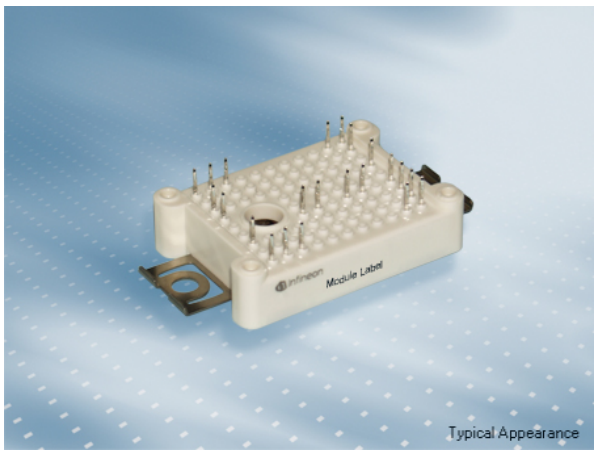
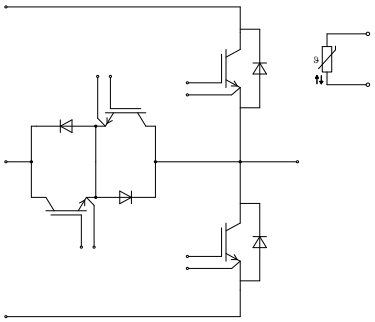
技术信息 / Technical Information

IGBT-模块
IGBT-Module

F3L75R12W1H3_B11

初步数据 / Preliminary Data





V_{CES} = 1200V
$I_{C\ nom}$ = 75A / I_{CRM} = 150A

典型应用
- 三电平应用
- 太阳能应用

Typical Applications
- 3-Level-Applications
- Solar Applications

电气特性
- 低电感设计
- 低开关损耗
- 低 V_{CEsat}

Electrical Features
- Low Inductive Design
- Low Switching Losses
- Low V_{CEsat}

机械特性
- 低热阻的三氧化二铝（ Al_2O_3 衬底
- 紧凑型设计
- PressFIT 压接技术
- 集成的安装夹使安装坚固

Mechanical Features
- Al_2O_3 Substrate with Low Thermal Resistance
- Compact design
- PressFIT Contact Technology
- Rugged mounting due to integrated mounting clamps

Module Label Code

Barcode Code 128

Sample
00000123456000000000000

DMX - Code

Content of the Code	Digit
Module Serial Number	1 - 5
Module Material Number	6 - 11
Production Order Number	12 - 19
Datecode (Production Year)	20 - 21
Datecode (Production Week)	22 - 23

prepared by: CM	date of publication: 2015-08-26	
approved by: AKDA	revision: V2.0	UL approved (E83335)

初步数据
Preliminary Data

IGBT, T1-T4 / IGBT, T1-T4

最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
集电极电流 Implemented collector current		I_{CN}	75	A
连续集电极直流电流 Continuous DC collector current	T_C = 100°C, $T_{vj\,max}$ = 175°C T_C = 25°C, $T_{vj\,max}$ = 175°C	$I_{C\,nom}$ I_C	30 45	A A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	150	A
总功率损耗 Total power dissipation	T_C = 25°C, $T_{vj\,max}$ = 175°C	P_{tot}	275	W
栅极 - 发射极峰值电压 Gate-emitter peak voltage		V_{GES}	+/-20	V

特征值 / Characteristic Values

			min.	typ.	max.	
集电极 - 发射极饱和电压 Collector-emitter saturation voltage	I_C = 30 A, V_{GE} = 15 V, T_{vj} = 25°C I_C = 30 A, V_{GE} = 15 V, T_{vj} = 125°C I_C = 30 A, V_{GE} = 15 V, T_{vj} = 150°C	$V_{CE\,sat}$		1,45 1,55 1,60	1,70	V V V
栅极阈值电压 Gate threshold voltage	I_C = 2,60 mA, V_{CE} = V_{GE}, T_{vj} = 25°C	V_{GEth}	5,05	5,80	6,45	V
栅极电荷 Gate charge	V_{GE} = -15 V ... +15 V	Q_G		0,57		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C	R_{Gint}		0,0		Ω
输入电容 Input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V	C_{ies}		4,40		nF
反向传输电容 Reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V	C_{res}		0,235		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C	I_{CES}			1,0	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C	I_{GES}			100	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	I_C = 30 A, V_{CE} = 400 V, T_{vj} = 25°C V_{GE} = 15 V, T_{vj} = 125°C R_{Gon} = 6,8 Ω, T_{vj} = 150°C	$t_{d\,on}$		0,03 0,03 0,03		µs µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 30 A, V_{CE} = 400 V, T_{vj} = 25°C V_{GE} = 15 V, T_{vj} = 125°C R_{Gon} = 6,8 Ω, T_{vj} = 150°C	t_r		0,01 0,012 0,012		µs µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 30 A, V_{CE} = 400 V, T_{vj} = 25°C V_{GE} = 15 V, T_{vj} = 125°C R_{Goff} = 6,8 Ω, T_{vj} = 150°C	$t_{d\,off}$		0,25 0,32 0,34		µs µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 30 A, V_{CE} = 400 V, T_{vj} = 25°C V_{GE} = 15 V, T_{vj} = 125°C R_{Goff} = 6,8 Ω, T_{vj} = 150°C	t_f		0,025 0,04 0,045		µs µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 30 A, V_{CE} = 400 V, L_S = 40 nH, T_{vj} = 25°C V_{GE} = 15 V, di/dt = 2600 A/µs (T_{vj} = 150°C), T_{vj} = 125°C R_{Gon} = 6,8 Ω, T_{vj} = 150°C	E_{on}		0,40 0,60 0,70		mJ mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 30 A, V_{CE} = 400 V, L_S = 40 nH, T_{vj} = 25°C V_{GE} = 15 V, du/dt = 2400 V/µs (T_{vj} = 150°C), T_{vj} = 125°C R_{Goff} = 6,8 Ω, T_{vj} = 150°C	E_{off}		1,05 1,60 1,75		mJ mJ mJ
短路数据 SC data	V_{GE} ≤ 15 V, V_{CC} = 800 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt, t_P ≤ 10 µs, T_{vj} = 150°C	I_{SC}		270		A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT	R_{thJC}		0,500	0,550	K/W

