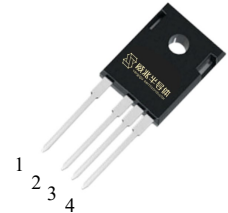


## Features

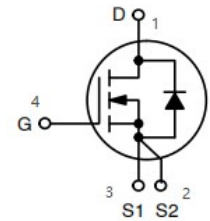
- High speed switching with low on-resistance
- Very low switching losses
- Controllable dv/dt
- Avalanche Ruggedness and 100% Avalanche test
- Robust body diode

$V_{DS}$	1200	V
$R_{DS(on),TYP}@25^{\circ}C$	80	mΩ
$I_D$	36	A

### TO-247-4L



Part ID	Package Type	Marking	Packing
HCCZ120R080H1	TO-247-4L	120R080H1	30pcs/Pipe



## Maximum ratings, at $T_A = 25^{\circ}C$ , unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		1200	V
$V_{GS_{MAX}}$	Gate-Source voltage		-10~+25	V
$V_{GS_{OP}}$	Gate-Source voltage		-5~+20	V
$I_D$	Continuous drain current @ $V_{GS}=20V$ (Silicon limited)	$T_C = 25^{\circ}C$	36	A
$I_D$	Continuous drain current @ $V_{GS}=20V$ (Silicon limited)	$T_C = 100^{\circ}C$	24	A
$I_{DM}$	Pulse drain current tested	$T_C = 25^{\circ}C$	80	A
EAS	Avalanche energy, single pulsed		1200	mJ
PD	Maximum power dissipation	$T_C = 25^{\circ}C$	288	W
		$T_C = 110^{\circ}C$	125	W
$T_{STG,TJ}$	Storage and Junction Temperature Range		-55 to 175	$^{\circ}C$
TL	Solder Temperature		260	$^{\circ}C$
MD	Mounting Torque M3 screw		0.6	N.m

## Thermal Characteristics

Symbol	Parameter	Typical	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	—	0.52	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	—	40	$^{\circ}C/W$

**Electrical Characteristics**

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> =100μA	1200	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(T <sub>j</sub> =25°C)	V <sub>DS</sub> =1200V, V <sub>GS</sub> =0V	-	-	100	μA
	Zero Gate Voltage Drain Current(T <sub>j</sub> =150°C)	V <sub>DS</sub> =1200V, V <sub>GS</sub> =0V	-	-	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =-10/+25V, V <sub>DS</sub> =0V	-	-	±100	nA
g <sub>fs</sub>	Transconductance	V <sub>DS</sub> =20V, I <sub>D</sub> =20A	-	8	-	S
V <sub>GS(th)</sub>	Gate Threshold Voltage(T <sub>j</sub> =25°C)	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =5mA	2.00	3.00	4.00	V
	Gate Threshold Voltage(T <sub>j</sub> =150°C)	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =5mA	-	2.40	-	V
R <sub>DS(on)</sub>	Drain-Source On-State Resistance (T <sub>j</sub> =25°C)	V <sub>GS</sub> =20V, I <sub>D</sub> =20A	-	80.0	105	mΩ
	...(T <sub>j</sub> =150°C)	V <sub>GS</sub> =20V, I <sub>D</sub> =20A	-	140	-	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> =800V, V <sub>GS</sub> =0V, f=1MHz	-	1410	-	pF
C <sub>oss</sub>	Output Capacitance		-	97	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	6.7	-	pF
R <sub>g</sub>	Gate Resistance	f=1MHz	-	3.00	-	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =800V, I <sub>D</sub> =20A, V <sub>GS</sub> =0/20V, T <sub>vj</sub> =25°C	-	55.5	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	17.6	-	nC
Q <sub>gd</sub>	Gate-Drain Charge		-	25.8	-	nC
<b>Switching Characteristics@ T<sub>j</sub> = 25°C</b>						
E <sub>tot</sub>	Total switching energy	V <sub>DD</sub> =800V, I <sub>D</sub> =20A, R <sub>G</sub> =5.1Ω, V <sub>GS</sub> =0/20V	-	649	-	μJ
E <sub>on</sub>	Turn-on energy		-	570	-	
E <sub>off</sub>	Turn-off energy		-	79.0	-	
T <sub>d(on)</sub>	Turn-on Delay Time		-	30.9	-	ns
T <sub>r</sub>	Turn-on Rise Time		-	24.1	-	ns
T <sub>d(off)</sub>	Turn-Off Delay Time		-	26.0	-	ns
T <sub>f</sub>	Turn-Off Fall Time		-	15.6	-	ns
<b>Switching Characteristics@ T<sub>j</sub> = 150°C</b>						

