Features

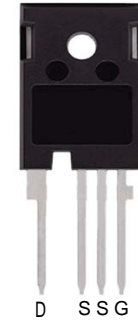·High Blocking Voltage with Low On-Resistance
·High Speed Switching with Low Capacitances
·Avalanche Ruggednes

Applications
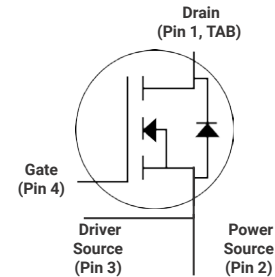
·Solar Inverters
·Switch Mode Power Supplies
·High Voltage DC-DC Converters
·Battery Chargers

D　S S G
TO-247-4L
Package

Drain
(Pin 1, TAB)

Gate
(Pin 4)

Driver
Source
(Pin 3)

Power
Source
(Pin 2)

Ordering Part Number	Package	Marking
UF3C065040K4S	TO-247-4L	U306504BG

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

Symbol	Parameter	Value	Unit	Test Conditions
V_{DS}	Drain - Source Voltage	650	V	V_{GS} = 0 V, I_D = 100 μA
V_{GSmax}	Gate - Source Voltage (dynamic)	-8/+22	V	AC (f >1 Hz)
V_{GSop}	Gate - Source Voltage (static)	-4/+18	V	Static
I_D	Continuous Drain Current	49	A	V_{GS} = 18 V, T_C = 25°C
		35		V_{GS} = 18 V, T_C = 100°C
$I_{D(pulse)}$	Pulsed Drain Current	123	A	Pulse width t_P limited by T_{jmax}
P_{tot}	Power Dissipation	241	W	T_C=25°C
T_J , T_{stg}	Operating Junction and Storage Temperature	-40 to +175	°C	

●Example of acceptable V_{GS} waveform

25V
20V
-5V
-10V

Thermal Characteristics

Symbol	Parameter	Value	Unit	Test Conditions
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.62	°C/W	
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	40		

Electrical Characteristics (T$_C$ = 25°C unless otherwise specified)

Parameter	Symbol	Value min.	Value typ.	Value max.	Unit	Test Condition
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	650	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2	-	4	V	V_{DS}=V_{GS},I_D=4.8mA
Zero gate voltage drain current	I_{DSS}	-	1	100	µA	V_{DS}=650V,V_{GS}=0V T_j=25°C
		-	10	-		T_j=175°C
Gate-source leakage current	I_{GSS}	-		250	nA	V_{GS}=18V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	45	59	mΩ	V_{GS}=18V, I_D=17.6A, T_j=25°C
			55	-		T_j=175°C
Transconductance	g_{fs}	-	6.4	-	S	V_{DS}=20V,I_D=17.6A
Dynamic Characteristics						
Input Capacitance	C_{iss}	-	1509	-	pF	V_{DS} = 650V V_{GS} = 0V T_J = 25°C V_{AC} = 25mV f = 1MHz
Output Capacitance	C_{oss}	-	130	-		
Reverse Transfer Capacitance	C_{rss}	-	16	-		
Gate Total Charge	Q_G	-	69.9	-	nC	V_{DS} = 400V V_{GS} = 0/18V I_D = 17.6A
Gate-Source charge	Q_{gs}	-	15.4	-		
Gate-Drain charge	Q_{gd}	-	28	-		
Turn-On Switching Energy	E_{ON}	-	87.4	-	µJ	V_{DD} = 400V V_{GS} = -4/+18V I_D = 17.6A R_G = 5Ω L = 100uH
Turn-Off Switching Energy	E_{OFF}	-	24	-		
Turn-on delay time	$t_{d(on)}$	-	10.56	-	ns	
Rise time	t_r	-	4.16	-		
Turn-off delay time	$t_{d(off)}$	-	19.52	-		
Fall time	t_f	-	6.4	-		
Gate resistance	R_G	-	0.9	-	Ω	V_{AC} = 25mV, f=1MHz