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初步数据
Preliminary Data

外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个 IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,450		K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40		150	°C

二极管, D1 / D4 / Diode, D1 / D4

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}		1200		V
连续正向直流电流 Continuous DC forward current		I_F		30		A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}		60		A
I2t-值 I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I²t		310		A²s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	I_F = 30 A, V_{GE} = 0 V I_F = 30 A, V_{GE} = 0 V I_F = 30 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		2,15 1,85 1,70	t.b.d.	V V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 30 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 400 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		85,0 90,0 95,0		A A A
恢复电荷 Recovered charge	I_F = 30 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 400 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		2,30 2,95 3,30		µC µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 30 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 400 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		0,85 1,25 1,35		mJ mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}		0,700	0,750	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个二极管 / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}		0,700		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\ op}$	-40		150	°C

初步数据
Preliminary Data

IGBT, T2 / T3 / IGBT, T2 / T3

最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	650	V
集电极电流 Implemented collector current		I_{CN}	50	A
连续集电极直流电流 Continuous DC collector current	T_C = 100°C, $T_{vj\,max}$ = 175°C T_C = 25°C, $T_{vj\,max}$ = 175°C	$I_{C\,nom}$ I_C	30 60	A A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	100	A
总功率损耗 Total power dissipation	T_C = 25°C, $T_{vj\,max}$ = 175°C	P_{tot}	175	W
栅极 - 发射极峰值电压 Gate-emitter peak voltage		V_{GES}	+/-20	V

特征值 / Characteristic Values

			min.	typ.	max.	
集电极 - 发射极饱和电压 Collector-emitter saturation voltage	I_C = 30 A, V_{GE} = 15 V, T_{vj} = 25°C I_C = 30 A, V_{GE} = 15 V, T_{vj} = 125°C I_C = 30 A, V_{GE} = 15 V, T_{vj} = 150°C	$V_{CE\,sat}$		1,25 1,30 1,30	1,50	V V V
栅极阈值电压 Gate threshold voltage	I_C = 0,80 mA, V_{CE} = V_{GE}, T_{vj} = 25°C	V_{GEth}	5,05	5,80	6,45	V
栅极电荷 Gate charge	V_{GE} = -15 V ... +15 V	Q_G		0,50		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C	R_{Gint}		0,0		Ω
输入电容 Input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V	C_{ies}		3,10		nF
反向传输电容 Reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V	C_{res}		0,095		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 650 V, V_{GE} = 0 V, T_{vj} = 25°C	I_{CES}			1,0	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C	I_{GES}			100	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	I_C = 30 A, V_{CE} = 400 V, T_{vj} = 25°C V_{GE} = 15 V, T_{vj} = 125°C R_{Gon} = 6,2 Ω, T_{vj} = 150°C	$t_{d\,on}$		0,022 0,022 0,025		µs µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 30 A, V_{CE} = 400 V, T_{vj} = 25°C V_{GE} = 15 V, T_{vj} = 125°C R_{Gon} = 6,2 Ω, T_{vj} = 150°C	t_r		0,01 0,012 0,012		µs µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 30 A, V_{CE} = 400 V, T_{vj} = 25°C V_{GE} = 15 V, T_{vj} = 125°C R_{Goff} = 6,2 Ω, T_{vj} = 150°C	$t_{d\,off}$		0,12 0,15 0,165		µs µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 30 A, V_{CE} = 400 V, T_{vj} = 25°C V_{GE} = 15 V, T_{vj} = 125°C R_{Goff} = 6,2 Ω, T_{vj} = 150°C	t_f		0,025 0,037 0,04		µs µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 30 A, V_{CE} = 400 V, L_S = 40 nH, T_{vj} = 25°C V_{GE} = 15 V, di/dt = 3000 A/µs (T_{vj} = 150°C), T_{vj} = 125°C R_{Gon} = 6,2 Ω, T_{vj} = 150°C	E_{on}		0,40 0,55 0,60		mJ mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 30 A, V_{CE} = 400 V, L_S = 40 nH, T_{vj} = 25°C V_{GE} = 15 V, du/dt = 4200 V/µs (T_{vj} = 150°C), T_{vj} = 125°C R_{Goff} = 6,2 Ω, T_{vj} = 150°C	E_{off}		0,90 1,20 1,30		mJ mJ mJ
短路数据 SC data	V_{GE} ≤ 15 V, V_{CC} = 360 V, t_P ≤ 8 µs, T_{vj} = 25°C V_{CEmax} = V_{CES} -L_{sCE} ·di/dt, t_P ≤ 6 µs, T_{vj} = 150°C	I_{SC}		350 250		A A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT	R_{thJC}		0,750	0,850	K/W

初步数据
Preliminary Data

外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个 IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,700		K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40		150	°C

二极管, D2 / D3 / Diode, D2 / D3

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}		650		V
正向电流 Implemented forward current		I_{FN}		50		A
连续正向直流电流 Continuous DC forward current		I_F		30		A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}		100		A
I2t-值 I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C V_R = 0 V, t_P = 10 ms, T_{vj} = 150°C	I²t		130 115		A²s A²s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	I_F = 30 A, V_{GE} = 0 V, T_{vj} = 25°C I_F = 30 A, V_{GE} = 0 V, T_{vj} = 125°C I_F = 30 A, V_{GE} = 0 V, T_{vj} = 150°C	V_F		1,45 1,35 1,30	1,65	V V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 30 A, - di_F/dt = 2600 A/µs (T_{vj}=150°C), T_{vj} = 25°C V_R = 400 V, T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		42,0 48,0 50,0		A A A
恢复电荷 Recovered charge	I_F = 30 A, - di_F/dt = 2600 A/µs (T_{vj}=150°C), T_{vj} = 25°C V_R = 400 V, T_{vj} = 125°C T_{vj} = 150°C	Q_r		1,80 2,40 2,60		µC µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 30 A, - di_F/dt = 2600 A/µs (T_{vj}=150°C), T_{vj} = 25°C V_R = 400 V, T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		0,45 0,65 0,73		mJ mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}		0,800	1,10	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个二极管 / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,600		K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40		150	°C

