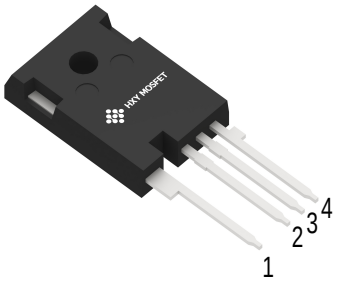
HAIMZH120R030M1T

SiC Power MOSFET N-Channel Enhancement Mode

Features

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



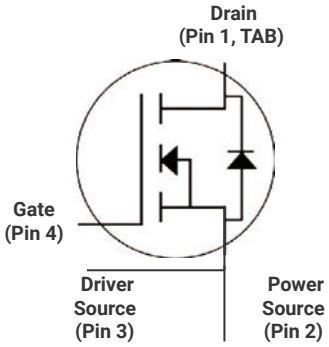
TO-247H-4L

Benefits

- Higher system effciency
- 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

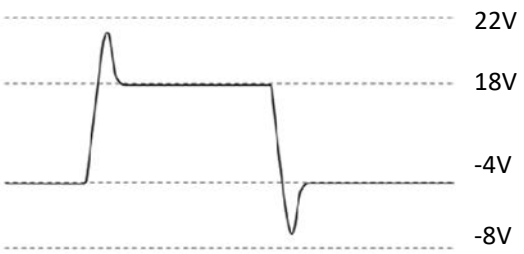


Ordering Part Number	Package	Qty(PCS)
HAIMZH120R030M1T	TO-247H-4L	30

Maximum Ratings (T_C = 25 °C unless otherwise specifed)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1200	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 117 84	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	250	A
Gate-Source voltage	V_{GS}	-4/+18	V
Gate-Source voltage（dynamic,Absolute maximum values）	V_{GSmax}	-8/+22	V
Power dissipation (T_C = 25°C)	P_{tot}	556	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

- Example of acceptable V_{GS} 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 Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	1200	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2	-	4	V	V_{DS}=V_{GS},I_D=25mA
Zero gate voltage drain current	I_{DSS}	- -	1 10	50 -	μA	V_{DS}=1200V,V_{GS}=0V T_j=25°C T_j=175°C
Gate-source leakage current	I_{GSS}	-		200	nA	V_{GS}=18V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	- -	33 50	49 -	mΩ	V_{GS}=20V, I_D=80A, T_j=25°C T_j=175°C
Transconductance	g_{fs}	-	27	-	S	V_{DS}=20V,I_D=40A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	4508	-	pF	V_{DS} = 1000V V_{GS} = 0V T_J = 25°C V_{AC} = 25mV f = 1MHz
Output Capacitance	C_{oss}	-	214	-		
Reverse Transfer Capacitance	C_{rss}	-	26	-		
Gate Total Charge	Q_G	-	222	-	nC	V_{DS} = 800V V_{GS} = -0/18V I_D = 80A
Gate-Source charge	Q_{gs}	-	46.4	-		
Gate-Drain charge	Q_{gd}	-	77.6	-		
Turn-On Switching Energy	E_{ON}	-	2290	-	μJ	V_{DD} = 800V V_{GS} = -4/+18V I_D = 80A R_G = 5Ω L = 120uH
Turn-Off Switching Energy-	E_{OFF}	-	630			
Turn-on delay time	$t_{d(on)}$	-	49.2	-	ns	
Rise time	t_r	-	14.2	-		
Turn-off delay time	$t_{d(off)}$	-	21.7	-		
Fall time	t_f	-	11.3	-		
Gate resistance	R_G	-	0.9	-	Ω	V_{AC} = 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°C
			3.9			V_{GS}=0V,I_{SD}=40A, T_J=175°C
Body Diode Reverse Recovery Time	t_{rr}	-	29.6	-	ns	V_R = 400V, I_D = 80A di/dt = 1000A/μS
Body Diode Reverse Recovery Charge	Q_{rr}	-	272	-	nC	

