SemiWell SEMICONDUCTOR™

Preliminary

SIM200D12SV3

"HALF-BRIDGE" IGBT MODULE

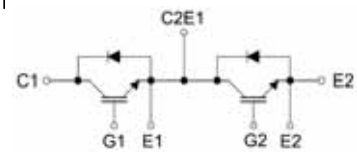
V_{CES} = 1200V
Ic = 200A
$V_{CE(ON)}$ typ. = 1.7V
@ Ic = 200A

Features

- Trench gate + field stopper, using Infineon chip design
- 10μs Short circuit capability
- Low turn-off losses
- Short tail current for over 18KHz
- Positive V_{CE}(on) temperature coefficient

Applications

- AC & DC Motor controls
- VVVF inverters
- Optimized for high frequency inverter Type Welding machines
- SMPS
- UPS, Robotics



Package : V3

Absolute Maximum Ratings @ Tj=25℃ (per leg)

Symbol	Parameter	Condition	Ratings	Unit
V_{CES}	Collector-to-Emitter Voltage	V_{GE} = 0V, Ic = 1.0mA	1200	V
V_{GES}	Gate emitter voltage		± 20	V
Ic	Continuous Collector Current	Tc = 80℃(25℃)	200(260)	A
I_{CM}	Pulsed collector current	Tc = 25℃	400	A
I_F	Diode Continuous Forward Current	Tc = 80℃(25℃)	200(260)	A
I_{FM}	Diode Maximum Forward Current	Tc=25℃	400	A
T_{SC}	Short Circuit Withstand Time		10	μs
V_{iso}	Isolation Voltage test	AC 1 minute	2500	V
T_j	Junction Temperature		-40 ~ 150	℃
T_{stg}	Storage Temperature		-40 ~ 125	℃
Weight	Weight of Module		360	g
Mounting Torque	Power Terminal Screw : M5		3.5	Nm
	Terminal connection Screw : M5		3.5	Nm

Electrical Characteristics @ Tj = 25℃ (unless otherwise specified)

Symbol	Parameters	Min	Typ	Max	Unit	Test conditions
$V_{(BR)CES}$	Collector-to-Emitter Breakdown Voltage	1200	-	-	V	V_{GE} = 0V, Ic = 1.0mA
$V_{CE(ON)}$	Collector-to-Emitter Saturation Voltage	1.4	1.7	2.15		Ic = 200A, V_{GE} = 15V
$V_{GE(th)}$	Gate Threshold Voltage	5.0	5.8	6.5		V_{CE} = V_{GE}, Ic = 500μA
I_{CES}	Zero Gate Voltage Collector Current	-	-	1.0	mA	V_{GE} = 0V, V_{CE} = 1200V
I_{GES}	Gate-to-Emitter Leakage Current	-	-	± 200	nA	V_{CE} = 0V, V_{GE} = ± 20V

V_{FM}	Diode Forward Voltage Drop	-	1.65	2.15	V	I_C = 200A

Switching Characteristic @ Tj = 25°C (unless otherwise specified)

Symbol	Parameters	Min	Typ	Max	Unit	Test conditions
C_{ies}	Input capacitance	-	17306	-	pF	V_{CC} = 30V, V_{GE} = 0V f = 1.0MHz
C_{oss}	Output capacitance	-	810	-		
C_{res}	Reverse transfer capacitance	-	360	-		
$t_{d(on)}$	Turn-on delay time	-	300	-	ns	T_j = 125°C, V_{CC} = 600V I_C = 200A, V_{GE} = 15V R_G = 3.6Ω
t_r	Rise time	-	108	-		
$t_{d(off)}$	Turn-off delay time	-	660	-		
t_f	Fall time	-	156	-		
I_{rr}	Diode Peak Reverse Recovery current	-	160	-	A	T_j = 125°C, V_{CC} = 600V I_F = 200A, V_{GE} = 15V R_G = 3.6Ω, di/dt=1200A/us
t_{rr}	Diode Reverse Recovery time	-	250	-	ns	