$E_{tot}$	Total switching energy	$V_{DD}=800V,$ $I_D=20A,$ $R_G=5.1\Omega,$ $V_{GS}=0/20V$	-	610	-	uJ
$E_{on}$	Turn-on energy		-	523	-	
$E_{off}$	Turn-off energy		-	87.0	-	
$T_{d(on)}$	Turn-on Delay Time		-	36.6	-	ns
$T_r$	Turn-on Rise Time		-	20.8	-	ns
$T_{d(off)}$	Turn-Off Delay Time		-	29.4	-	ns
$T_f$	Turn-Off Fall Time		-	17.7	-	ns

**Source- Drain Diode Characteristics@  $T_j = 25^\circ C$  (unless otherwise stated)**

$V_{SD}$	Forward on voltage	$I_{SD}=10A, V_{GS}=0V$	-	3.55	4.15	V
$I_{rrm}$	Diode peak reverse recovery current	$V_{dd}=800V, I_{sd}=20A,$ $V_{GS}=0/20V, T_{vj}=25^\circ C$	-	7.97	-	A
$T_{rr}$	Reverse Recovery Time		-	35.8	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	160	-	nC

**Source- Drain Diode Characteristics@  $T_j = 150^\circ C$  (unless otherwise stated)**

$V_{SD}$	Forward on voltage	$I_{SD}=10A, V_{GS}=0V$	-	3.15	-	V
$I_{rrm}$	Diode peak reverse recovery current	$V_{dd}=800V, I_{sd}=20A,$ $V_{GS}=0/20V, T_{vj}=150^\circ C$	-	13.5	-	A
$T_{rr}$	Reverse Recovery Time		-	51.1	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	367	-	nC