Typical Performance Characteristics

Fig 1. Output Characteristic (T_J=-55℃)

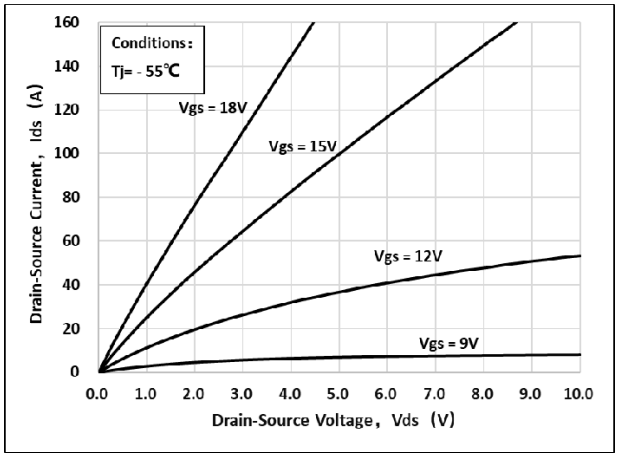


Fig 2. Output Characteristic (T_J=25℃)

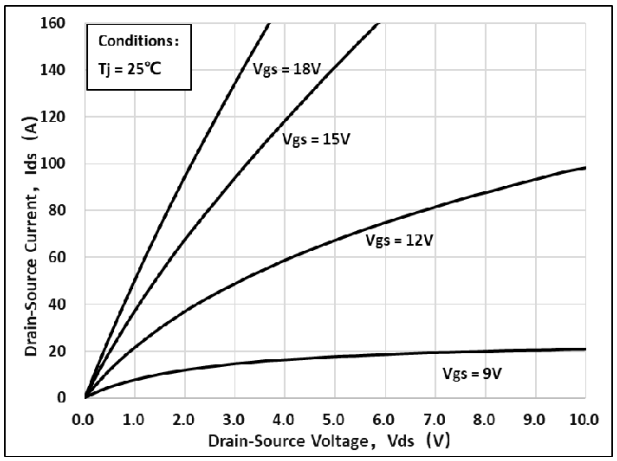


Fig 3. Output Characteristic (T_J=175℃)