Body Diode Characteristics

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}		3.2		V	$V_{GS}=0V, I_{SD}=8.8A,$ $T_J=25°C$
			2.7			$V_{GS}=0V, I_{SD}=8.8A,$ $T_J=175°C$
Continuous Diode Forward Current	I_S		48		A	$V_{GS}=-4V, T_C=25°C$
Body Diode Reverse Recovery Time	t_{rr}	-	20.4	-	ns	$V_R = 400V,$ $I_D = 17.6A$
Body Diode Reverse Recovery Charge	Q_{rr}	-	114.1	-	nC	di/dt = 1000A/µS

Typical Performance Characteristics

Fig 1. Output Characteristic (T$_J$=-55℃)
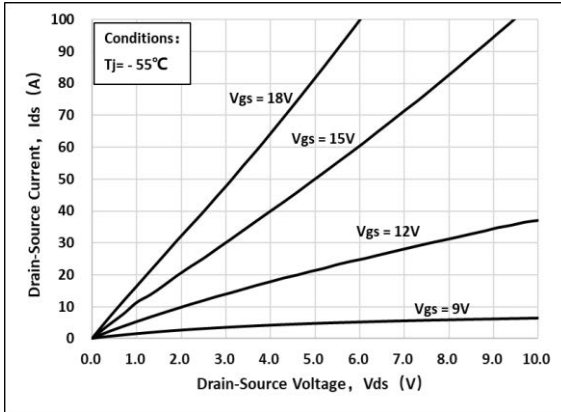
Fig 2. Output Characteristic (T$_J$=25℃)