Thermal Characteristic Values

Symbol	Parameters	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-Case (IGBT Part, Per 1/2 Module)	-	-	0.10	°C/W
$R_{\theta JC}$	Junction-to-Case (Diode Part, Per 1/2 Module)	-	-	0.20	
$R_{\theta CS}$	Case-to-Heat Sink (Conductive grease applied)	-	0.04	-	

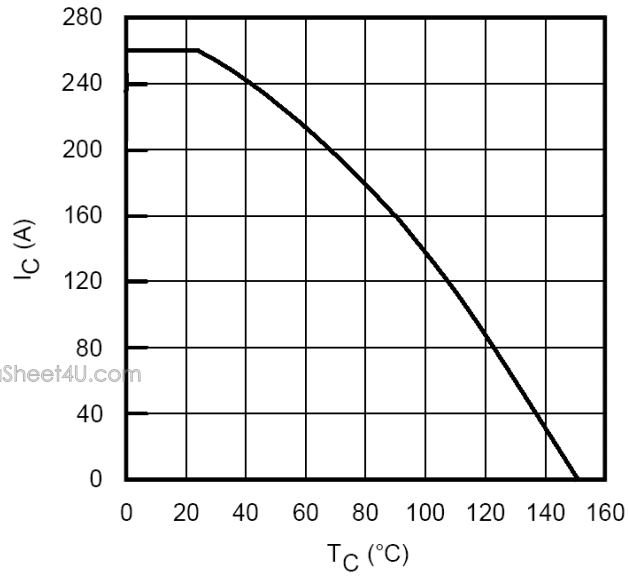


Fig 1. Maximum DC Collector Current vs. Case Temperature

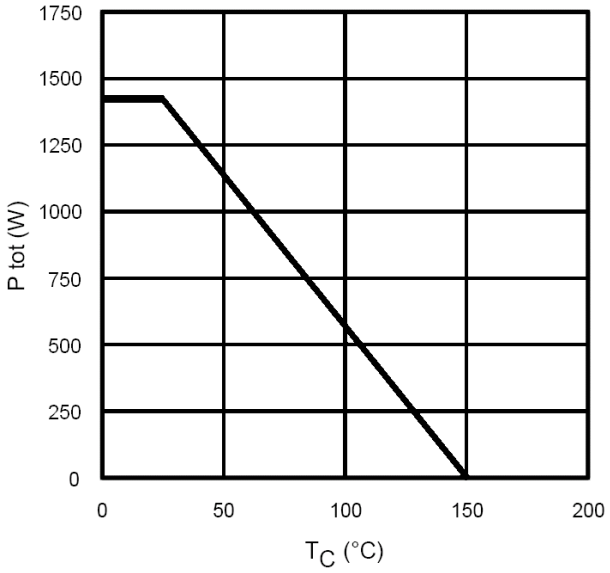


