LEF75G602

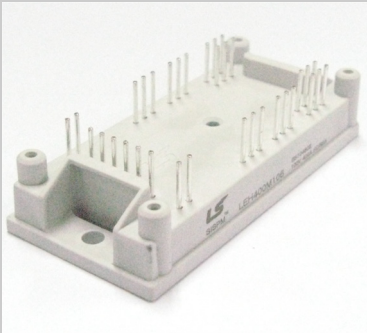
SISPM™

600V 75A 4-Pack IGBT Module

Features

- Non punch through (NPT) Technology
- Ultra-fast
- 10μs Short circuit current
- Positive VCE(on) temperature coefficient
- Free wheeling diodes with fast and soft reverse recovery

Preliminary data



SISPM1

82.0 x 37.4 x 21.2mm

Applications

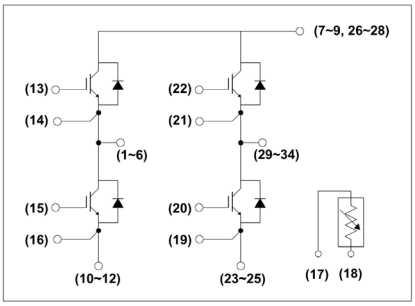
- Power supply
- UPS / Inverter

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Item	Symbol	Conditions	Value	Units
IGBT	V_{CES}		600	V
	V_{GES}		± 20	V
	I_C	@T_j= 150 °C, T_C = 25 °C, Continuous	75	A
		@T_j= 150 °C, T_C = 80 °C, Continuous	50	A
	I_{CM}	@ t_P = 1 ms	150	A
	T_{SC}	Chip Level, @T_j = 150 °C, V_{GE}= 15 V, V_{CES} < 600 V	10	μs
	T_j	Operating Junction Temperature *(1)	-40~125	°C
	P_D	@T_j= 150 °C, T_C = 25 °C	250	W
		@T_j= 150 °C, T_C = 80 °C	150	W
Diode	V_{RRM}		600	V
	I_F	@T_j=175 °C, T_C = 25 °C, Continuous	100	A
		@T_j= 175 °C, T_C = 80 °C, Continuous	75	A
	I_{FRM}	@ t_P= 1 ms	150	A
	T_j	Operating Junction Temperature *(2)	-40~125	°C
Module	T_{stg}	Storage Temperature	-40~125	°C
	V_{iso}	@AC 1minute	2500	V
	M_t	Main Terminal Mounting torque (M4)	2.0~2.2	Nm
	W	Weight	50	g

Internal Circuit & Pin Description

Pin Number	Pin Name	Pin Description
1~6, 29~34	U, V	U, V Output
7~9, 26~28	P	Positive DC Link Output
10~12, 23~25	N	Negative DC Link Output
13,22	GUH, GVH	Gate Input for High-side
14,21	EUH, EVH	Emitter Input for High-side
15,20	GUL, GVL	Gate Input for Low-side
16,19	EUL, EVL	Emitter Input for Low-side
17,18		NTC



(Note *1) The Maximum junction temperature of chip is 150°C.
(Note *2) The Maximum junction temperature of chip is 175°C.

Electrical Characteristics of IGBT T_C = 25°C unless otherwise noted

Static Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{CES}	C-E Breakdown Voltage	V_{GE} = 0 V, I_C = 250 μA	600	-	-	V
I_{CES}	C-E Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0 V	-	-	250	μA
I_{GES}	G-E Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0 V	-	-	-	nA
$V_{GE(th)}$	G-E Threshold Voltage	V_{GE} = V_{CE}, I_C = 75 mA	-	5.7	-	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 75 A, V_{GE} = 15 V, T_C = 25 °C	-	3.1	-	V
		I_C = 75 A, V_{GE} = 15 V, T_C= 125 °C	-	3.7	-	V

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
C_{ies}	Input Capacitance	V_{CE} = 25 V, V_{GE} = 0 V f = 1MHz, T_C = 25 °C	-	4.4	-	nF
C_{oes}	Output Capacitance		-	0.5	-	nF
C_{res}	Reverse Transfer Capacitance		-	0.3	-	nF
t_d(on)	Turn-On Delay Time	T_C = 125 °C, R_G = 25 Ω L = 100 μH, V_{DC} = 300 V V_{GE} = 15 V ~ -15 V I_C = 75 A	-	92	-	ns
t_r	Rise Time		-	69	-	ns
t_d(off)	Turn-Off Delay Time		-	433	-	ns
t_f	Fall Time		-	26	-	ns
E_{on}	Turn-On Switching Loss		-	3.1	-	mJ
E_{off}	Turn-Off Switching Loss		-	1.3	-	mJ
E_{ts}	Total Switching Loss		-	4.4	-	mJ
Q_g	Total Gate Charge	V_{GE} = 0 V ~ +15 V	-	300	-	nC
Q_{ge}	Gate-Emitter Charge		-	110	-	nC
Q_{gc}	Gate-Collector Charge		-	70	-	nC