负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

			min.	typ.	max.	
额定电阻值 Rated resistance	T_C = 25°C	R_{25}		5,00		kΩ
R100 偏差 Deviation of R100	T_C = 100°C, R_{100} = 493 Ω	ΔR/R	-5		5	%
耗散功率 Power dissipation	T_C = 25°C	P_{25}			20,0	mW
B-值 B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15\ K))]$	$B_{25/50}$		3375		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15\ K))]$	$B_{25/80}$		3411		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15\ K))]$	$B_{25/100}$		3433		K

根据应用手册标定
Specification according to the valid application note.

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初步数据
Preliminary Data

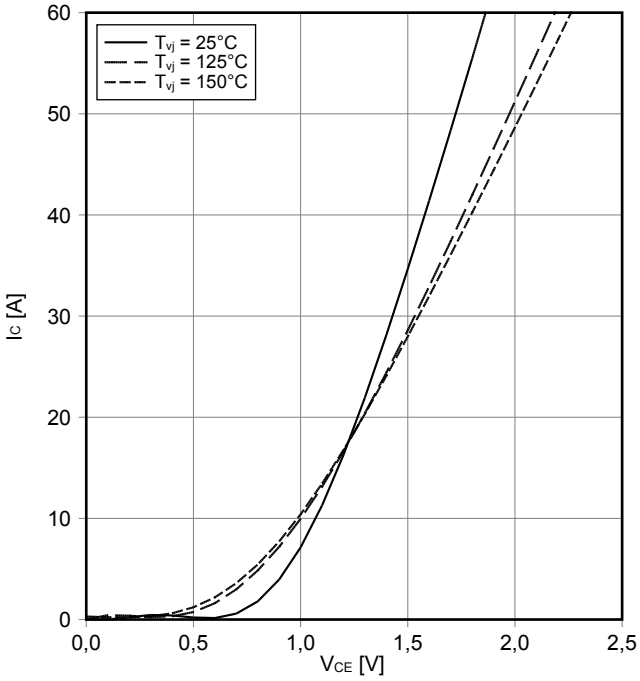
模块 / Module

绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		3,0		kV
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)			Al_2O_3		
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal			11,5 6,3		mm
电气间隙 Clearance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal			10,0 5,0		mm
相对电痕指数 Comperative tracking index		CTI		> 200		
			min.	typ.	max.	
杂散电感,模块 Stray inductance module		L_{sCE}		30		nH
模块引线电阻,端子-芯片 Module lead resistance, terminals - chip	T_C = 25°C, 每个开关 / per switch	$R_{CC'+EE'}$ $R_{AA'+CC'}$		5,00 6,00		mΩ
储存温度 Storage temperature		T_{stg}	-40		125	°C
Anpresskraft für mech. Bef. pro Feder mountig force per clamp		F	40	-	80	N
重量 Weight		G		24		g

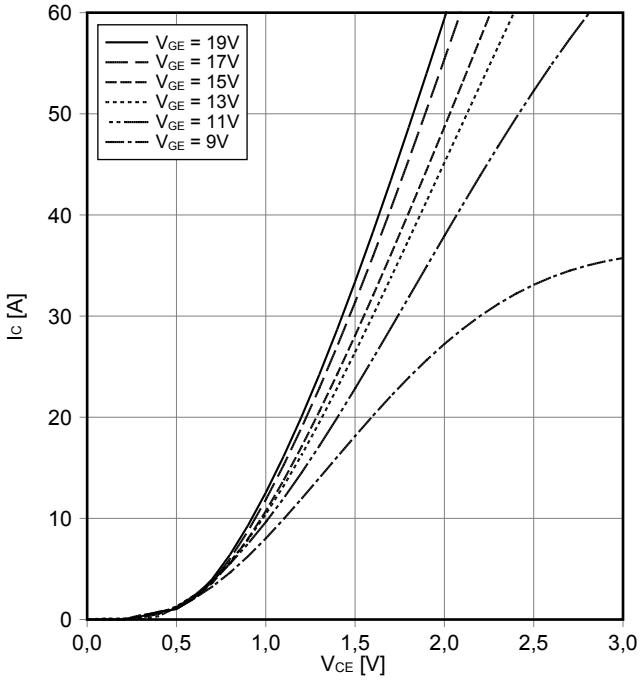
Der Strom im Dauerbetrieb ist auf 25A effektiv pro Anschlusspin begrenzt.
The current under continuous operation is limited to 25A rms per connector pin.

初步数据
Preliminary Data

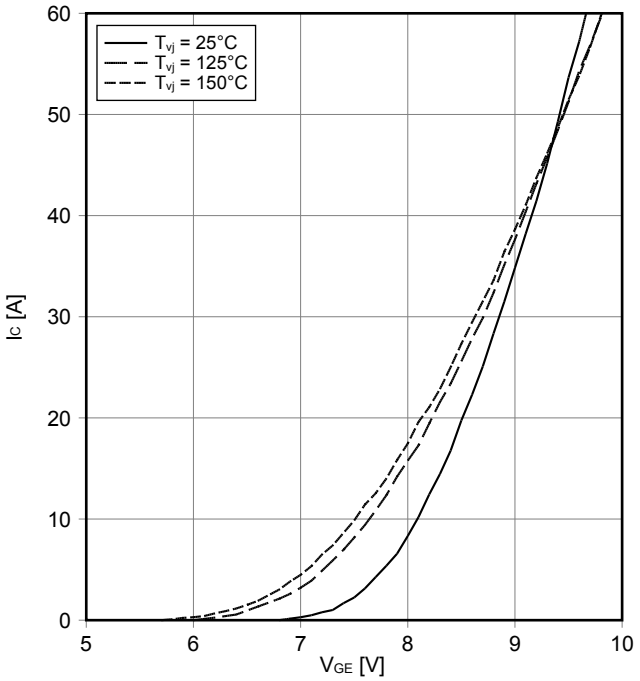
输出特性 IGBT, T1-T4 （典型）
output characteristic IGBT, T1-T4 (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