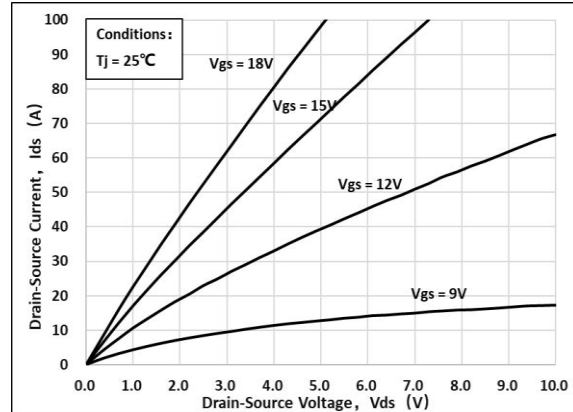
Fig 3. Output Characteristic (T$_J$=175℃)
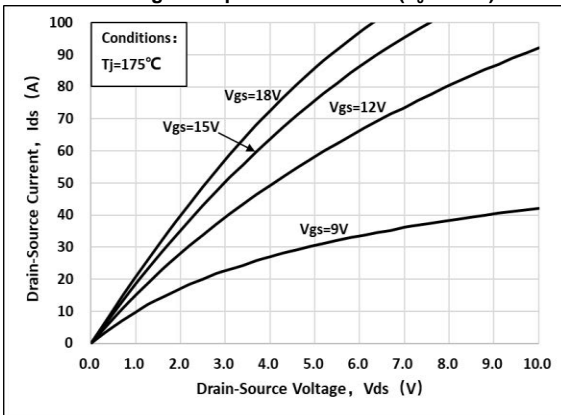
Fig 4: Rdson Vs Ids Characteristic
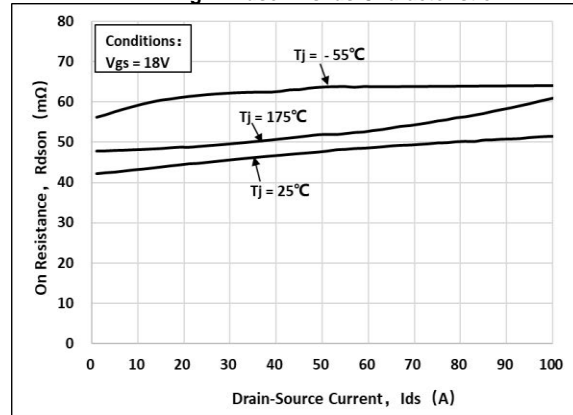
Fig 5: Rds(on) vs. Temperature
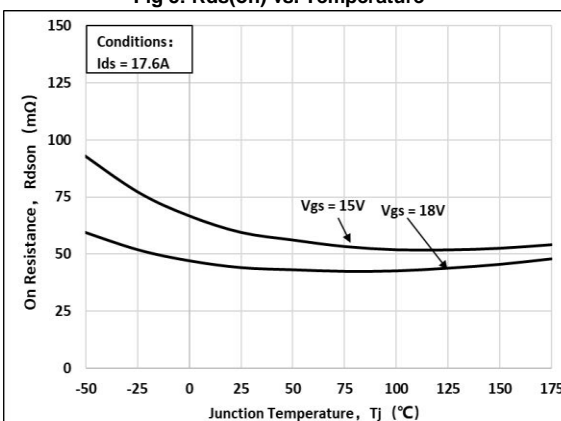
Fig 6: Transfer Characteristic
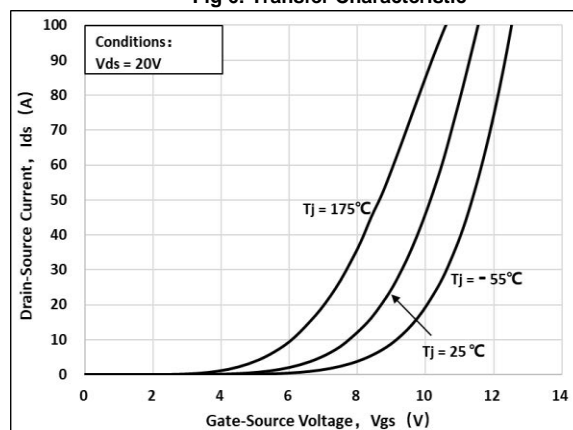
Fig 7: Body-diode Characteristic (T$_J$=-55℃)
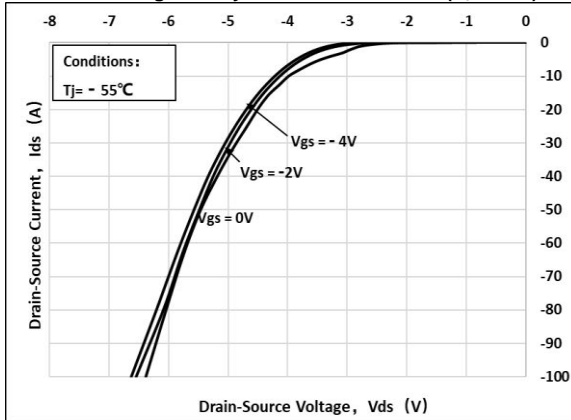
Fig 8: Body-diode Characteristic (T$_J$=25℃)
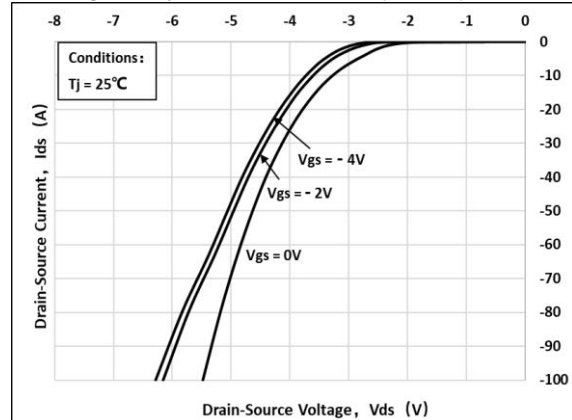
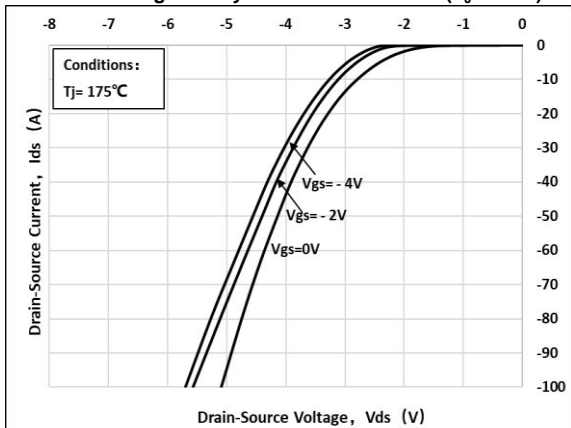