Electrical Characteristics of Diode T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
V_F	Diode Forward Voltage	I_F = 75 A V_{GE} = 0 V	T_C = 25 °C	-	1.5	-	V
			T_C = 25 °C	-	1.3	-	
t_{rr}	Diode Reverse Recovery Time	R_G = 25 Ω L=100 μH V_{DC}= 300 V V_{GE} = 15 V ~ -15 V I_C = 75 A	T_C = 25 °C	-	250	-	ns
			T_C = 25 °C	-	285	-	
I_{RRM}	Diode Peak Reverse Recovery Current		T_C = 25 °C	-	38	-	A
			T_C = 125 °C	-	93	-	
Q_{rr}	Diode Reverse Recovery Charge		T_C = 25 °C	-	3.2	-	μC
			T_C = 125 °C	-	9.8	-	
E_{rr}	Diode Reverse Recovery Energy		T_C = 25 °C	-	0.6	-	mJ
			T_C = 125 °C	-	1.8	-	

Thermal Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$R_{th(J-C)}$	Thermal Resistance (IGBT)	Junction-to-Case	-	0.43	-	°C/W
$R_{th(J-C)}$	Thermal Resistance (Diode)	Junction-to-Case	-	0.68	-	°C/W

NTC thermistor Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
R_{25}	Resistance	T_C = 25°C		22		kΩ
P	Power	T_C = 25°C		210		mW
$B_{25/100}$	B constant	T_C = 25°C, ± 3% tolerance	-	4000	-	K

* This specifications may not be considered as an assurance of characteristics and may not have same characteristics.
in case of using different test systems from @LSIS. We therefore strongly recommend prior consultation of our engineers.