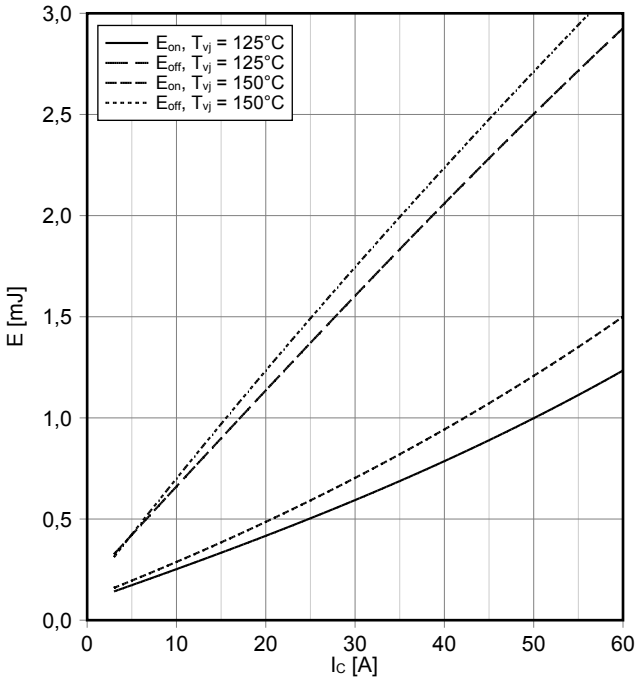
输出特性 IGBT, T1-T4 （典型）
output characteristic IGBT, T1-T4 (typical)
$I_C = f(V_{CE})$
T_{vj} = 150°C



传输特性 IGBT, T1-T4 (典型)
transfer characteristic IGBT, T1-T4 (typical)
$I_C = f(V_{GE})$
V_{CE} = 20 V



开关损耗 IGBT, T1-T4 （典型）
switching losses IGBT, T1-T4 (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
V_{GE} = ±15 V, R_{Gon} = 6.8 Ω, R_{Goff} = 6.8 Ω, V_{CE} = 400 V



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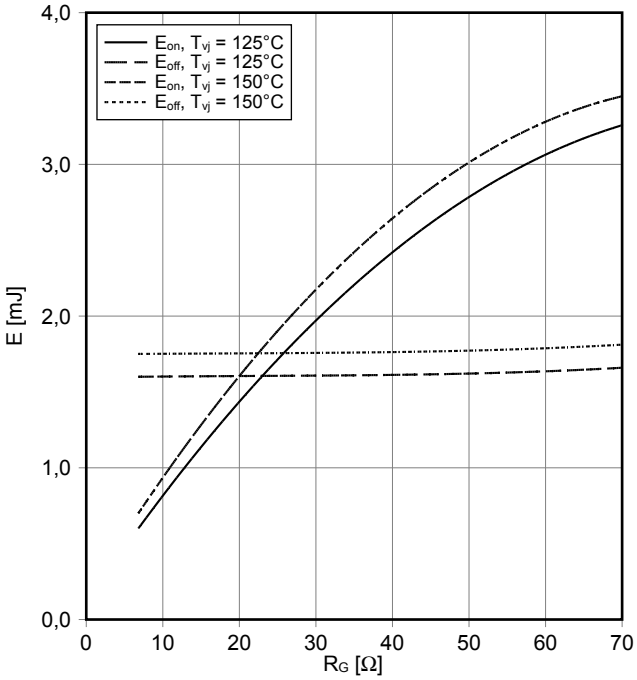
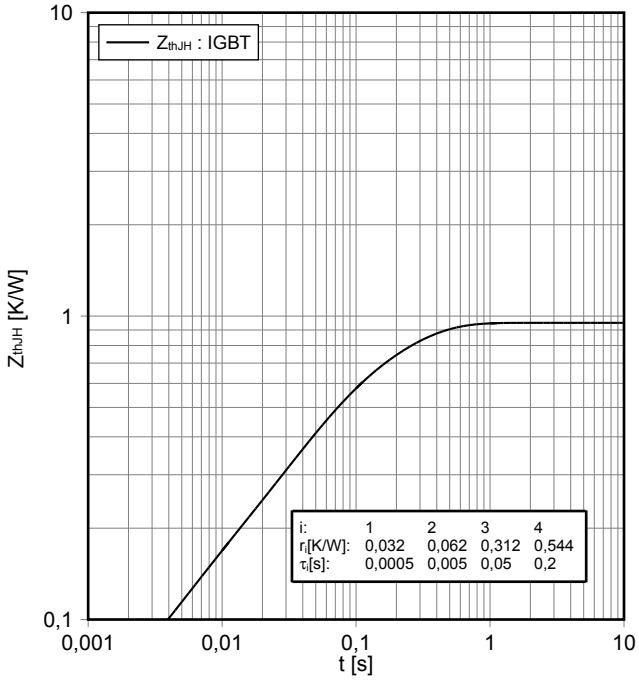
初步数据
Preliminary Data