Fig 2. Power Dissipation vs. Case Temperature

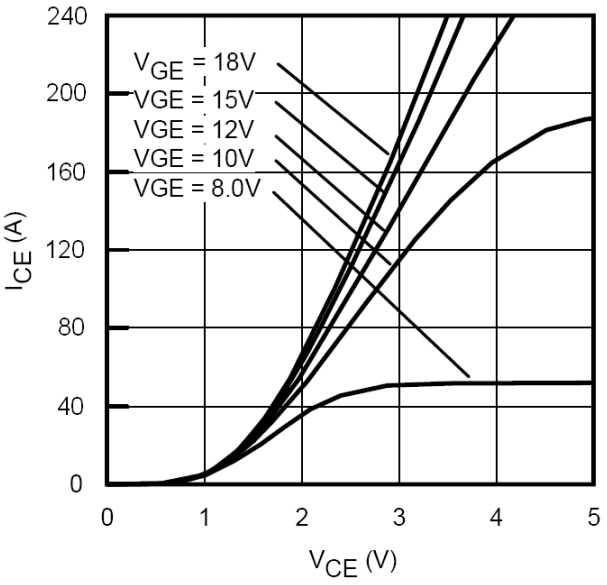


Fig 3. Typ. IGBT Output Characteristics

T_J = 25°C; tp = 80µs

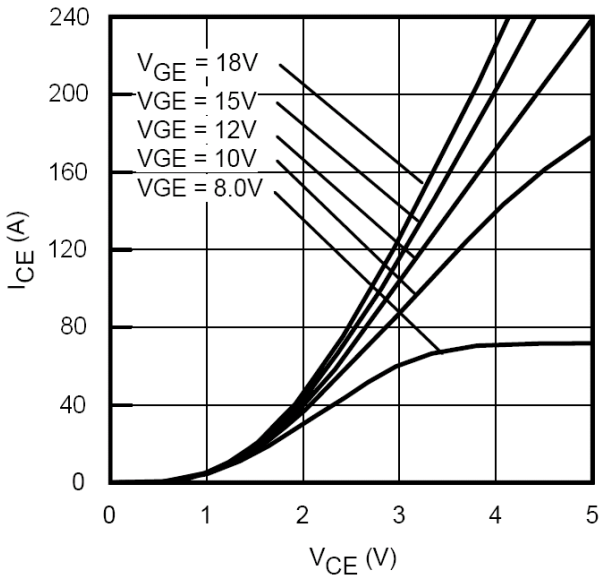


Fig 4. Typ. IGBT Output Characteristics

T_J = 125°C; tp = 80µs

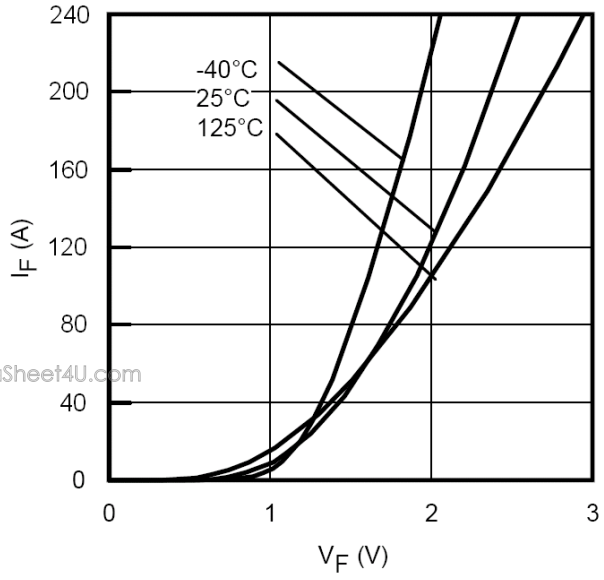


Fig 5. Typ. Diode Forward Characteristics

tp = 80μs

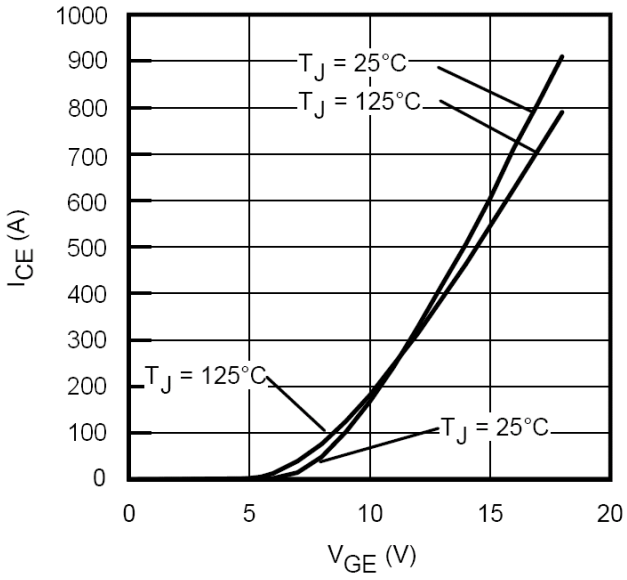