### Typical Characteristics

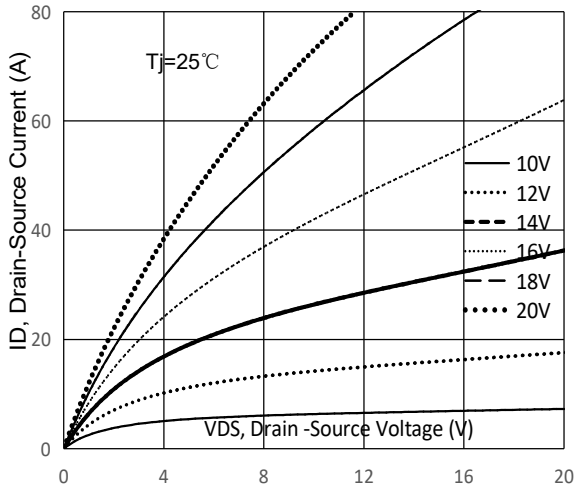


Fig1. Typical Output Characteristics

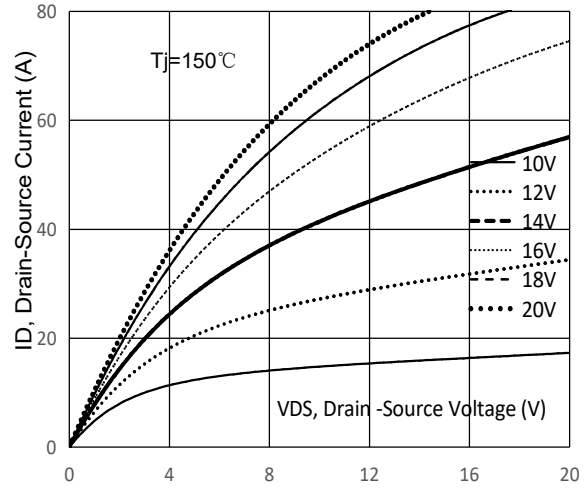


Fig2. Typical Output Characteristics

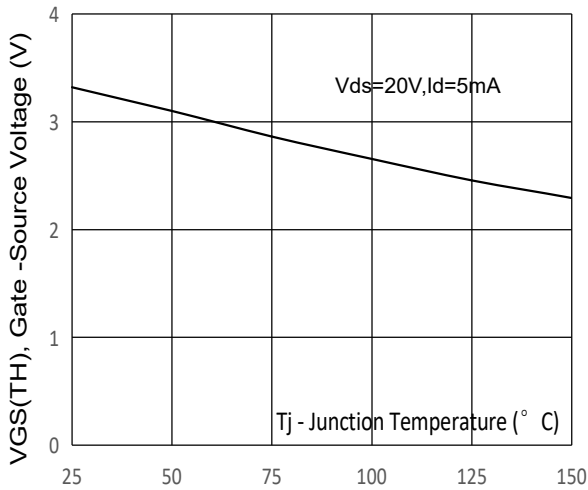


Fig3. Typical VGS(TH) Gate-Source Voltage Vs. Tj

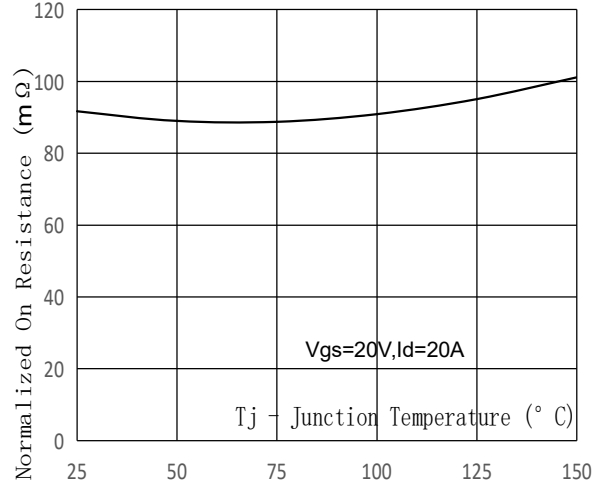


Fig4. Typical On-Resistance Vs. Tj

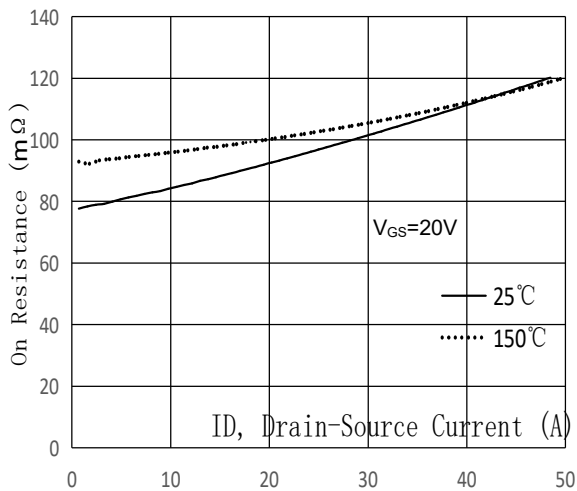