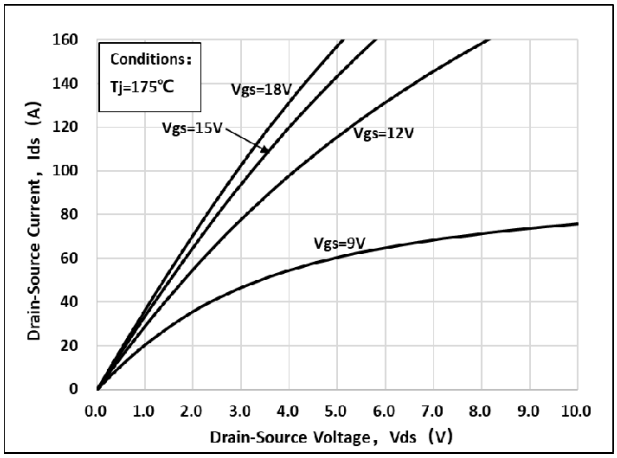


Fig 4: Rdson Vs Ids Characteristic

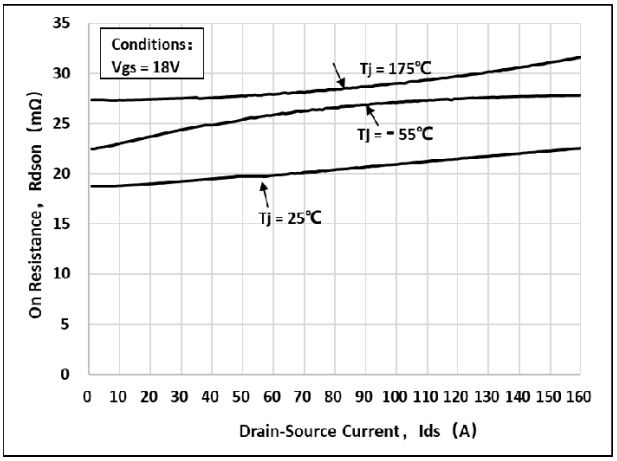


Fig 5: Rds(on) vs. Temperature

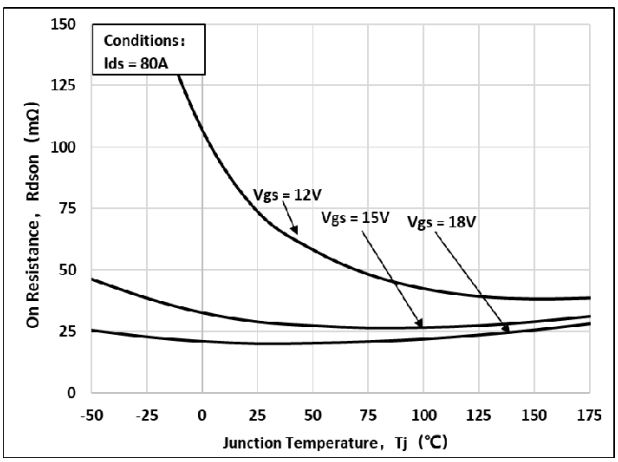


Fig 6: Transfer Characteristic

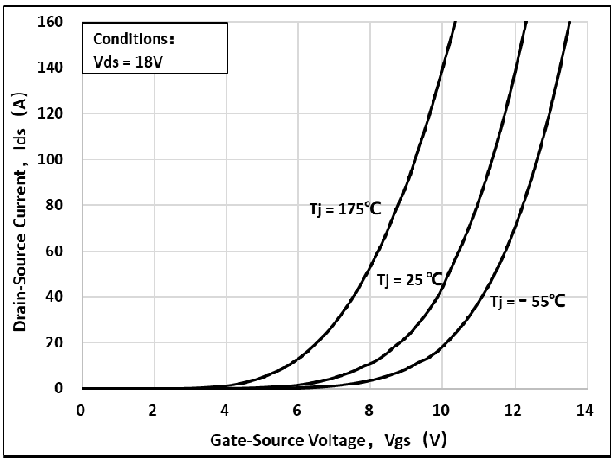


Fig 7: Body-diode Characteristic (T_J=-55℃)

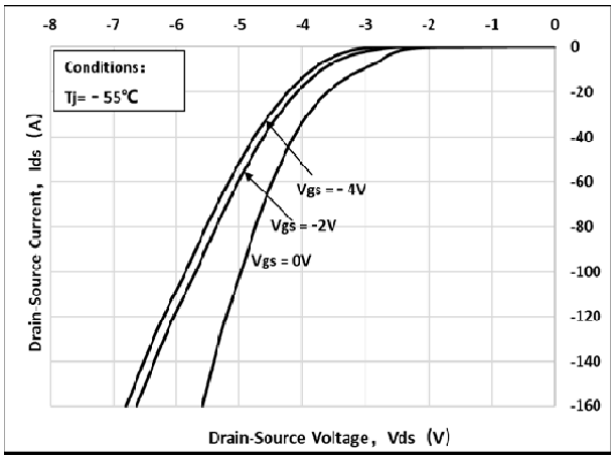


Fig 8: Body-diode Characteristic (T_J=25℃)

