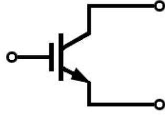
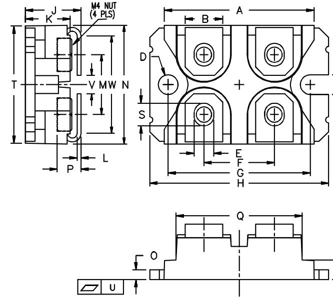
SG75S12S

Discrete IGBTs



Dimensions SOT-227(ISOTOP)



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	19.81	21.08

	I_C	V_{CE}
	A	V
SG75S12S	75	1200

Maximum Rated Values (T_{vj} = 25℃, unless specified otherwise)

Parameter	Symbol	Conditions	Values	Unit
Collector-Emitter Voltage	V_{CES}	V_{GE} shorted	1200	V
DC Collector Current	I_C	T_{hs} = 70℃	75	A
Peak Collector Current	I_{CM}	Pulse: t_p = 1ms, T_{hs} = 70℃	150	A
Gate Emitter Voltage	V_{GES}		±20	V
Total Power Dissipation	P_{tot}	T_{hs} = 25℃ per switch	340	W
IGBT Switching SOA	SwSOA	I_C = 150A, V_{CEM} = 1200V, V_{CC} ≤ 1000V, V_{GE} = ±15V, T_{vj} = 125℃ voltages measured on auxiliary terminals		
IGBT Short Circuit SOA	SCSOA	V_{CC} = 900V, V_{CEM} = 1200V, t_p = 10μs, V_{GE} = ±15V, T_{vj} = 125℃		
DC Forward Current	I_F		75	A
Peak Forward Current	I_{FM}	Pulse: t_p = 1ms, T_{hs} = 70℃	150	A

Maximum Rated Values (cont.) (T_{vj} = 25℃, unless specified otherwise)

Parameter	Symbol	Conditions	Values	Unit
Junction Temperature	T_{vj}		-40 ~ 150	℃
Storage Temperature	T_{tstg} / T_{cop}		-40 ~ 125	℃
Isolation Voltage	V_{iso}	1min, f = 50Hz	2500	V

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IGBT Characteristic Values (T_{vj} = 25℃, unless specified otherwise)

Parameter	Sybmol	Conditions		min.	typ.	max.	Unit
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$*	I_C = 75A, V_{GE} = 15V	T_{vj} = 25℃		2.00	2.35	V
			T_{vj} = 125℃		2.20		V
Collector Cut-off Current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V, T_{vj} = 125℃				6	mA
Gate-Emitter leakage Current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V, T_{vj} = 125℃				±500	nA
Gate-Emitter Threshold Voltage	$V_{GE(TO)}$	I_C = 3mA, V_{CE} = V_{GE}		4.5		6.5	V
Total Gate Charge	Q_{ge}	I_C = 75A, V_{CE} = 600V, V_{GE} = -15 to 15V			750		nC
Input Capacitance	C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz			6.5		nF
Output Capacitance	C_{oes}				1.6		nF
Reverse Transfer Capacitance	C_{res}				1.4		nF
Turn-On Delay Time	$t_{d(on)}$	I_C = 75A, V_{CC} = 600V, R_{gon} = 15Ω, T_{vj} = 125℃, V_{GE} = ±15V			0.1		μs
Rise Time	t_r				0.05		μs
Turn-Off Delay Time	$t_{d(off)}$	I_C = 75A, V_{CC} = 600V, R_{goff} = 15Ω, T_{vj} = 125℃, V_{GE} = ±15V			0.50		μs
Fall Time	t_f				0.09		μs
Turn-on Switching Energy	E_{on}	R_{gon} = 15Ω	I_C = 75A, T_{vj} = 125℃, V_{CC} = 600V, V_{GE} = ±15V, inductive load, integrated up to: 3% V_{CE} (E_{on}), 1% I_C (E_{off})		8.5		mJ
	E_{off}	R_{goff} = 15Ω			7.0		mJ
Module stray Inductance Plus to Minus	L_{sDC}					25	nH
Resistance terminal-chip	$R_{CC'+EE'}$		T_{hs} = 25℃		1.25		mΩ
			T_{hs} = 125℃		1.90		mΩ

* Note 1: Collector emitter saturation voltage is given at die level.