Fig5. Typical On Resistance Vs Drain Current

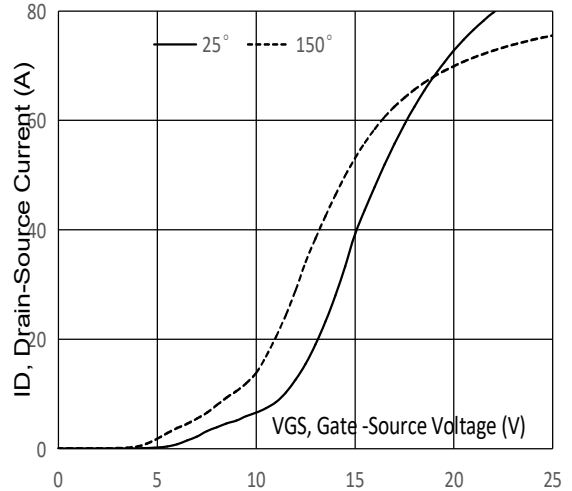


Fig6. Typical Transfer Characteristics

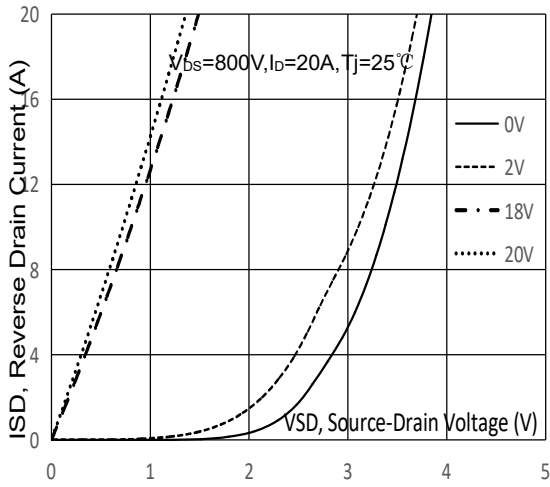


Fig7. Typical Source-Drain Diode Forward Voltage

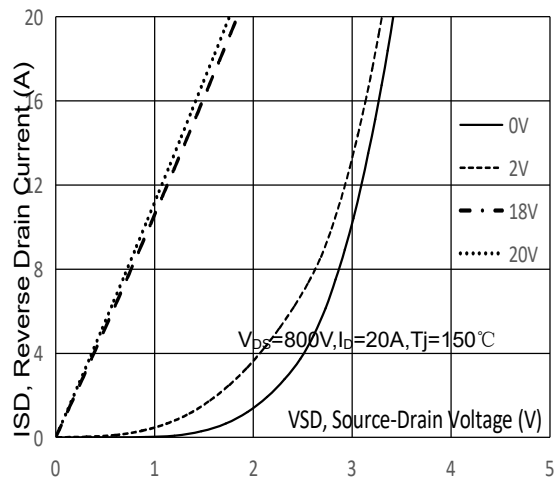


Fig8. Typical Source-Drain Diode Forward Voltage

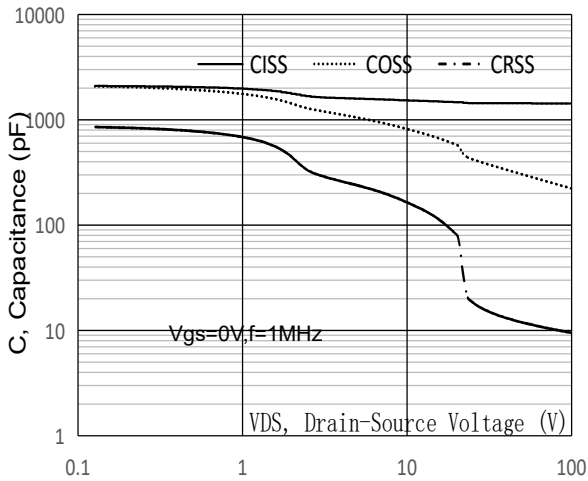


Fig9. Typical Capacitance Vs. Drain-Source Voltage

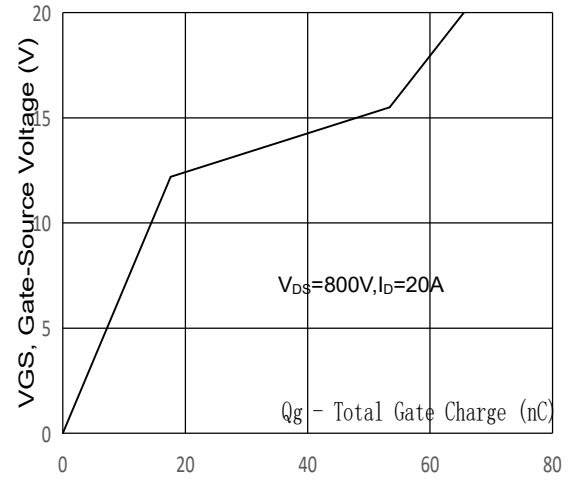