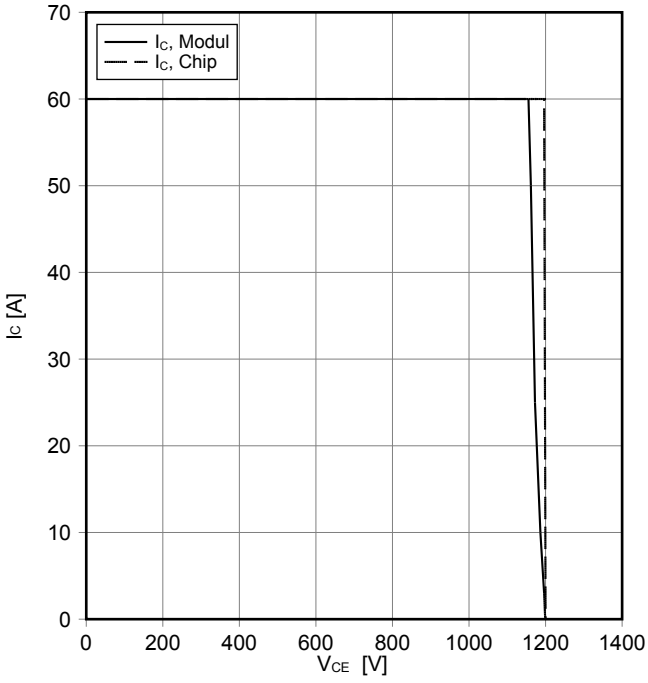
开关损耗 IGBT, T1-T4 （典型）
switching losses IGBT, T1-T4 (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
V_{GE} = ±15 V, I_C = 30 A, V_{CE} = 400 V



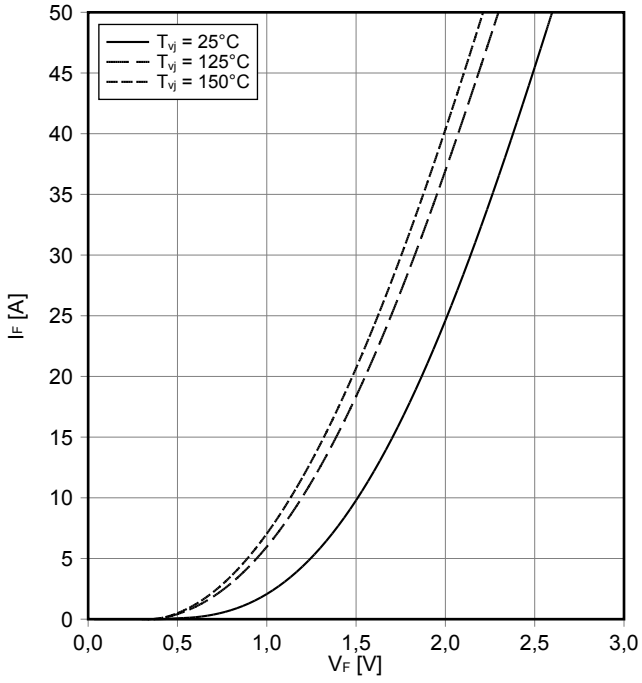
瞬态热阻抗 IGBT, T1-T4
transient thermal impedance IGBT, T1-T4
$Z_{thJH} = f(t)$



反偏安全工作区 IGBT, T1-T4 （RBSOA）
reverse bias safe operating area IGBT, T1-T4 (RBSOA)
$I_C = f(V_{CE})$
V_{GE} = ±15 V, R_{Goff} = 6.8 Ω, T_{vj} = 150°C



正向偏压特性 二极管, D1 / D4 （典型）
forward characteristic of Diode, D1 / D4 (typical)
$I_F = f(V_F)$



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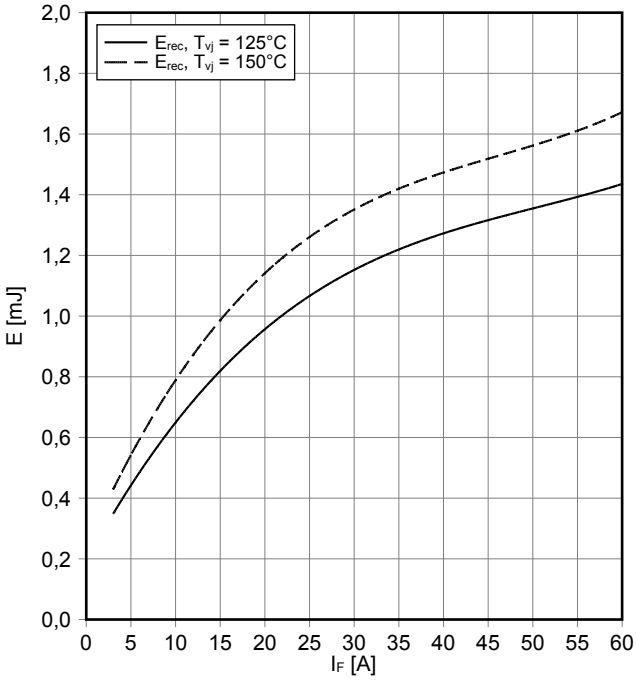
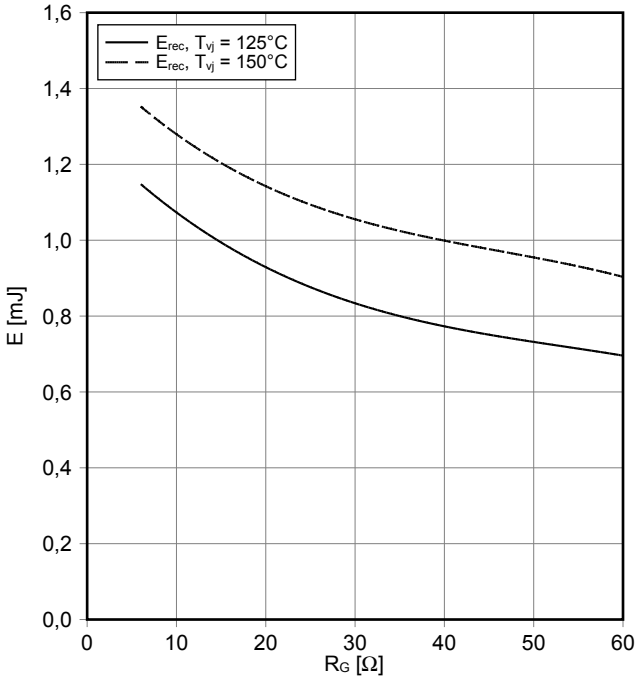
初步数据
Preliminary Data