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Diode Characteristic Values (T$_j$ = 25℃, unless specified otherwise)

Parameter	Symbol	Conditions		min.	typ.	max.	Unit
Forward Voltage	V_F*	I_F = 75A	T_{vj} = 25℃		2.00	2.40	V
			T_{vj} = 125℃		2.00		
Reverse Recovery Current	I_{rrm}	I_F = 75A, R_{gon} = 15Ω, V_{CC} = 600V, V_{GE} = ±15V, T_{vj} = 125℃			75		A
Reverse Recovery Charge	Q_{rr}				14		μC
Reverse Recovery Time	t_{rr}				0.35		μs
Reverse Recovery Energy	E_{rec}	I_F = 75A, T_{vj} = 125℃, V_{CC} = 600V, R_{gon} = 15Ω, V_{GE} = ±15V, inductive load, fully integrated			5.5		mJ
Resistance terminal-chip	$R_{CC'+EE'}$		T_{hs} = 25℃		1.25		mΩ
			T_{hs} = 125℃		1.90		

* Note 2: Forward voltage is gaiven at die level

Thermal Characteristics (T$_j$ = 25℃, unless specified otherwise)

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
IGBT Thermal Resistance Junction to Heatsink	R_{th} j-h Igbt	Heatsink: flatness < +/-20μm, roughness < 6μm without ridge Thermal grease: thickness: 30μm < t < 50μm			0.370	℃/W
Diode Thermal Resistance Junction to Heatsink	R_{th} j-h Diode				0.740	℃/W
Equivalent IGBT Thermal Resistance Junct. to Case	R_{th} j-c Igbt				0.235	℃/W
Equivalent Diode Thermal Resistance Junct. to Case	R_{th} j-c Diode				0.550	℃/W

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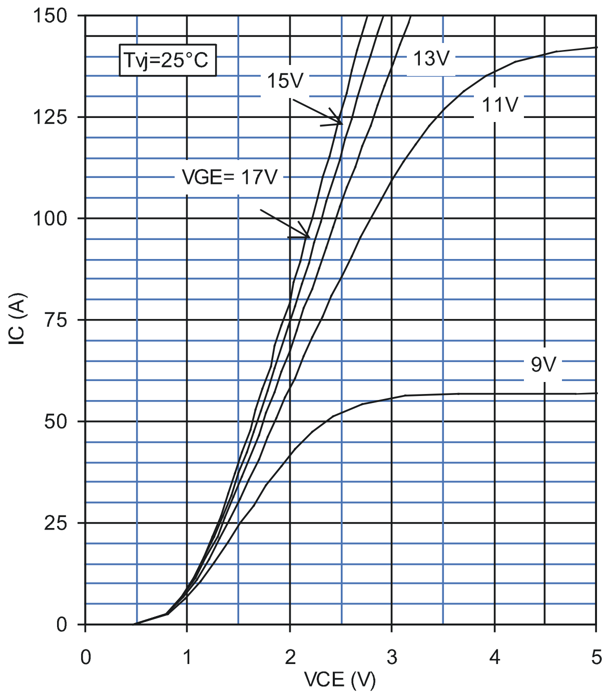