Fig 9: Body-diode Characteristic (T$_J$=175℃)

Fig 10: V$_{TH}$ Vs T$_J$ Temperature Characteristic

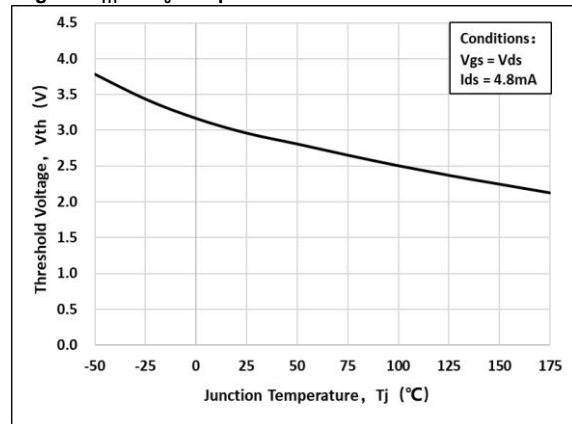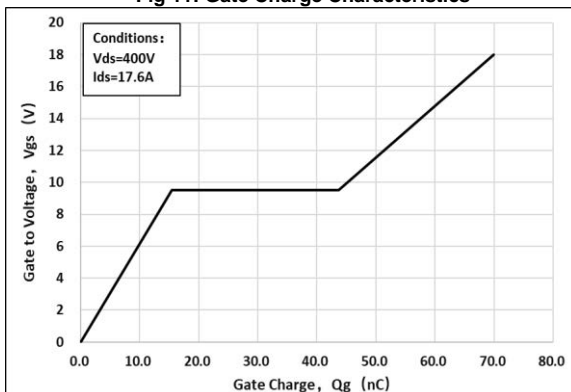**Fig 11: Gate Charge Characteristics**

Fig 12: 3rd Quadrant Characteristic(T$_J$=-55℃)
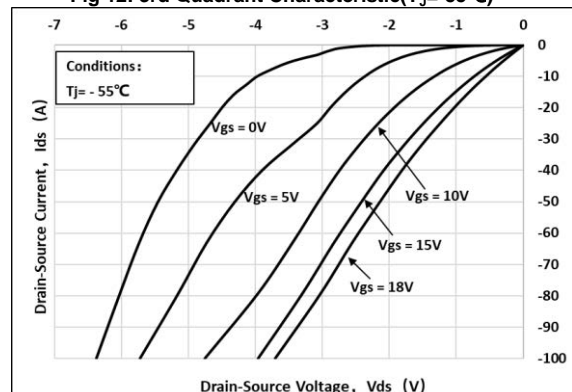
Fig 13: 3rd Quadrant Characteristic(T$_J$=25℃)