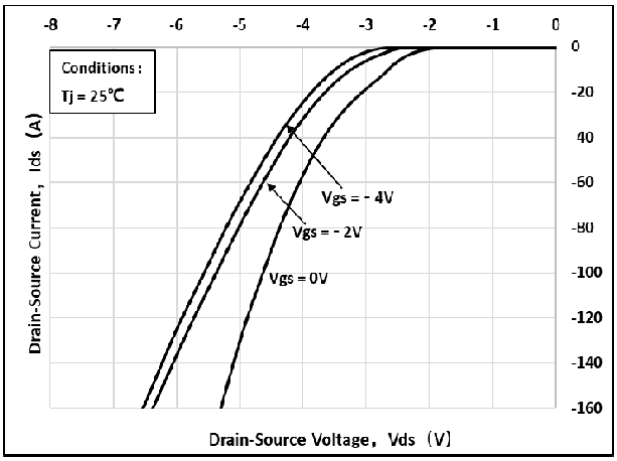


Fig 9: Body-diode Characteristic (T_J=175℃)

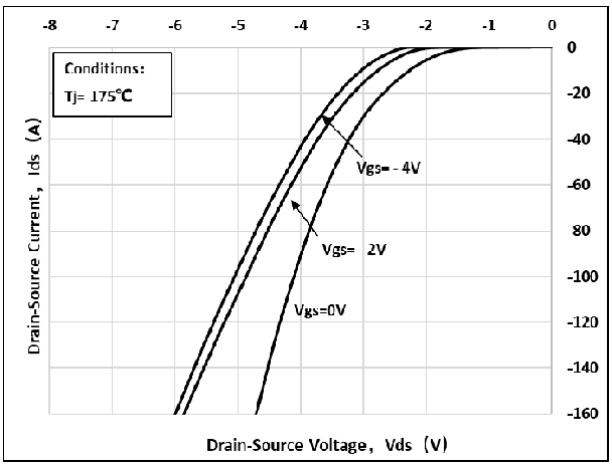


Fig 10: V_{TH} Vs T_J Temperature Characteristic

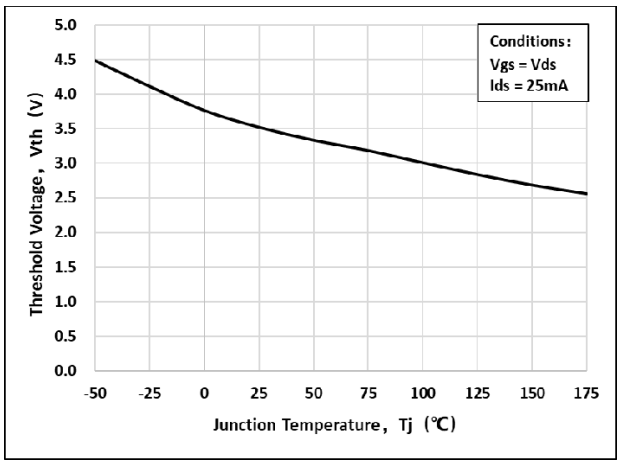


Fig 11: Gate Charge Characteristics

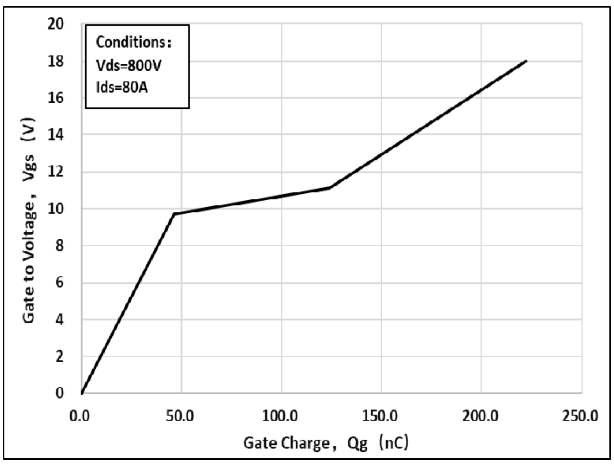


Fig 12: 3rd Quadrant Characteristic(T_J=-55℃)