Fig10. Typical Gate Charge Vs. Gate-Source Voltage

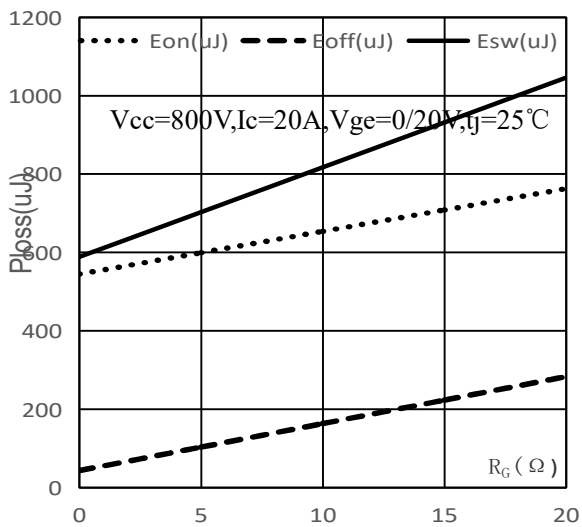


Fig11. Typical switching losses of  $R_G$

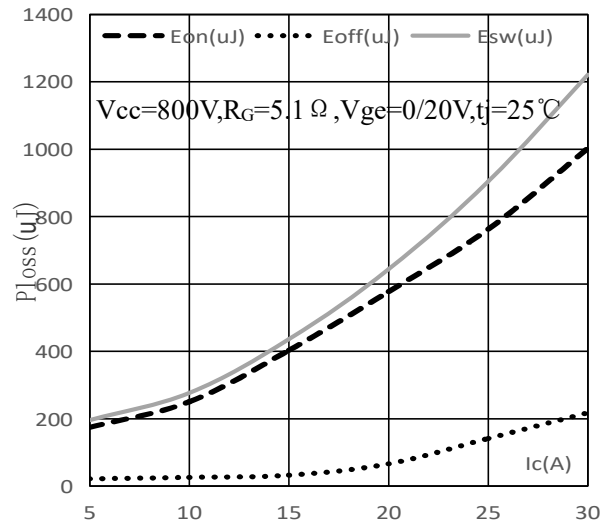


Fig12. Typical switching losses of  $I_C$

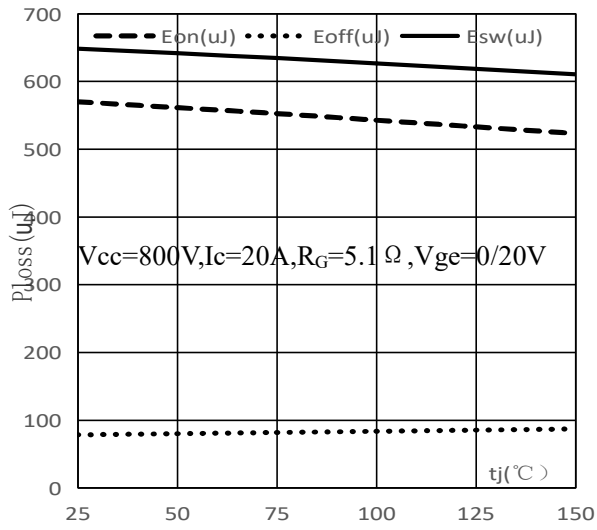


Fig13. Typical switching losses of  $t_j$

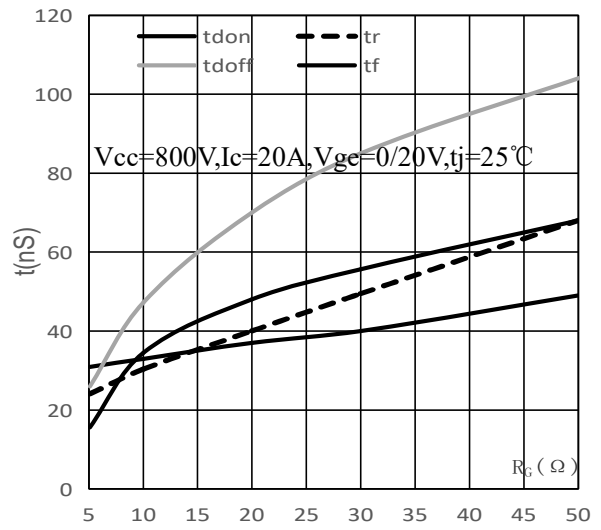


Fig14. Typical switching times as a function of  $R_G$

