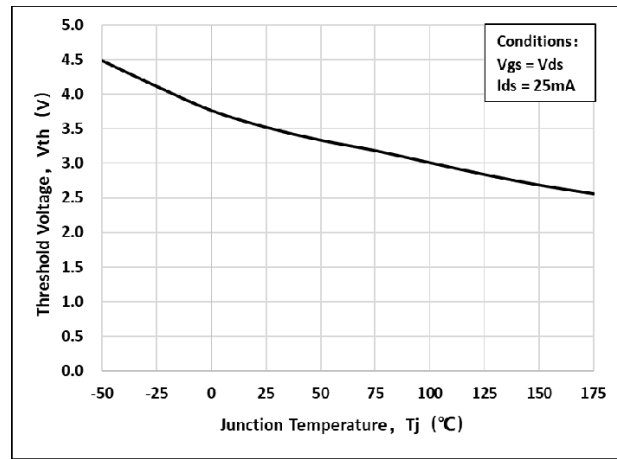


Fig 11: Gate Charge Characteristics

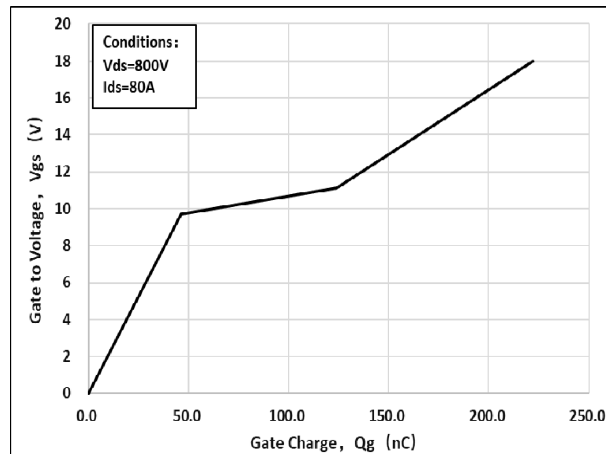


Fig 12: 3rd Quadrant Characteristic ( $T_J = -55^\circ\text{C}$ )

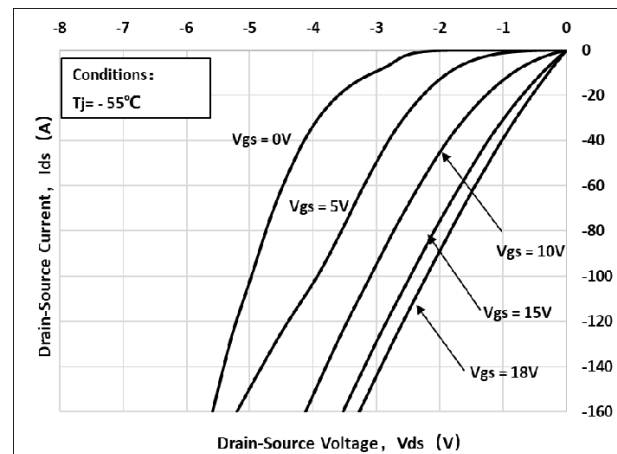




Fig 13: 3rd Quadrant Characteristic( $T_J=25^{\circ}\text{C}$ )

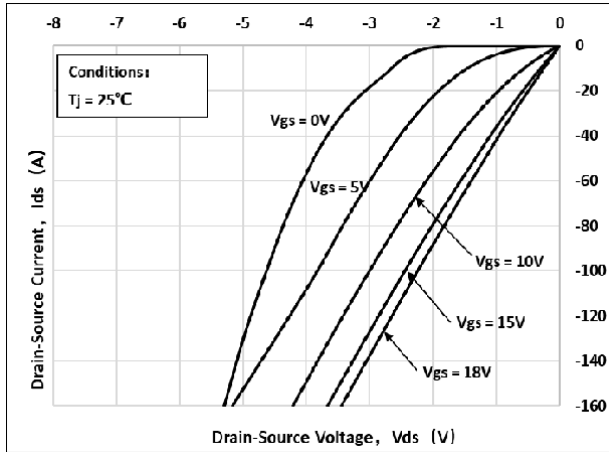


Fig 14: 3rd Quadrant Characteristic( $T_J=175^{\circ}\text{C}$ )