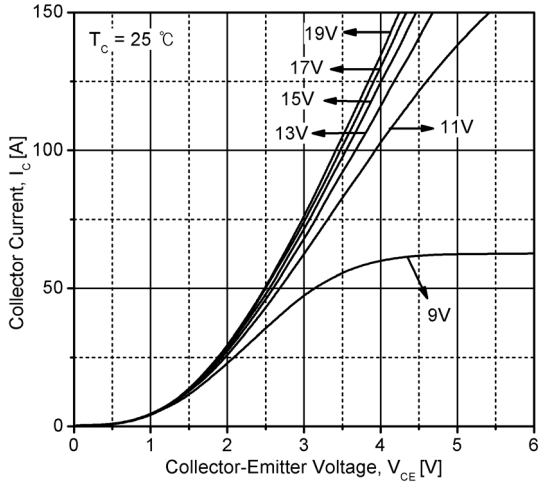


Fig 1. Typical IGBT Output Characteristics

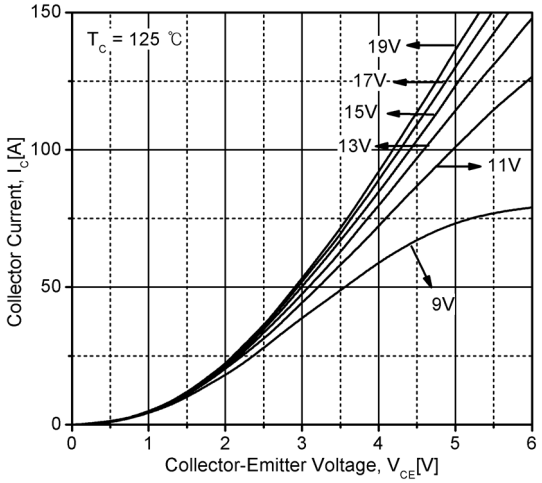


Fig 2. Typical IGBT Output Characteristics

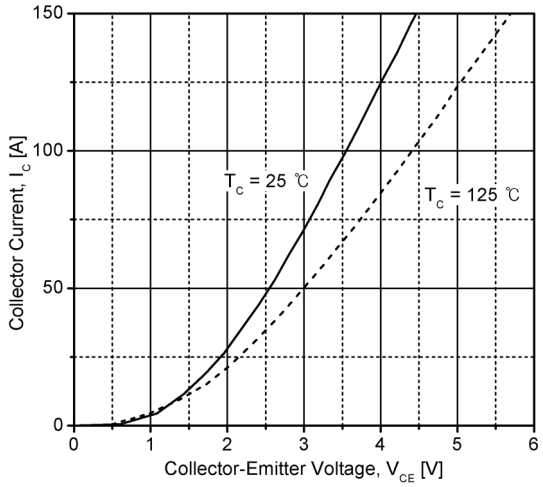


Fig 3. Typical IGBT Output Characteristics

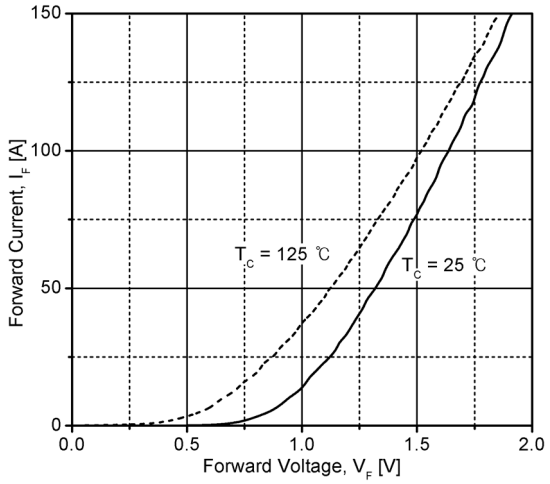


Fig 4. Typical Diode Forward Characteristics

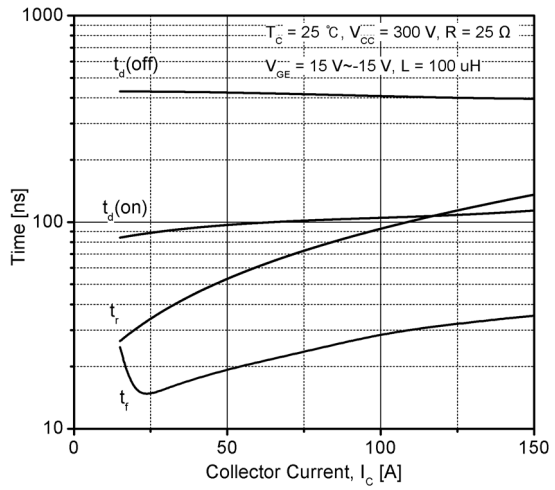


Fig 5. Typical Switching Time vs. Collector Current

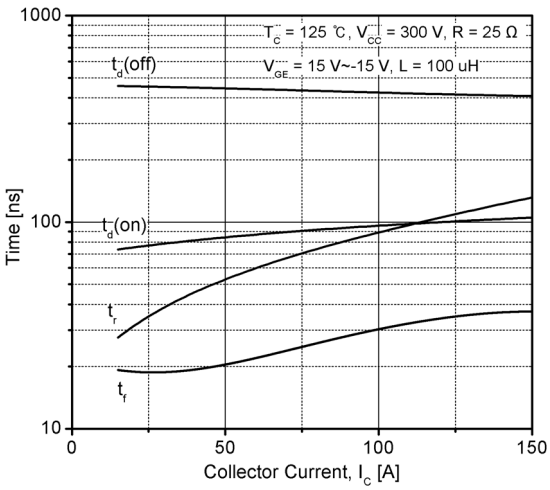