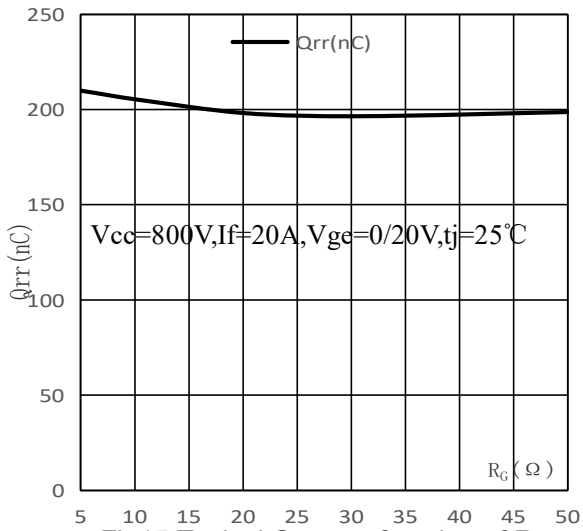


Fig15. Typical  $Q_{rr}$  as a function of  $R_G$

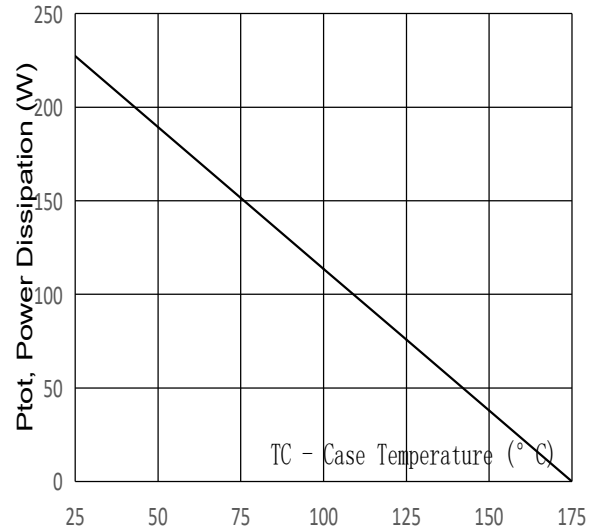


Fig16. Power Dissipation Vs. Case Temperature

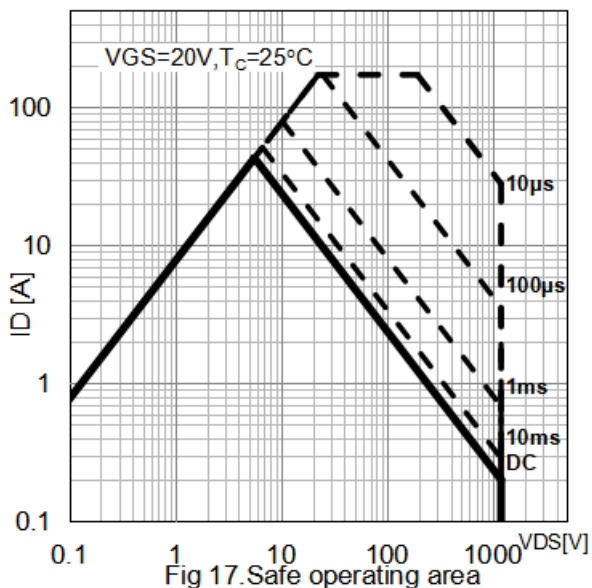


Fig 17. Safe operating area

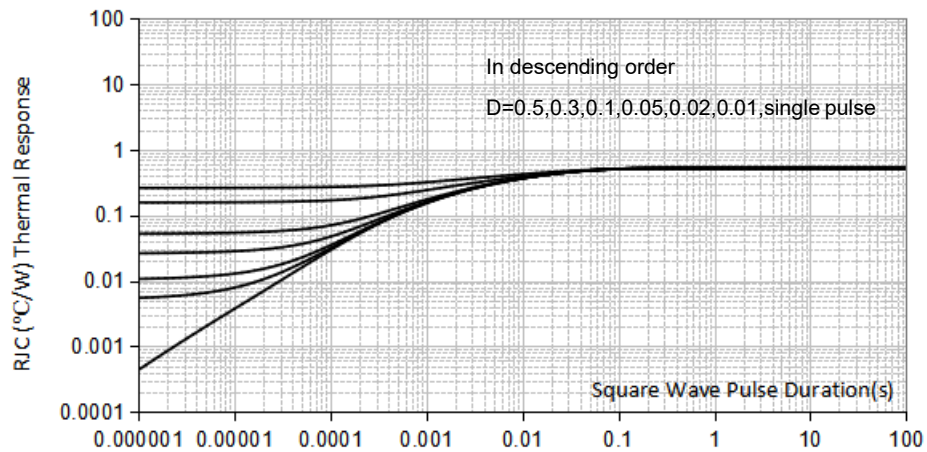
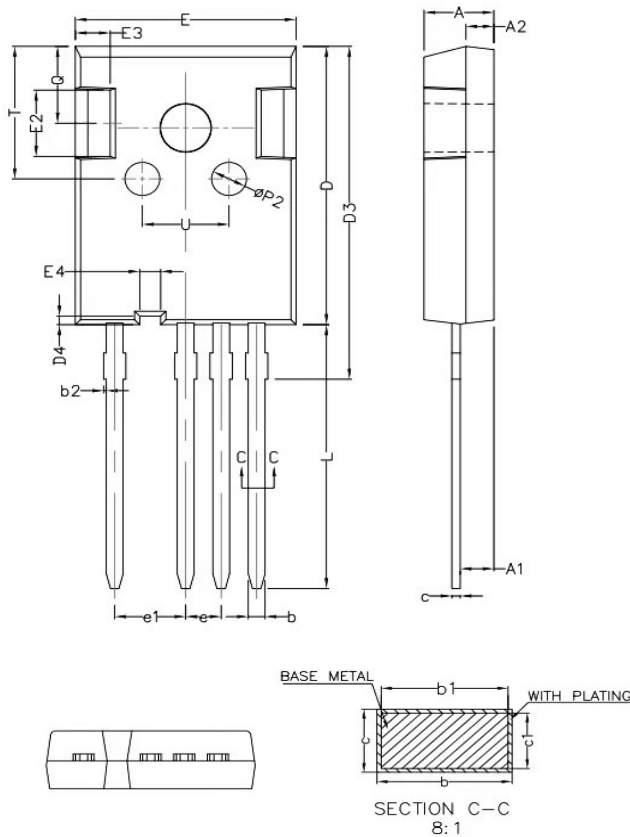


Fig 18. Max transient thermal impedance

### TO-247-4L Package Outline Data



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
b	1.16	-	1.29
b1	1.15	1.20	1.25
b2	0	-	0.20
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	1.20	1.35
D3	24.97	25.12	25.27
D4	0.55	0.65	0.75
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
E4	1.40	1.50	1.60
e	2.44	2.54	2.64
e1	4.98	5.08	5.18
L	19.80	19.92	20.10
P	3.50	3.60	3.70
P1	-	-	7.40
P2	2.40	2.50	2.60
Q	5.60	-	6.00
S	6.15BSC		
T	9.80	-	10.20
U	6.00	-	6.40

Unit:mm