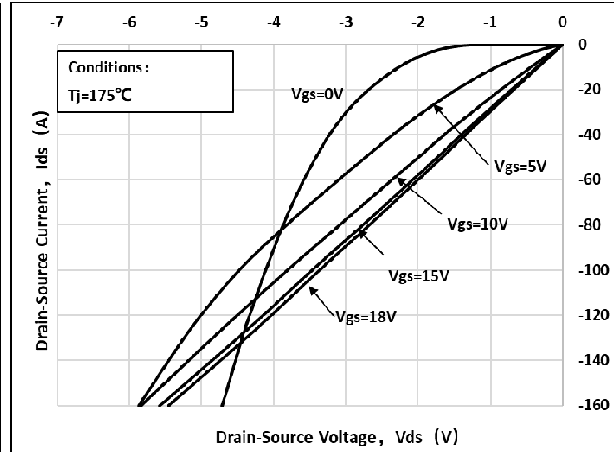


Fig 15: Capacitance Characteristic

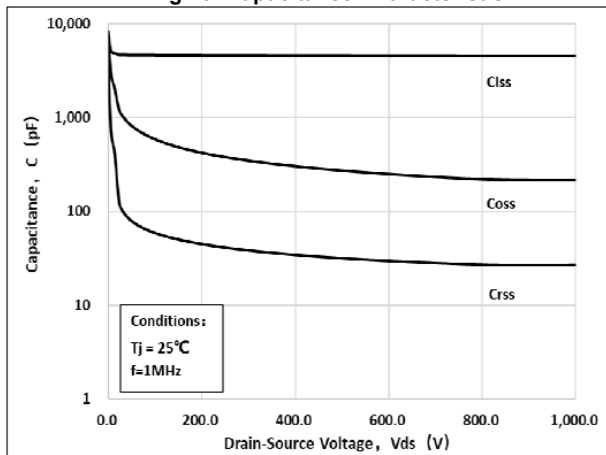


Fig 16: Safe Operating Area

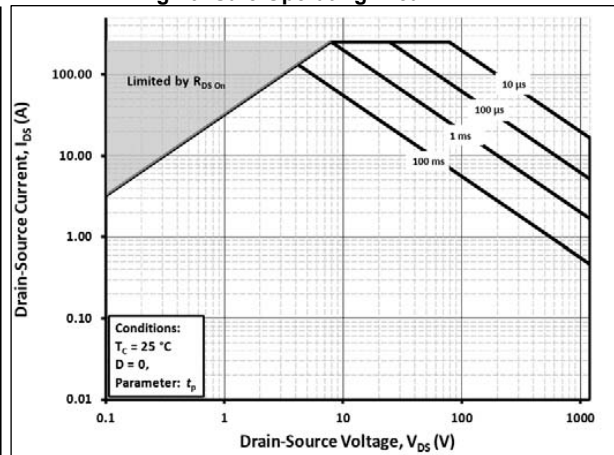
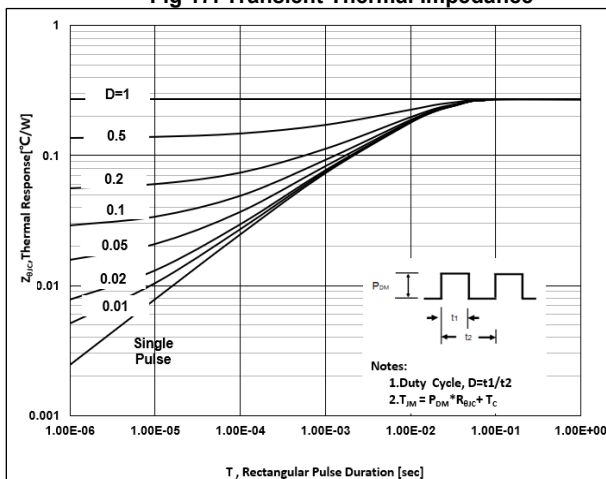