Fig 6. Typical Switching Time vs. Collector Current

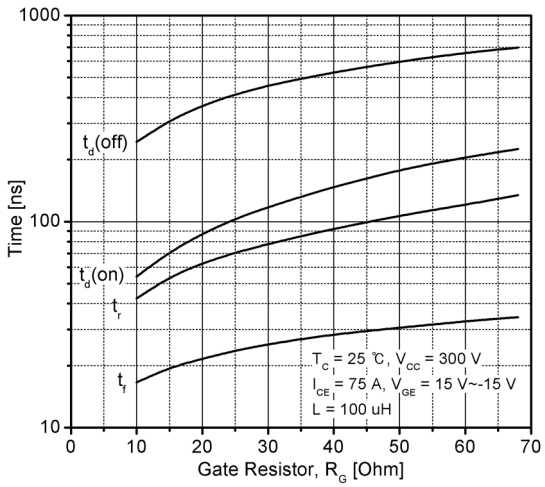


Fig 7. Typical Switching Time vs. Gate Resistor

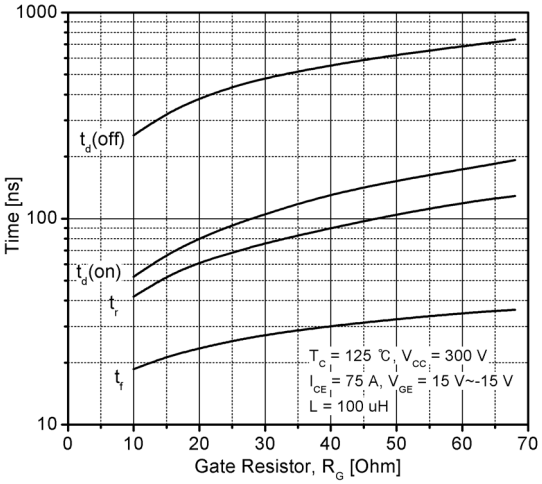


Fig 8. Typical Switching Time vs. Gate Resistor

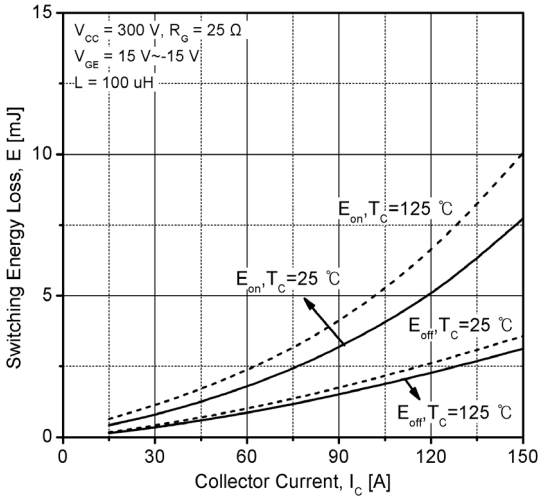


Fig 9. Typical IGBT Switching Loss

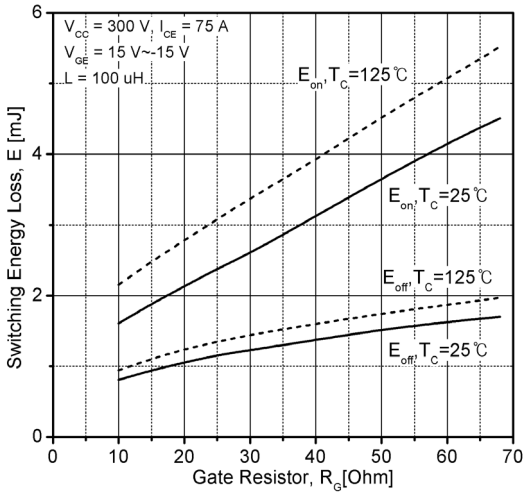


Fig 10. Typical IGBT Switching Loss

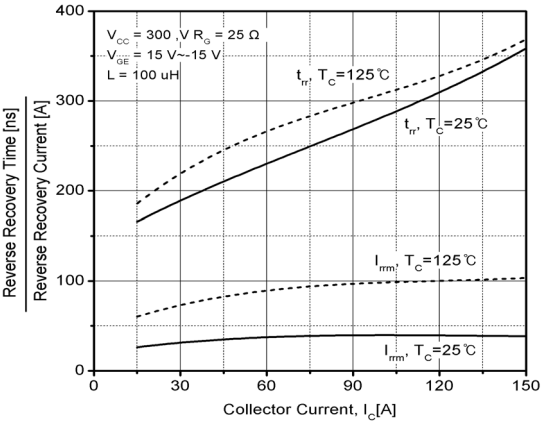