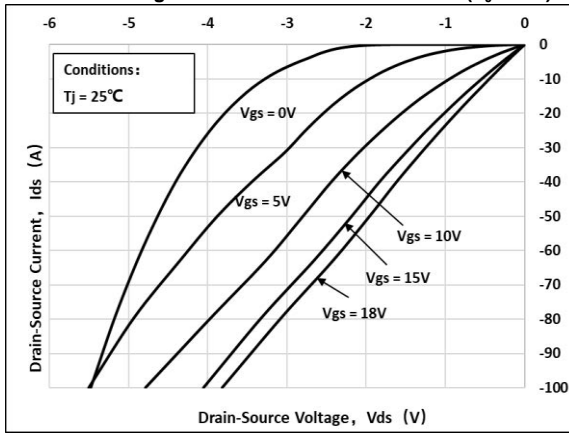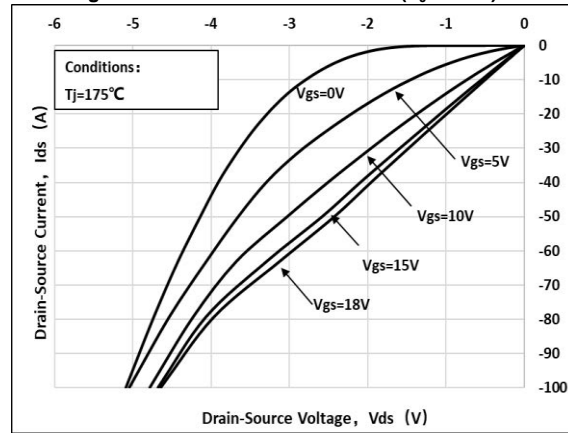**Fig 14: 3rd Quadrant Characteristic(T$_J$=175℃)**

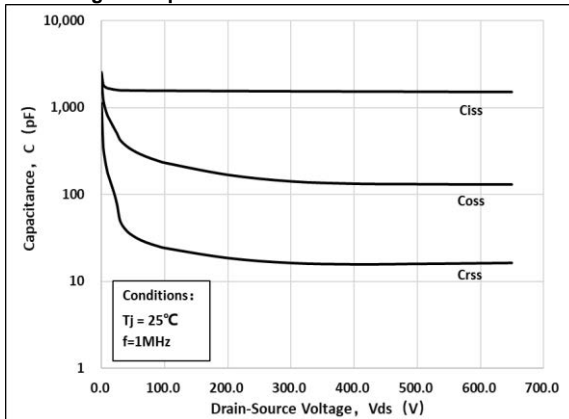**Fig 15: Capacitance Characteristic**
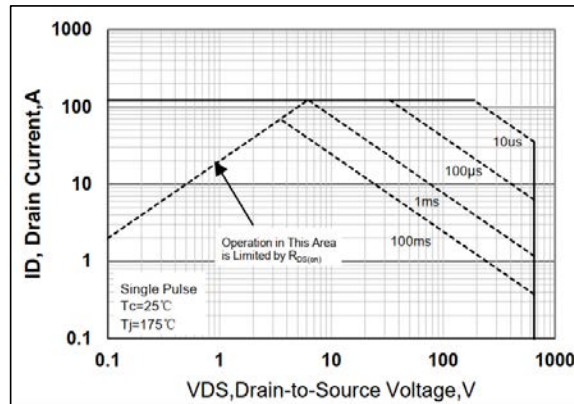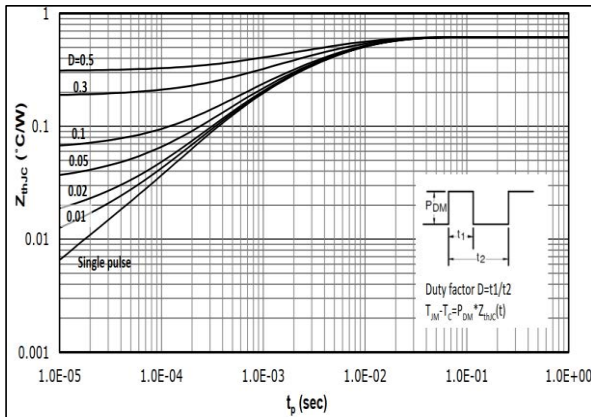