Fig 6. Typ. Transfer Characteristics

V_{CE} = 50V; tp = 10μs

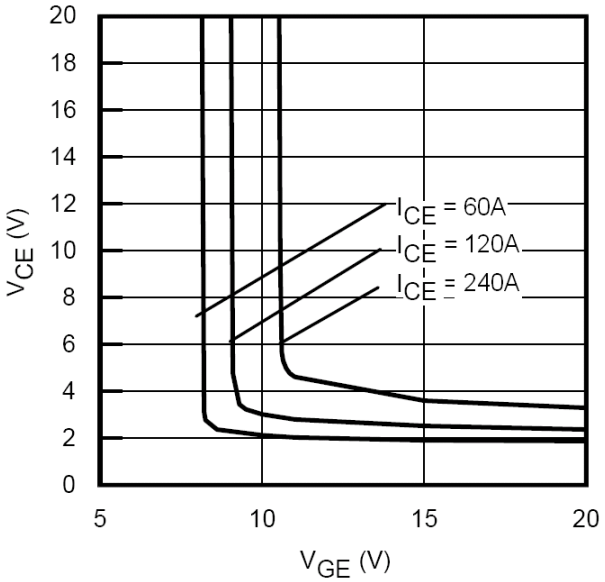


Fig 7. Typical V_{CE} vs. V_{GE}

T_J = 25℃

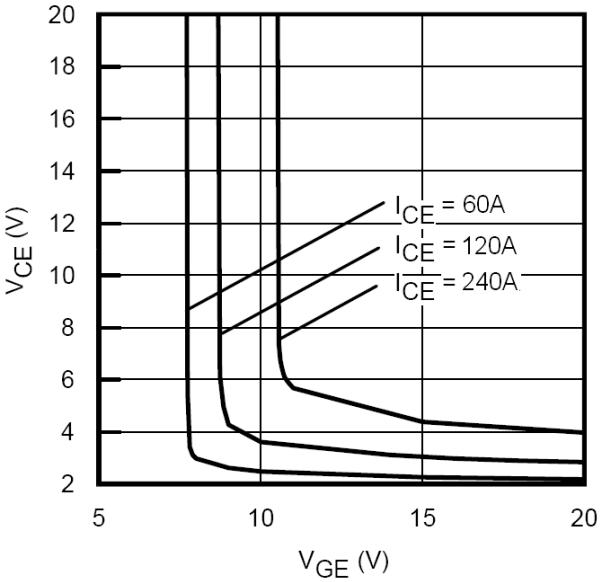


Fig 8. Typical V_{CE} vs. V_{GE}

T_J = 125℃

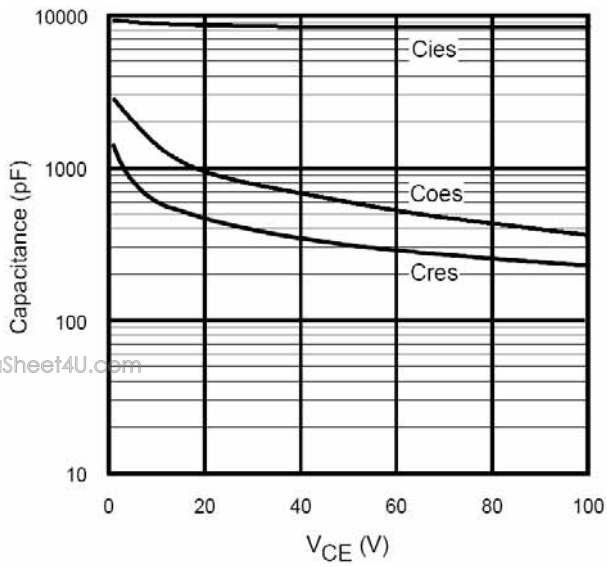


Fig 9. Typ. Capacitance vs. V_{CE}

V_{GE} = 0V; f = 1Mhz

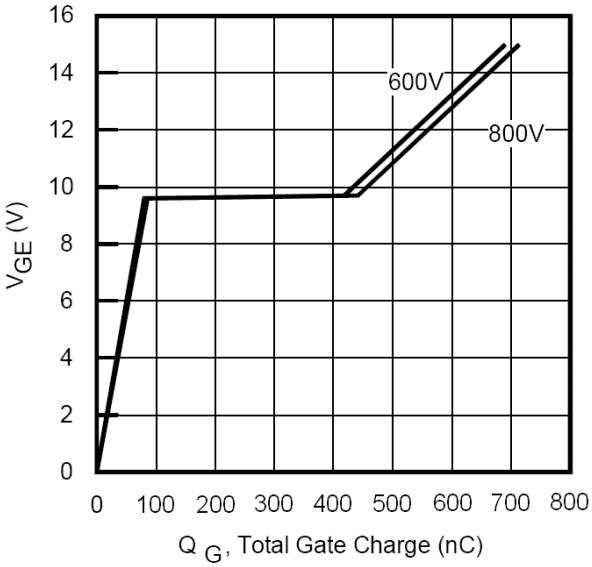


Fig 10. Typical Gate Charge vs. V_{GE}