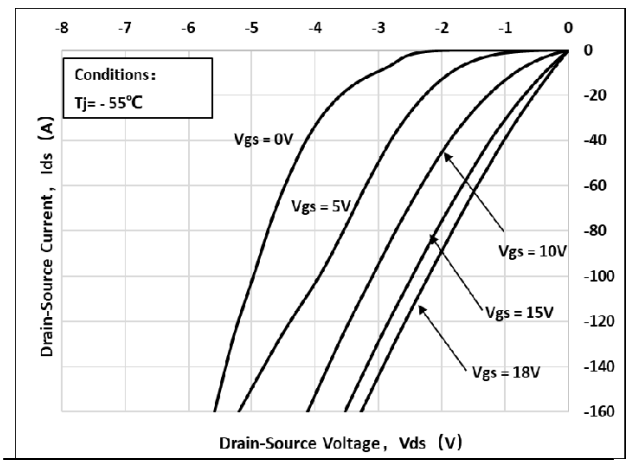


Fig 13: 3rd Quadrant Characteristic(T_J=25℃)

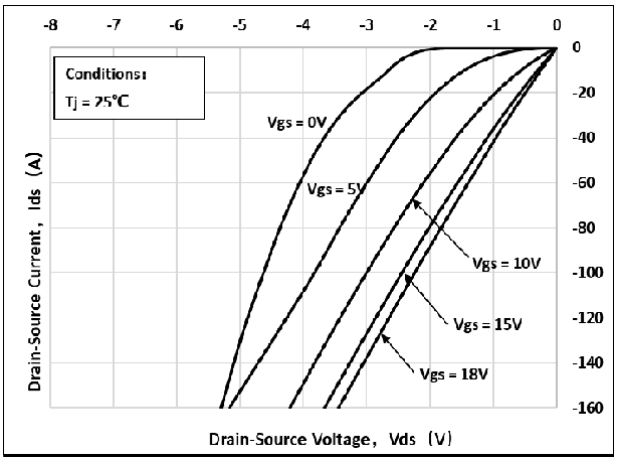


Fig 14: 3rd Quadrant Characteristic(T_J=175℃)