Fig 16: Safe Operating Area

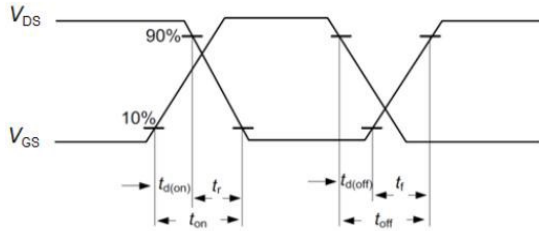**Fig 17: Transient Thermal Impedance**

Test Circuit & Waveform

Figure A. Definition of switching times
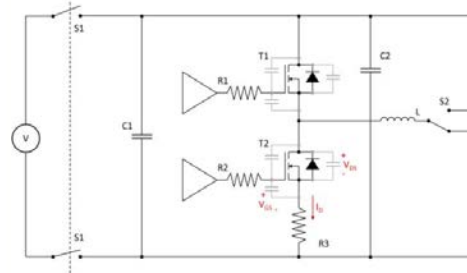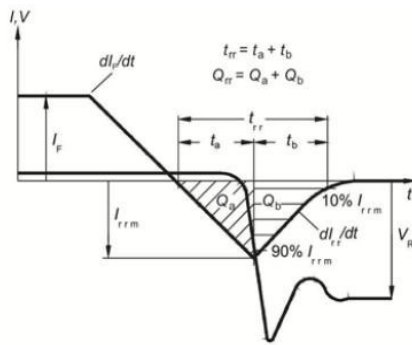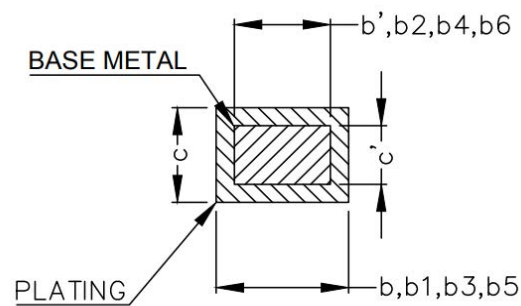