Fig. 1 Typ. Output Characteristics at Tvj=25℃

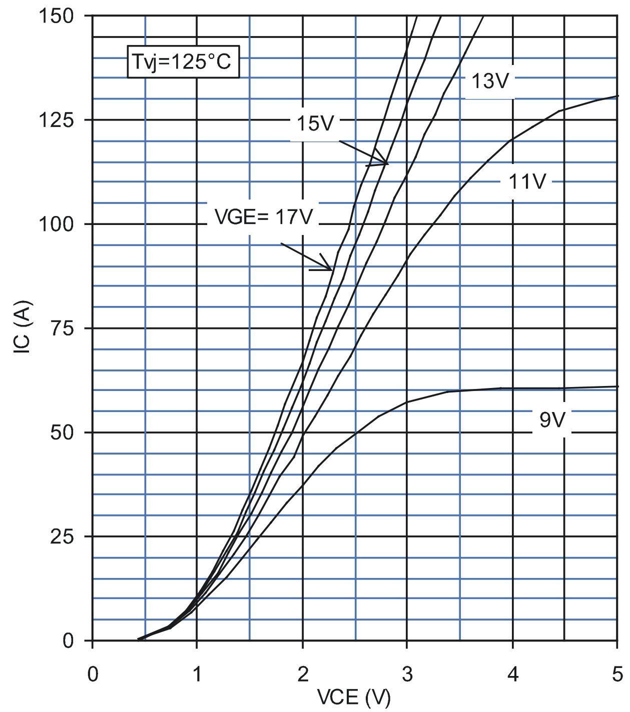

Fig. 2 Typ. Output Characteristics at Tvj=125℃

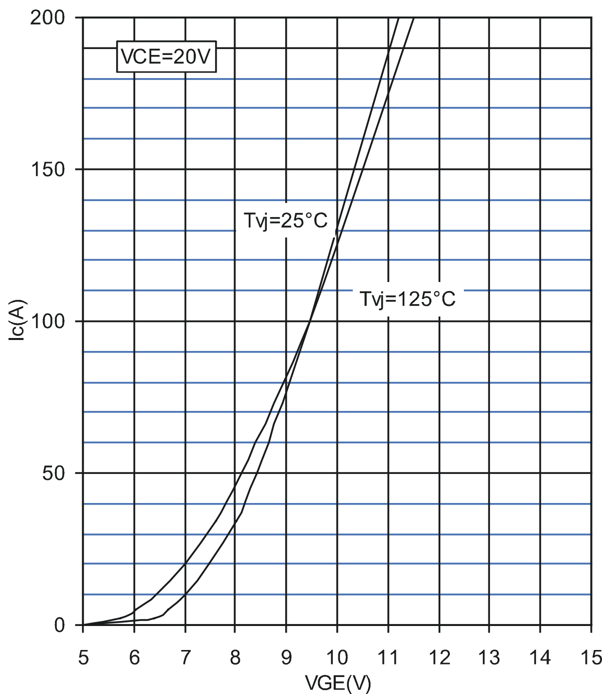

Fig. 3 Typ. Transfer Characteristics

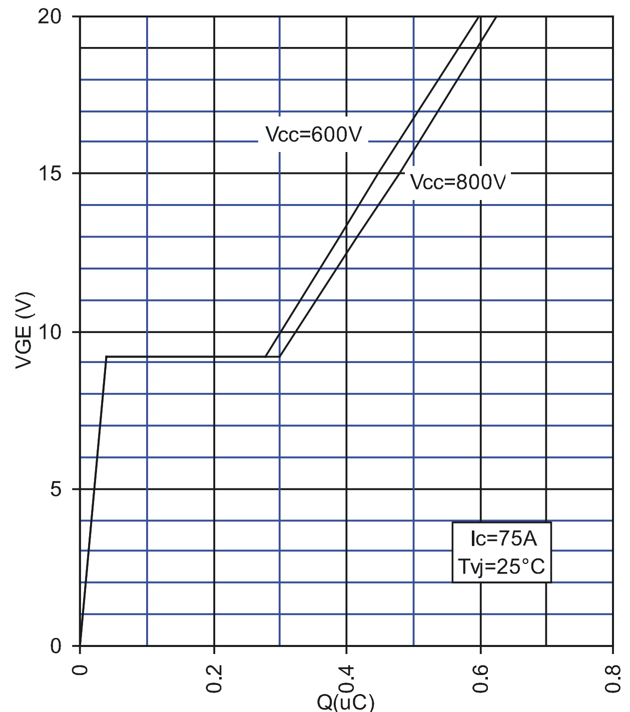

Fig. 4 Typ. Gate charge Characteristi

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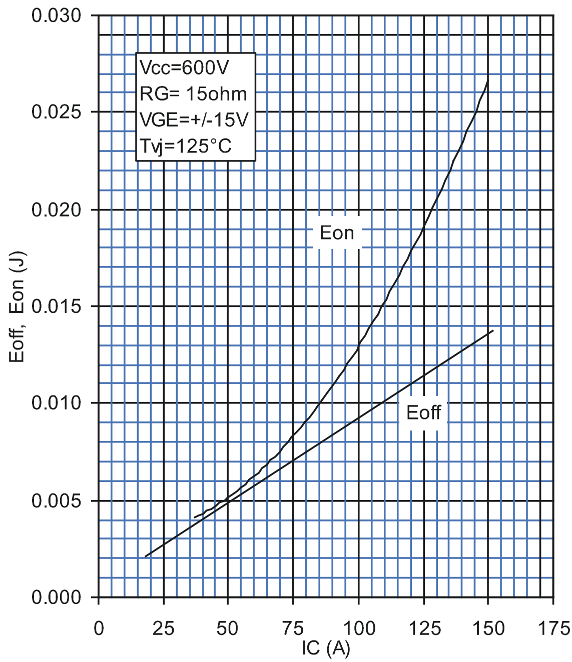