I_{CE} = 120A; L = 600μH

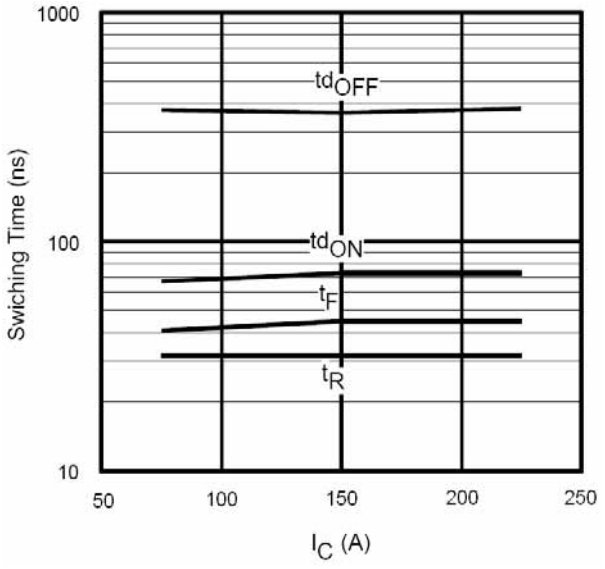


Fig 11. Typ. Switching Time vs. I_C

T_J = 125℃; L = 200μH; V_{CE} = 600V

R_G = 3.9Ω; V_{GE} = 15V

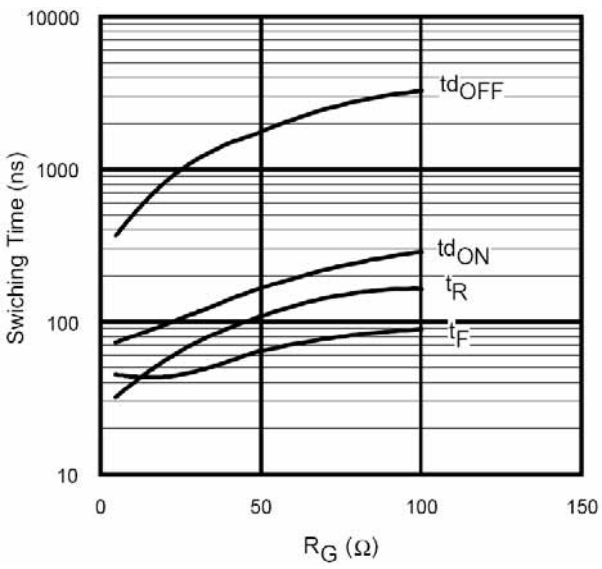


Fig 12. Typ. Switching Time vs. R_G

T_J = 125℃; L = 200μH; V_{CE} = 600V

I_{CE} = 200A; V_{GE} = 15V

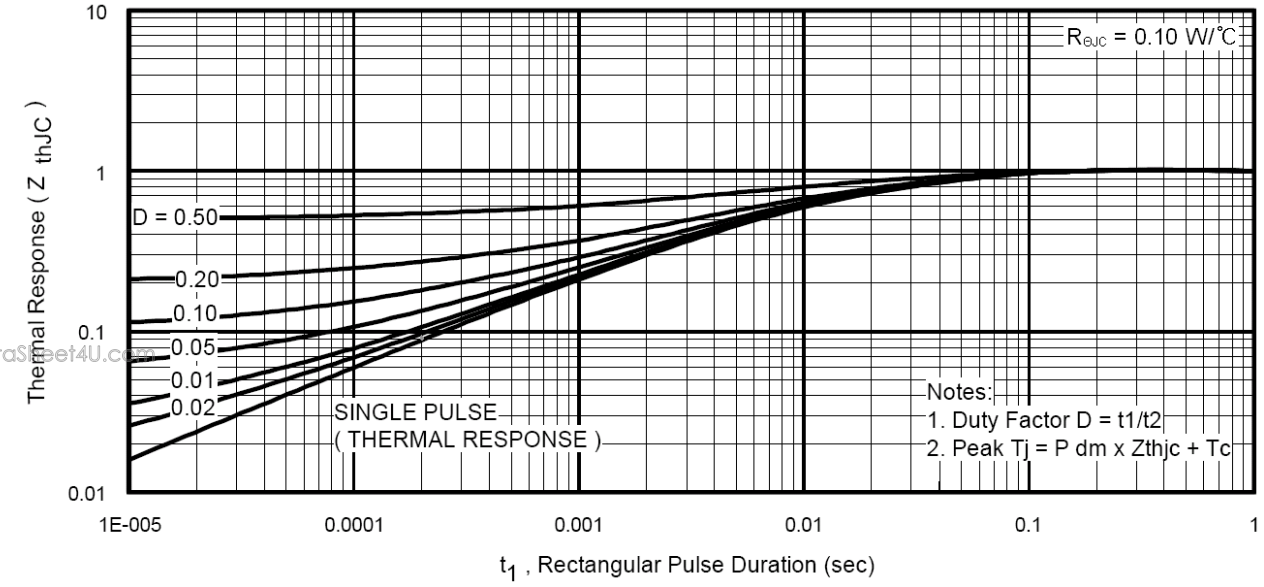


Fig 13. Normalized Transient Thermal Impedance, Juncion-to-Case (IGBT)