Figure B. Dynamic test circuit

Figure C. Definition of body diodeswitching characteristics

Package Dimensions

Package TO247-4L

BASE METAL

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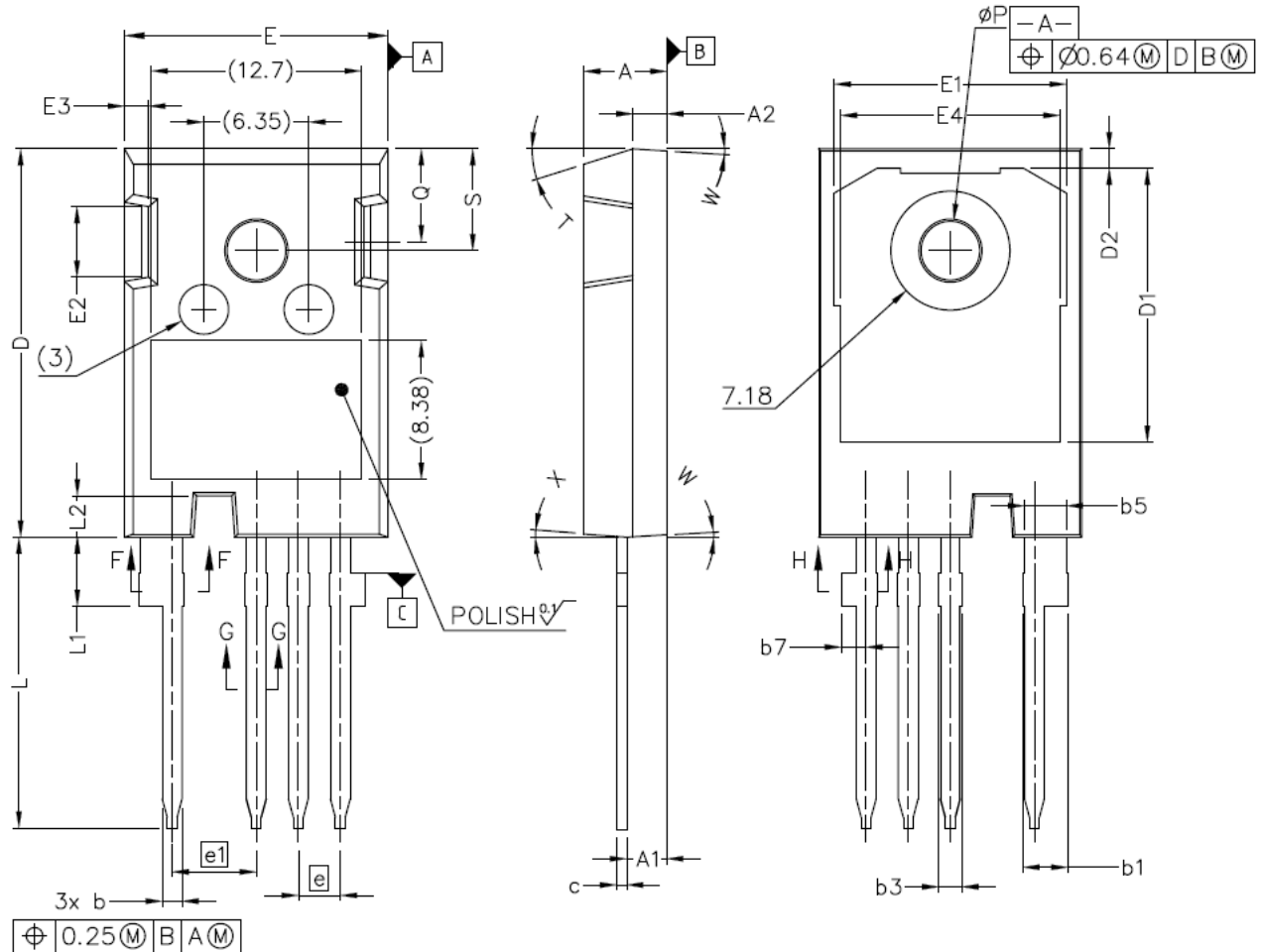
SECTION "F-F", "G-G" AND "H-H"
SCALE: NONE

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.	

Ø1.78 x4 [Ø.070"]
2.29 x4 [.090"]
0.25 REF. [.010"]
4.06 x4 [.160"]
2.54 [.100"]
2.54 [.100"]
5.08 [.200"]
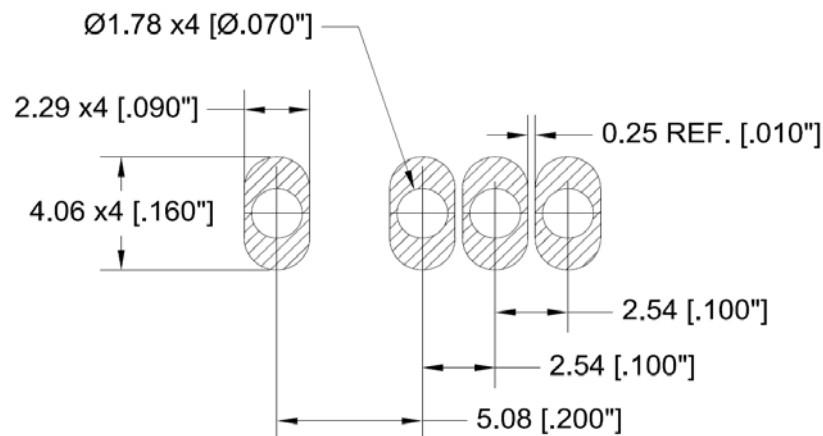
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