Fig. 5 Typ. Switching Energies per pulse vs on-state current

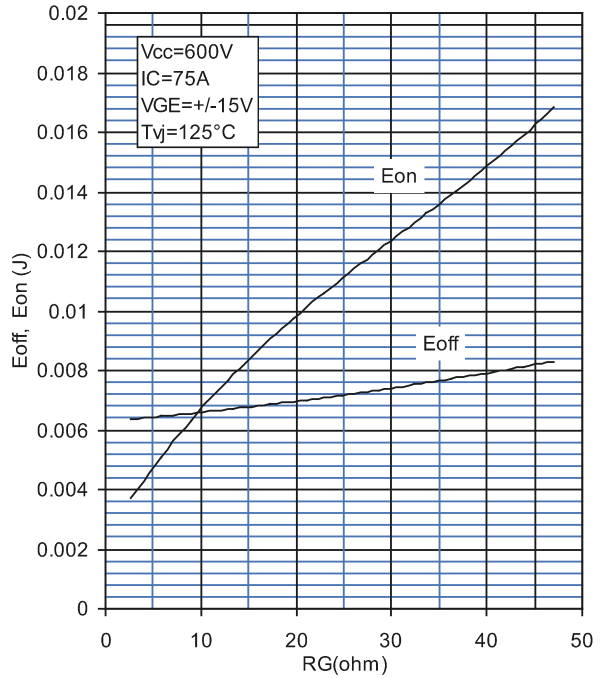

Fig. 6 Typ. Switching Energies per pulse v gate resistor

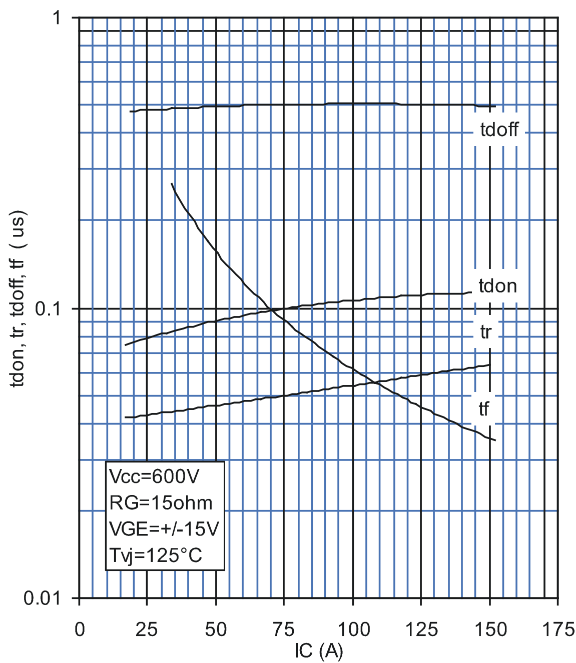

Fig. 7 Typ. Switching times vs on-state current

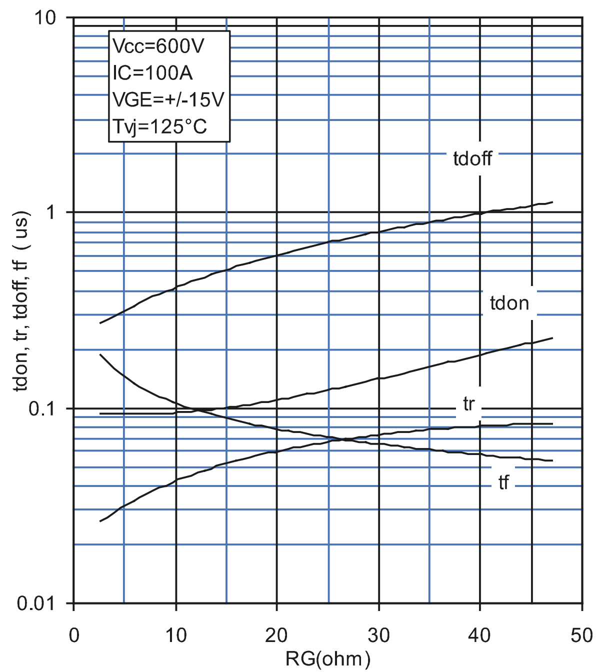

Fig. 8 Typ. Switching times vs gate resistor

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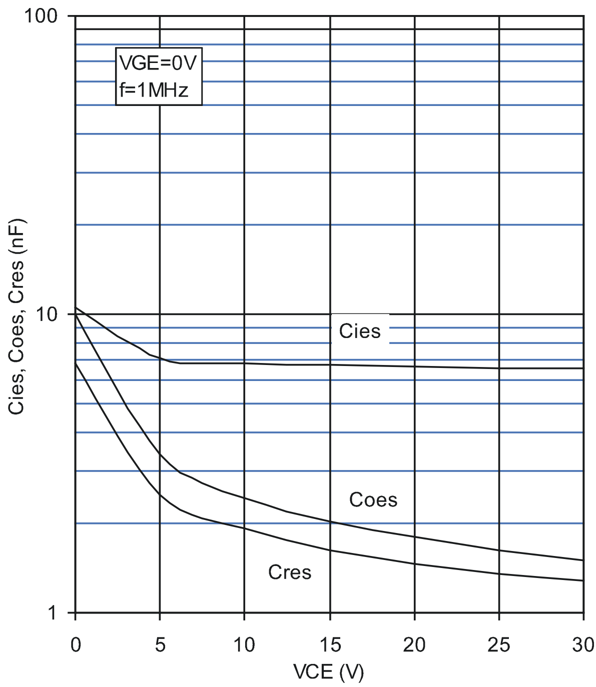