Fig 11. Typical Recovery Characteristics of Diode

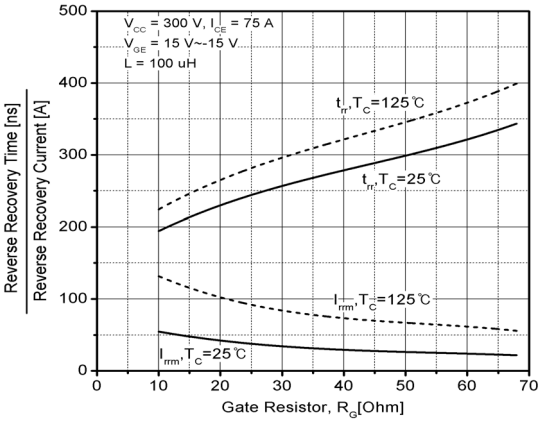


Fig 12. Typical Recovery Characteristics of Diode

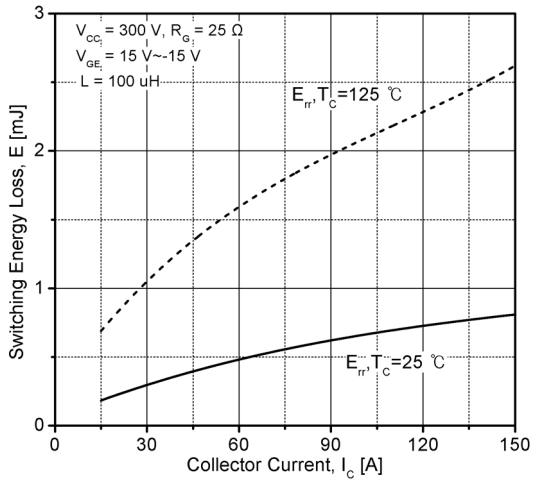


Fig 13. Typical Diode Switching Loss

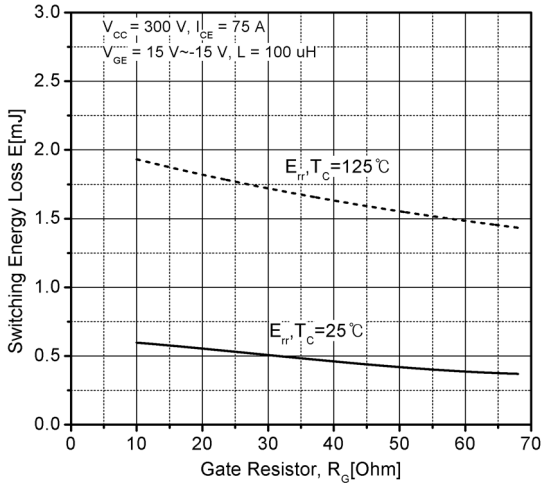


Fig 14. Typical Diode Switching Loss

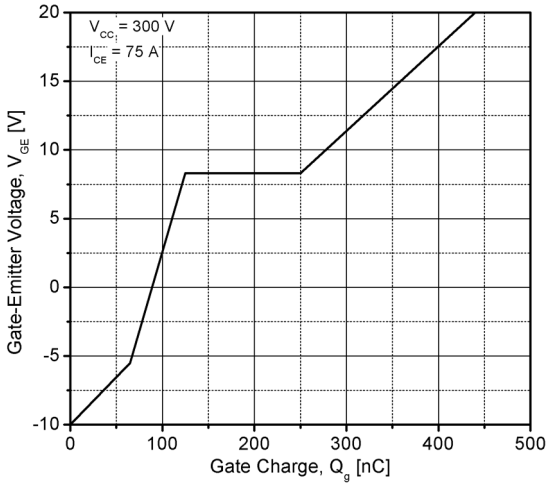


Fig 15. Typical Gate Charge Characteristics

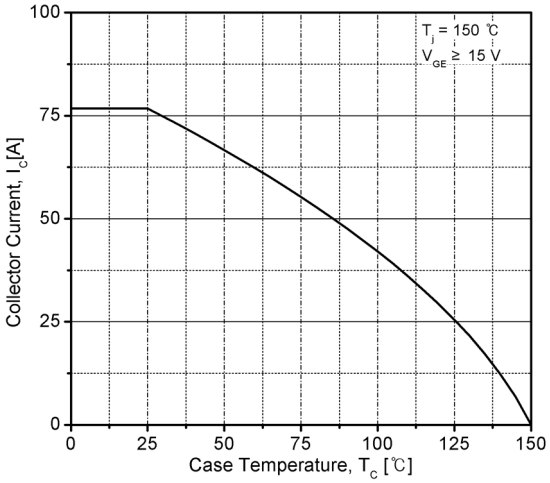


Fig 16. Case Temperature vs. Collector Current