Fig 17: Transient Thermal Impedance





## Test Circuit Schematic

Figure A. Definition of switching times

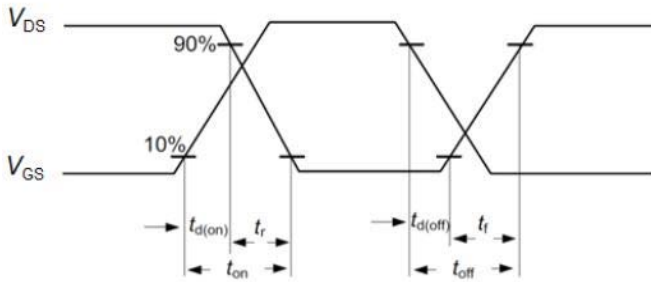


Figure B. Dynamic test circuit

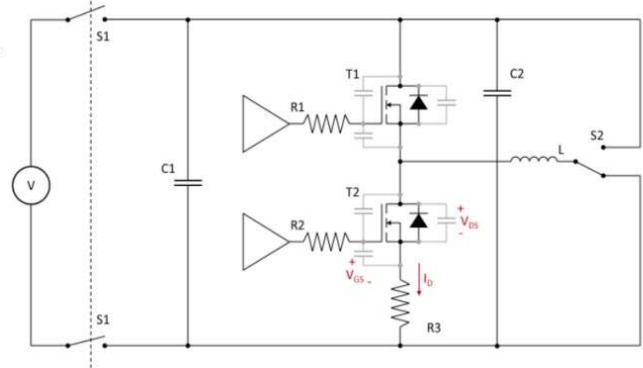


Figure C. Definition of body diodeswitching characteristics

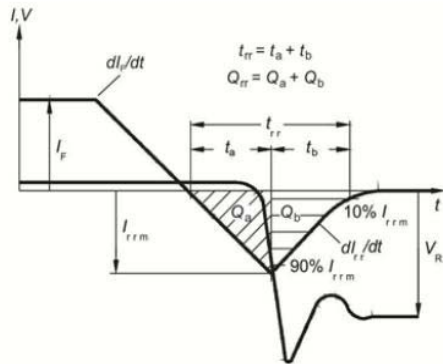
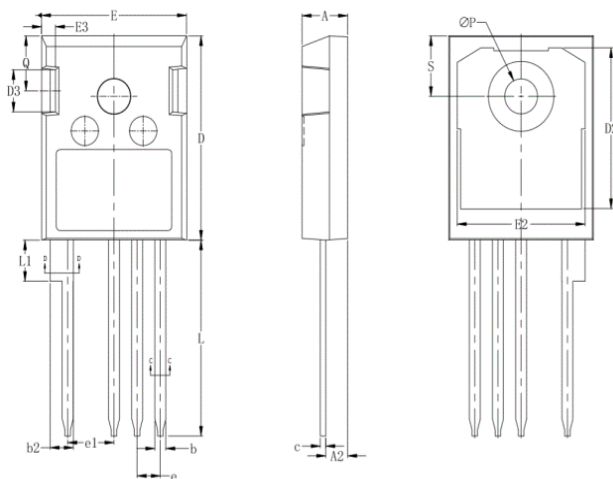


Figure C. Definition of diode switching characteristics



## Package Dimensions

Package TO-247-4L



Items	Values(mm)	
	MIN	MAX
A	4.8	5.2
A2	2.2	2.6
b	1.05	1.4
b2	2.4	2.75
c	0.5	0.75
D	20	21.5
D2	15.5	17.2
D3	4	5
E	15.5	16.1
E2	13	15
E3	1	2
e	2.54 BSC.	
e1	5.08 BSC.	
L	19	21
L1	4	4.45
ΦP	3.5	3.7
Q	5.4	5.9
S	5.9	6.4





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