Fig. 9 Typ. Capacitances vs collector-emitter Voltage

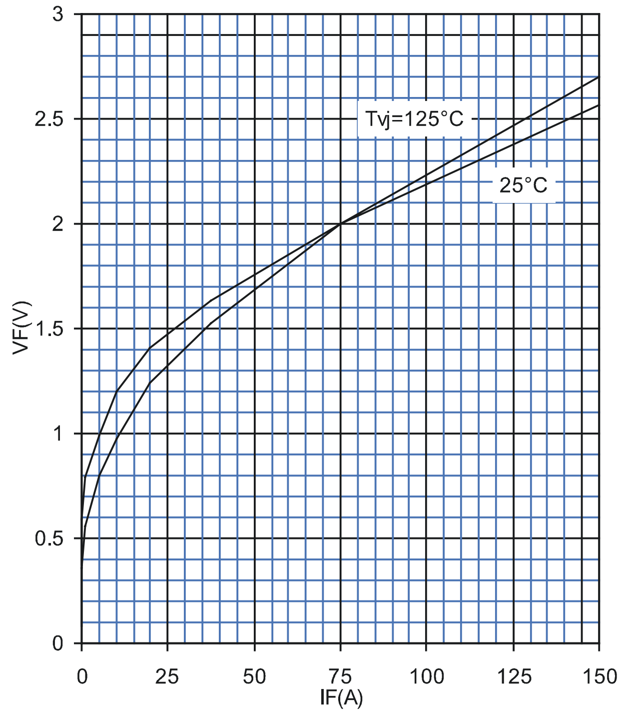

Fig. 10 Typ. Diode forward Characteristics

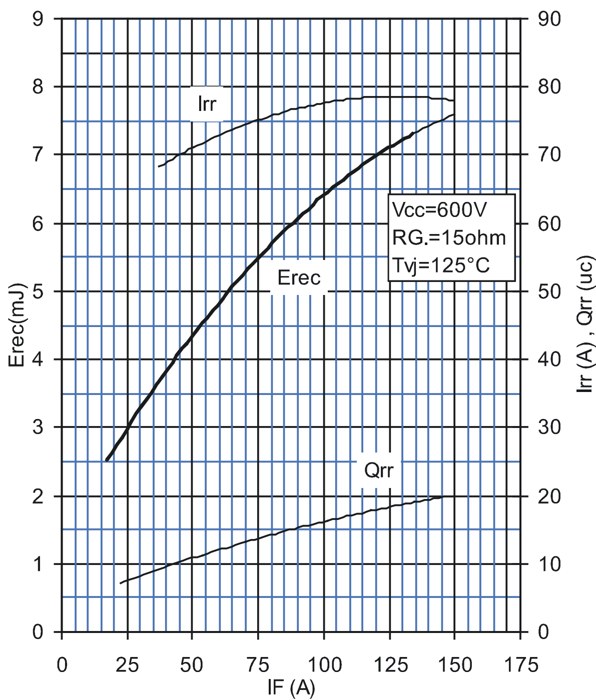

Fig. 11 Typ. Reverse Recovery Characteristics vs forward current