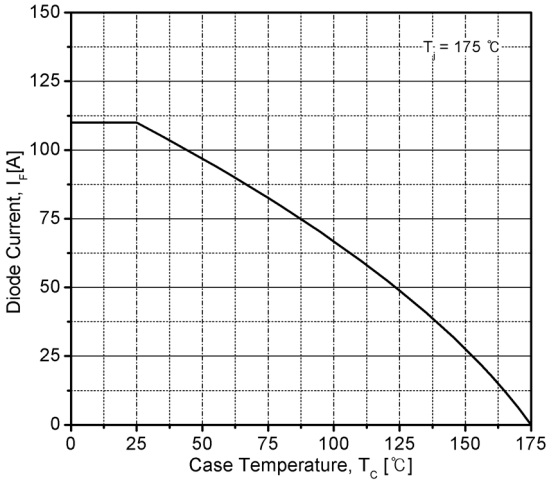


Fig 17. Case Temperature vs. Diode Current

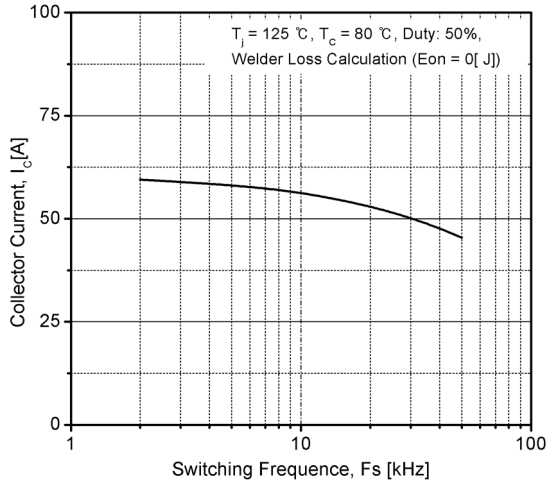


Fig 18. Switching Frequency vs. Collector Current

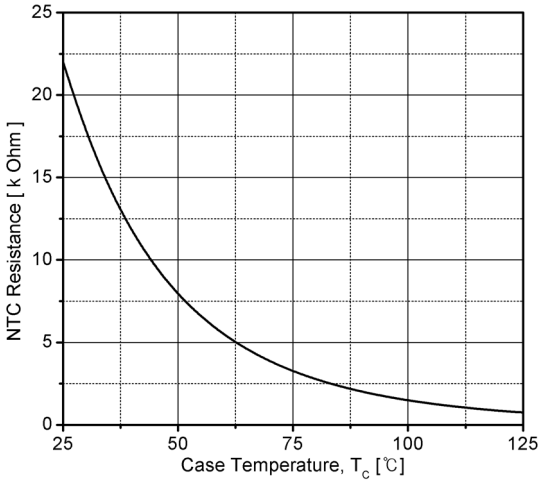


Fig 19. Typical Thermistor Characteristics

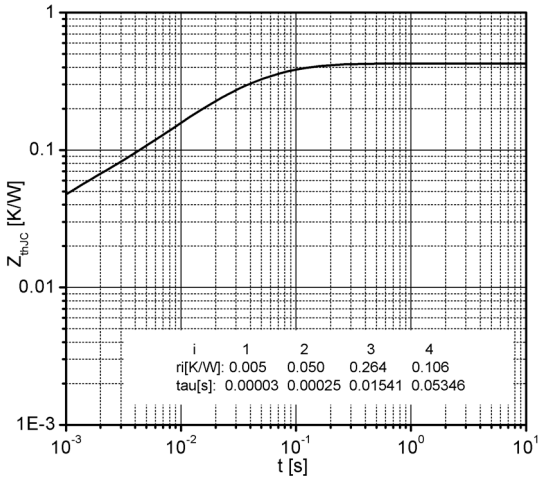


Fig 20. Typical IGBT Thermal Impedance

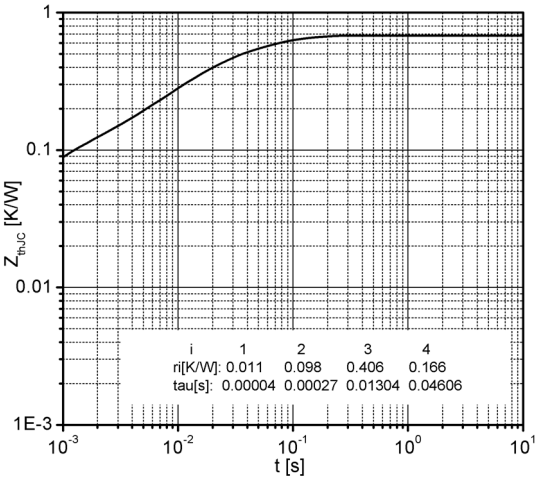


Fig 21. Typical Diode Thermal Impedance

Package Dimension(Dimension in mm)