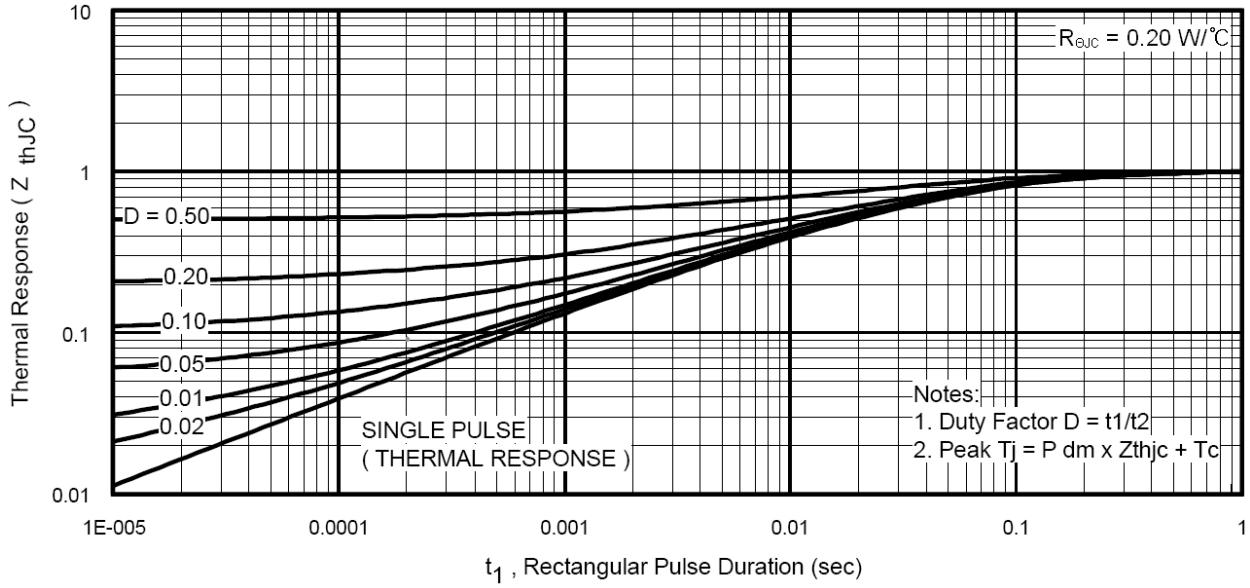
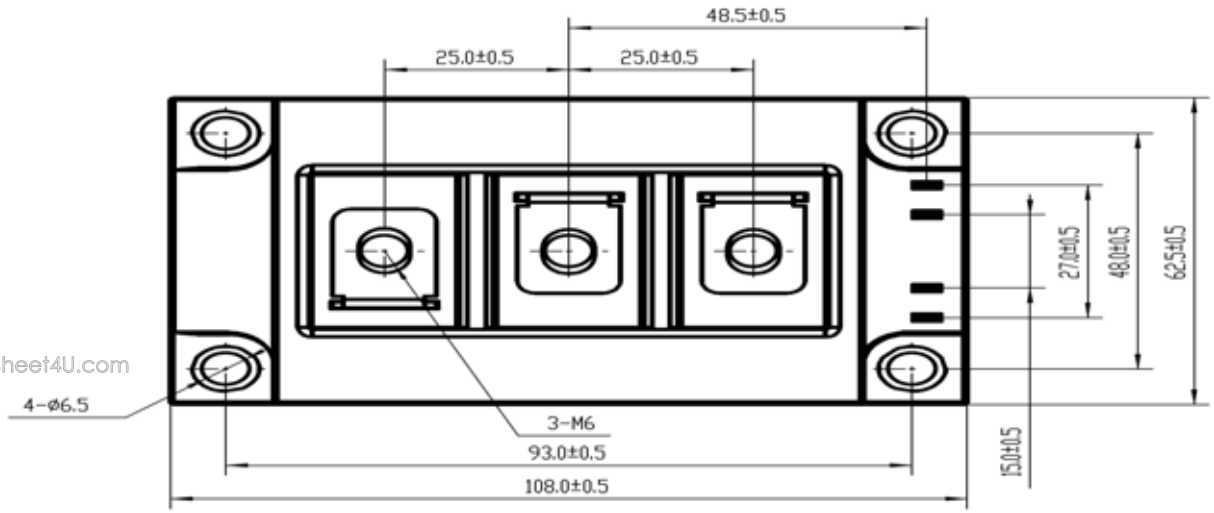
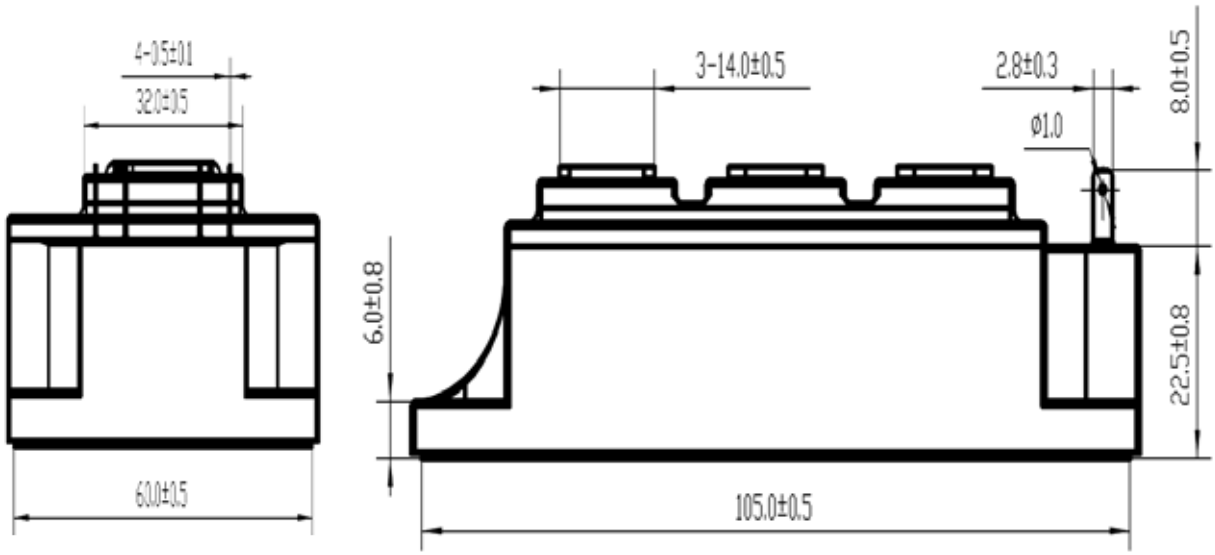


Fig 14. Normalized Transient Thermal Impedance, Juncion-to-Case (DIODE)

Package Outline (dimensions in mm)





OCT., 2008

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