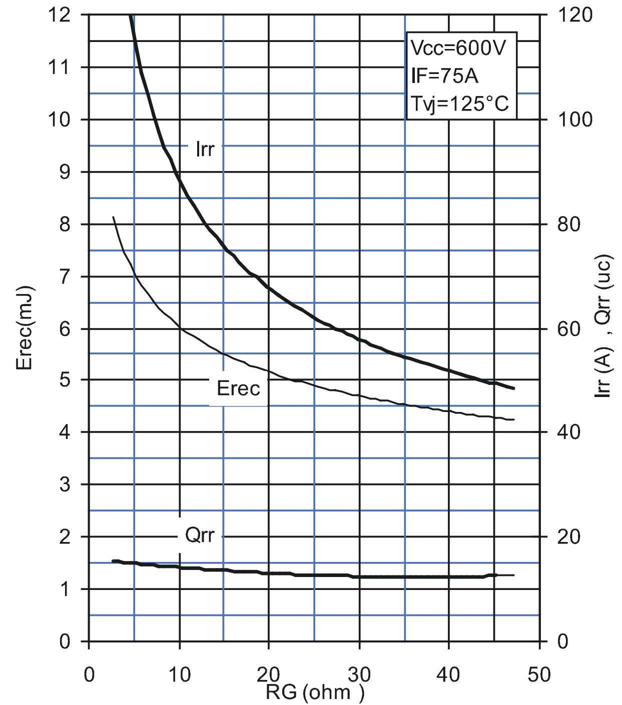

Fig. 12 Typ. Reverse Recovery Characteristics vs gate resistor

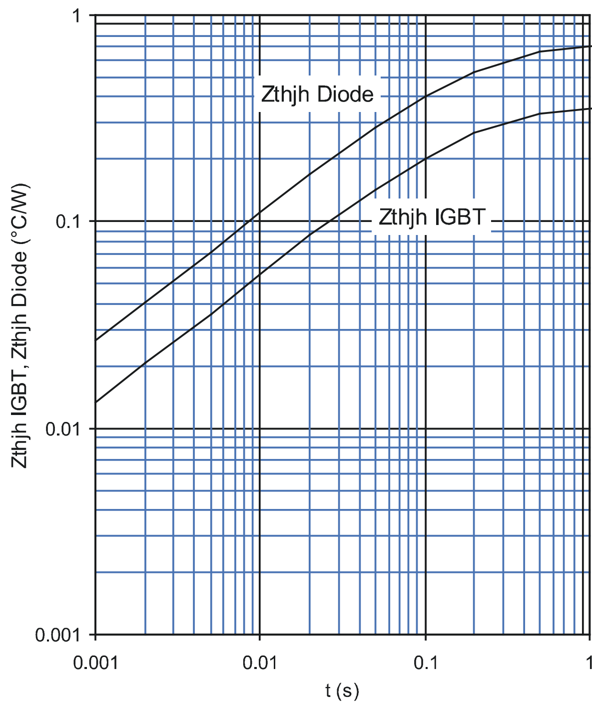

Fig. 13 Typ. Thermal impedance vs time