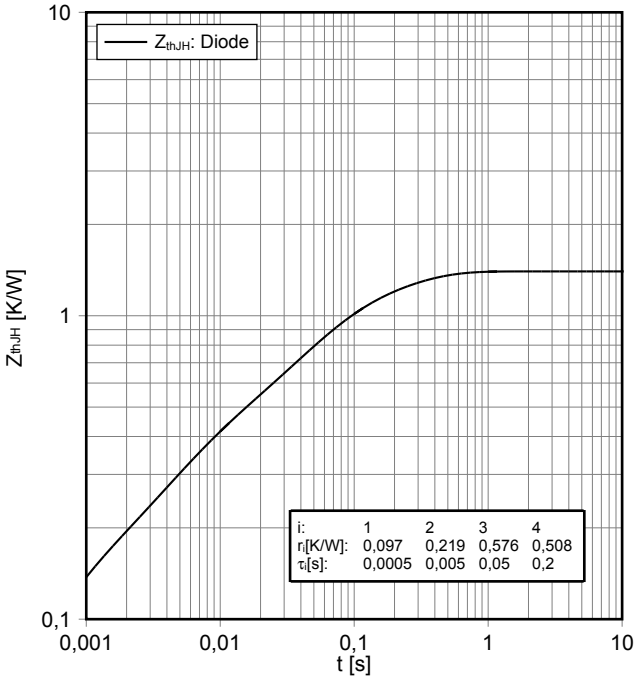
开关损耗 二极管, D1 / D4 （典型）
switching losses Diode, D1 / D4 (typical)
$E_{rec} = f(I_F)$
$R_{Gon} = 6{,}2\ \Omega$, $V_{CE} = 400$ V



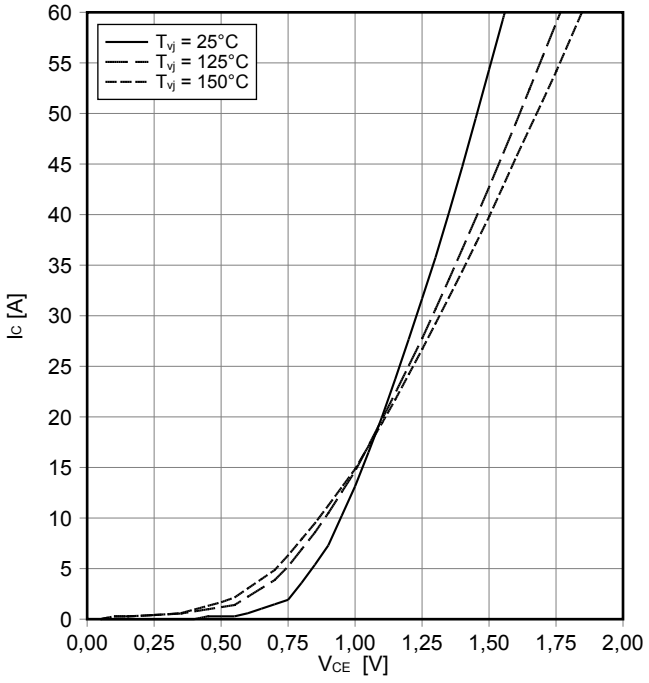
开关损耗 二极管, D1 / D4 （典型）
switching losses Diode, D1 / D4 (typical)
$E_{rec} = f(R_G)$
$I_F = 30$ A, $V_{CE} = 400$ V



瞬态热阻抗 二极管, D1 / D4
transient thermal impedance Diode, D1 / D4
$Z_{thJH} = f(t)$



输出特性 IGBT, T2 / T3 （典型）
output characteristic IGBT, T2 / T3 (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15$ V



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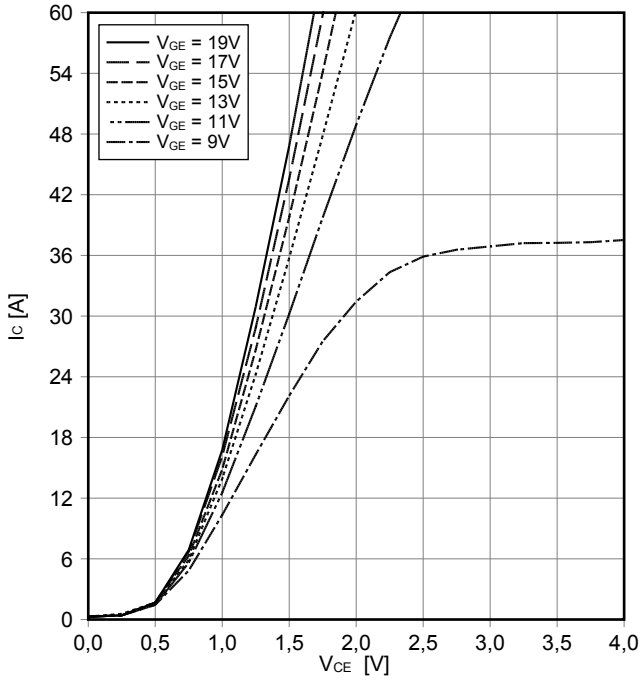
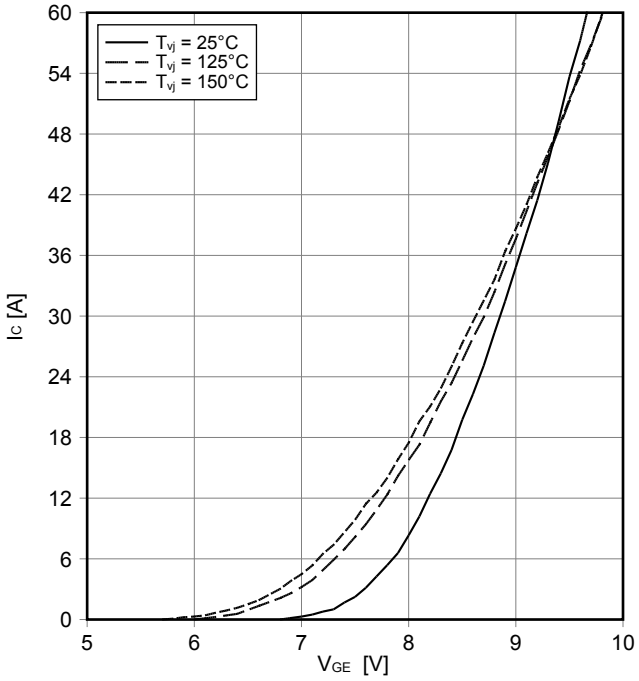
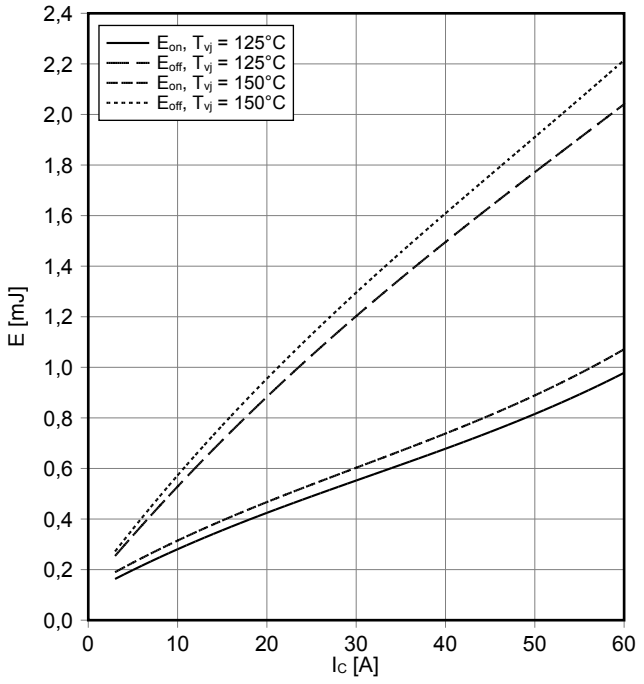
输出特性 IGBT, T2 / T3 （典型）
output characteristic IGBT, T2 / T3 (typical)
$I_C = f(V_{CE})$
$T_{vj} = 150°C$