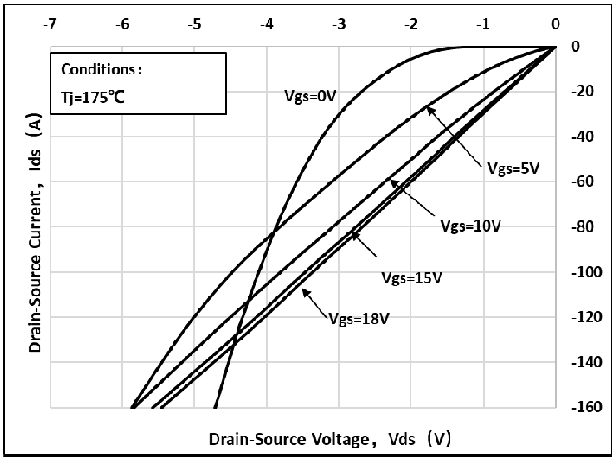


Fig 15: Capacitance Characteristic

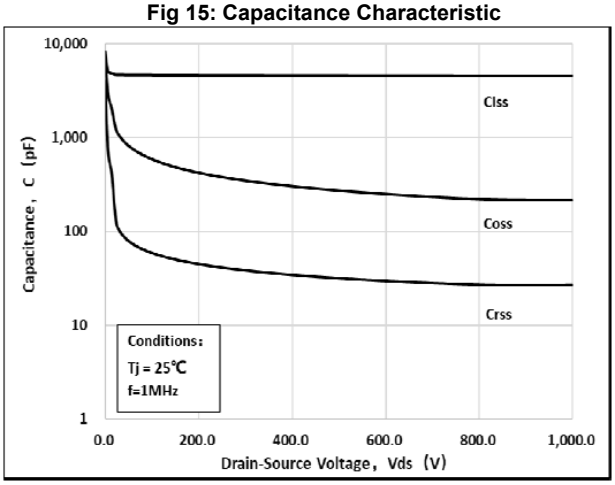


Fig 16: Safe Operating Area

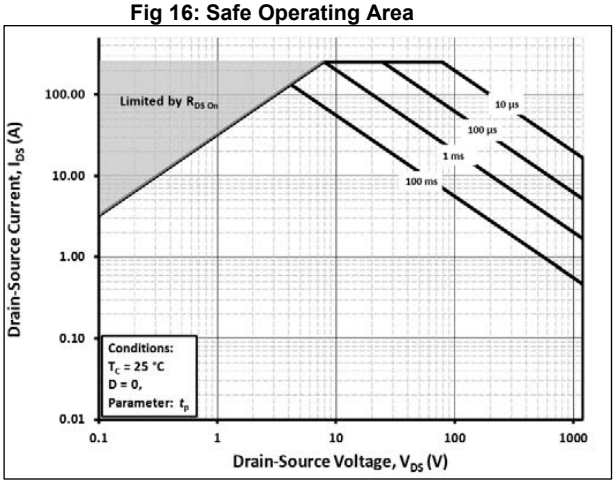
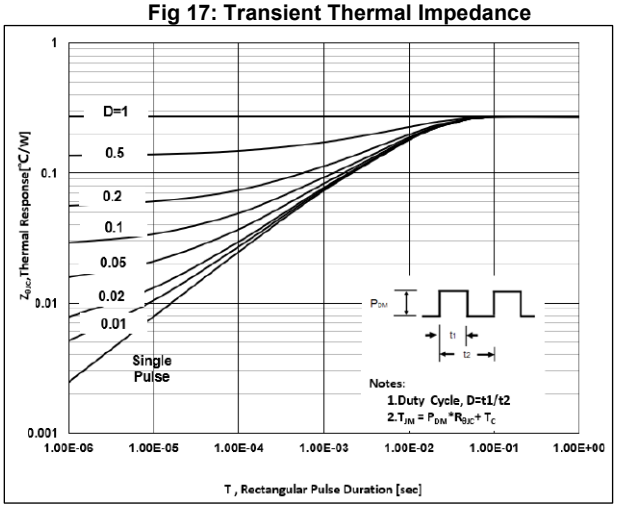