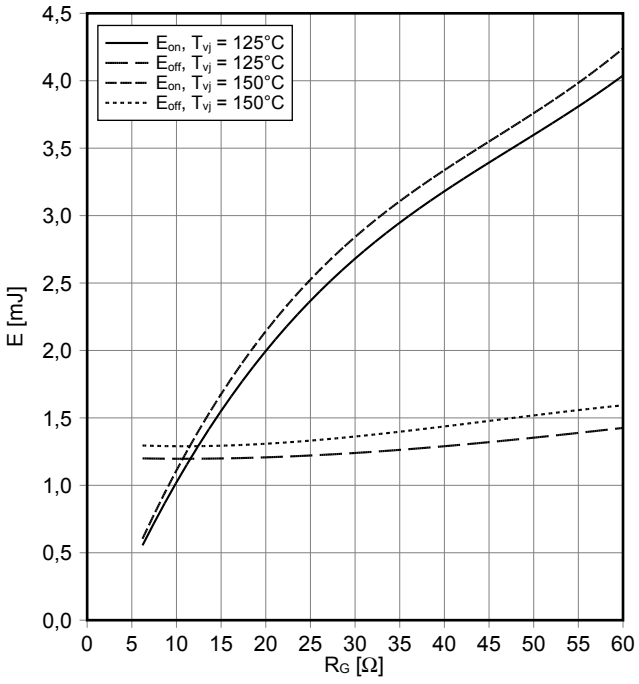
传输特性 IGBT, T2 / T3 (典型)
transfer characteristic IGBT, T2 / T3 (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20$ V



开关损耗 IGBT, T2 / T3 （典型）
switching losses IGBT, T2 / T3 (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm 15$ V, $R_{Gon} = 6.2\ \Omega$, $R_{Goff} = 6.2\ \Omega$, $V_{CE} = 400$ V



开关损耗 IGBT, T2 / T3 （典型）
switching losses IGBT, T2 / T3 (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm 15$ V, $I_C = 30$ A, $V_{CE} = 400$ V