Fig 17: Transient Thermal Impedance



Test Circuit Schematic

Figure A. Definition of switching times

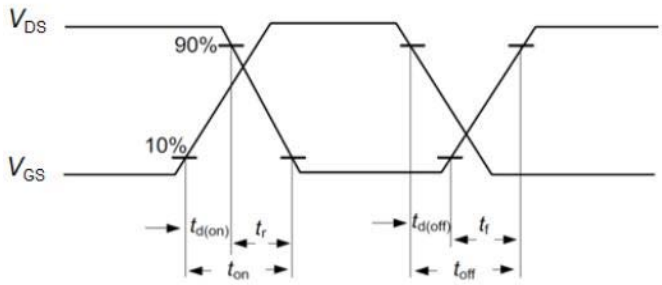


Figure B. Dynamic test circuit

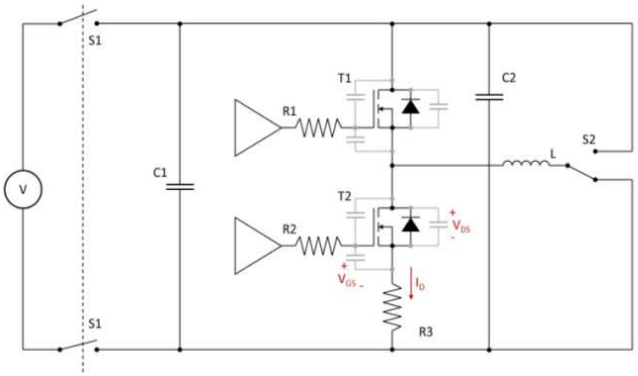


Figure C. Definition of body diodeswitching characteristics

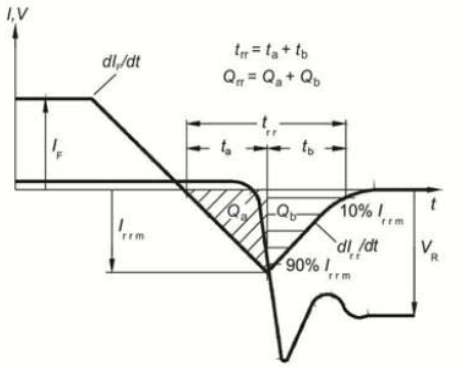
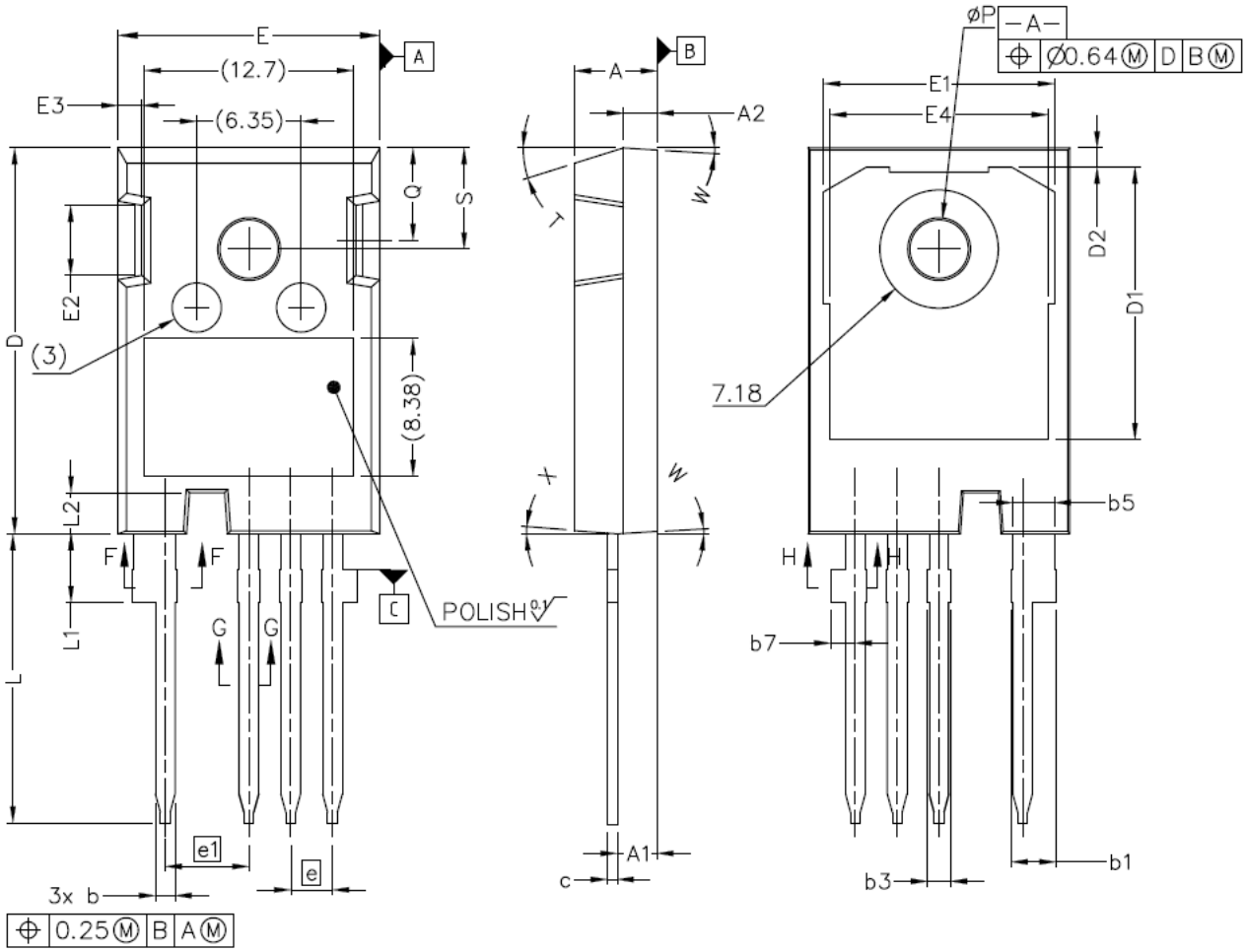
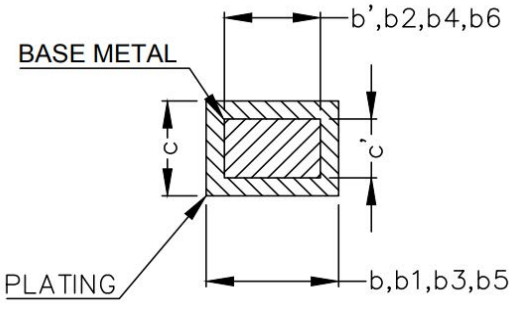


Figure C. **Definition of diode switching characteristics**

Package Dimensions

Package TO-247H-4L





SECTION "F-F", "G-G" AND "H-H"
SCALE: NONE

Package Dimensions

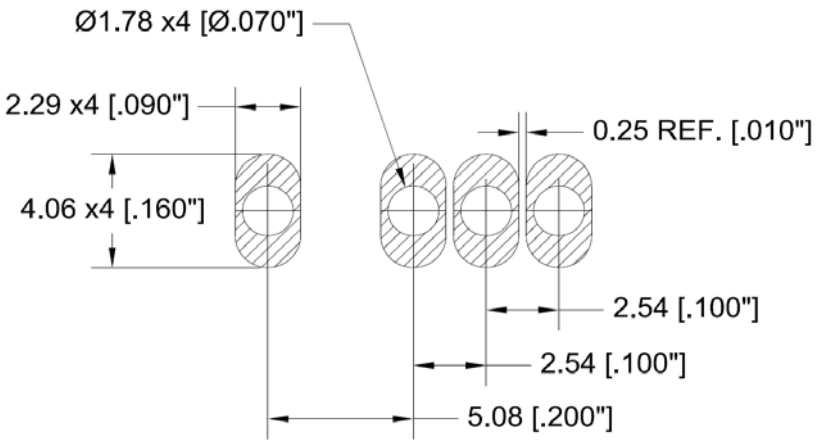
Package TO-247H-4L

NOTE ;

1. ALL METAL SURFACES: TIN PLATED, EXCEPT AREA OF CUT
2. DIMENSIONING & TOLERANCEING CONFIRM TO ASME Y14.5M-1994.
3. ALL DIMENSIONS ARE IN MILLIMETERS.ANGLES ARE IN DEGREES.
4. 'N' IS THE NUMBER OF TERMINAL POSITIONS

SYM	MILLIMETERS	
	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b`	1.07	1.28
b	1.07	1.33
b1	2.39	2.94
b2	2.39	2.84
b3	1.07	1.60
b4	1.07	1.50
b5	2.39	2.69
b6	2.39	2.64
b7	1.30	1.70
c`	0.55	0.65
c	0.55	0.68
D	23.30	23.60
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.13

SYM	MILLIMETERS	
	MIN	MAX
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	2.54 BSC	
e1	5.08 BSC	
N*	4	
L	17.31	17.82
L1	3.97	4.37
L2	2.35	2.65
Ø P	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
T	17.5° REF.	
W	3.5° REF.	
X	4° REF.	



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