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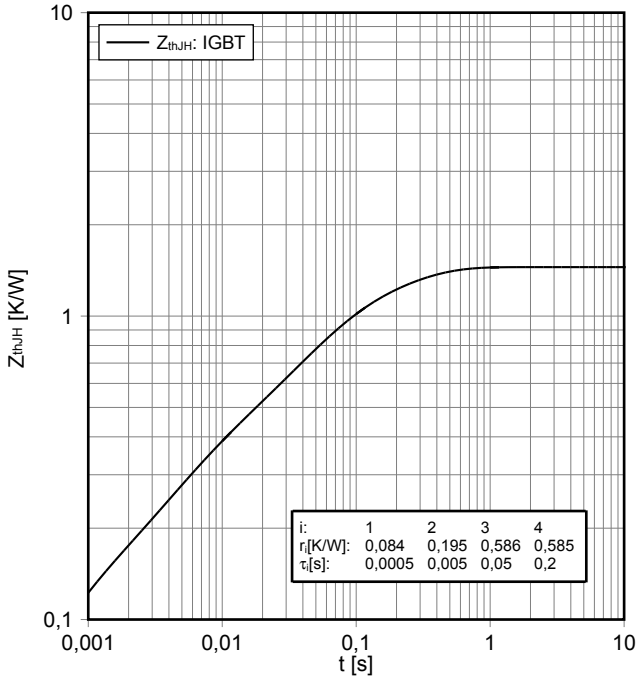
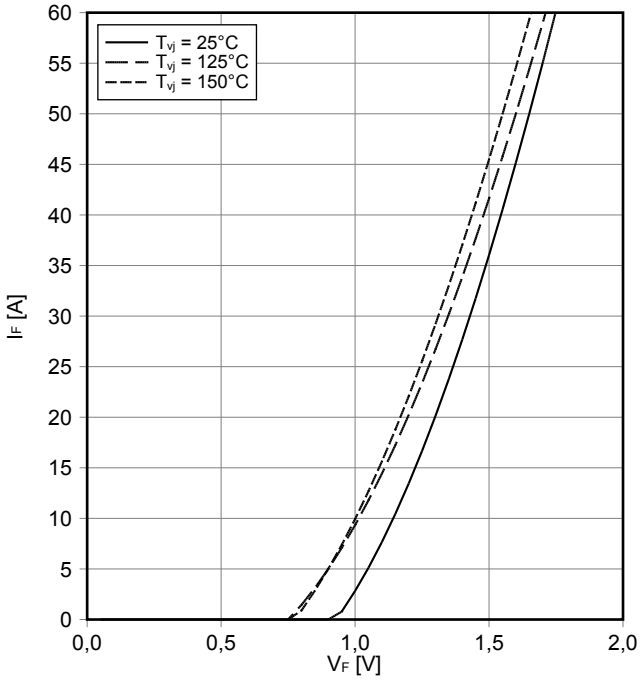
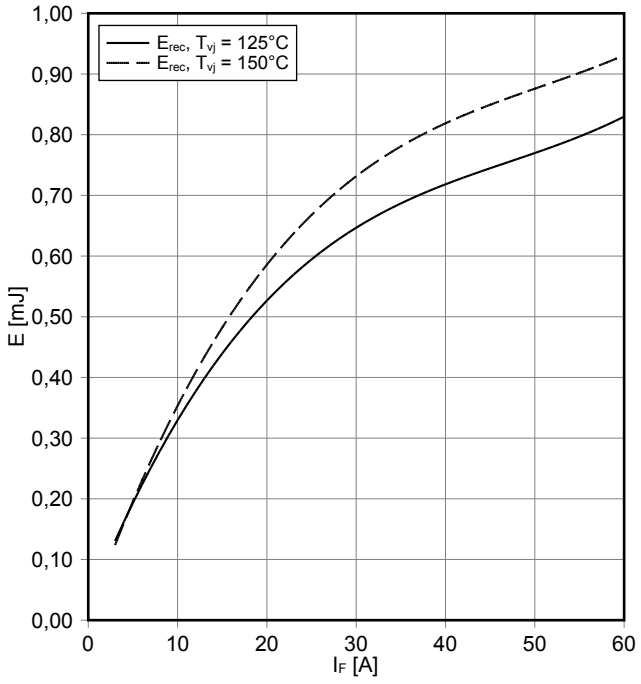
瞬态热阻抗 IGBT, T2 / T3
transient thermal impedance IGBT, T2 / T3
$Z_{thJH} = f(t)$



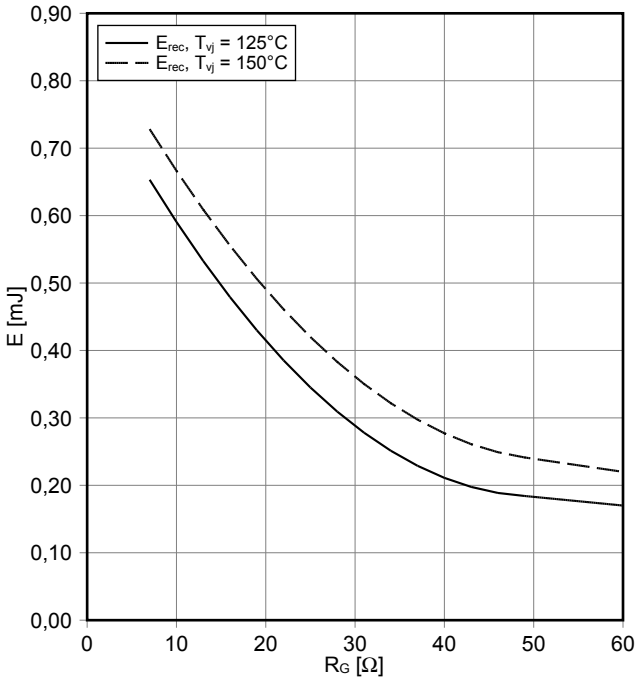
正向偏压特性 二极管, D2 / D3 （典型）
forward characteristic of Diode, D2 / D3 (typical)
$I_F = f(V_F)$



开关损耗 二极管, D2 / D3 （典型）
switching losses Diode, D2 / D3 (typical)
$E_{rec} = f(I_F)$
$R_{Gon} = 6.8\ \Omega$, $V_{CE} = 400$ V



开关损耗 二极管, D2 / D3 （典型）
switching losses Diode, D2 / D3 (typical)
$E_{rec} = f(R_G)$
$I_F = 30$ A, $V_{CE} = 400$ V



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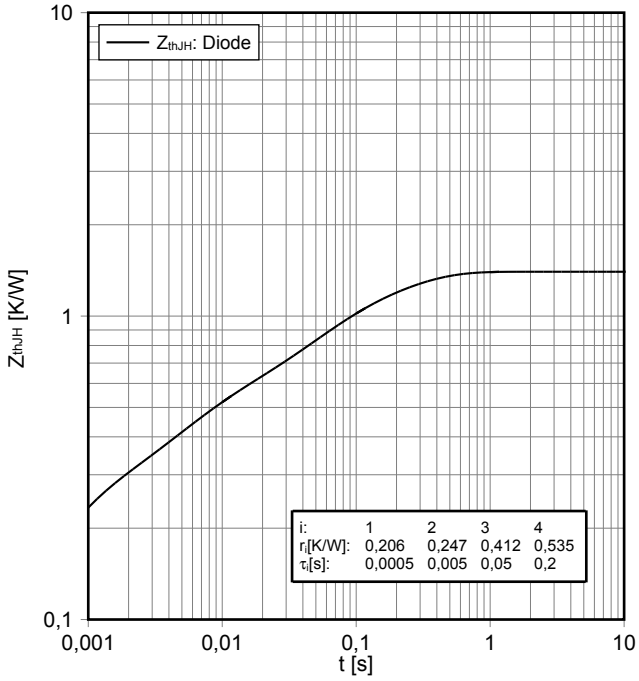
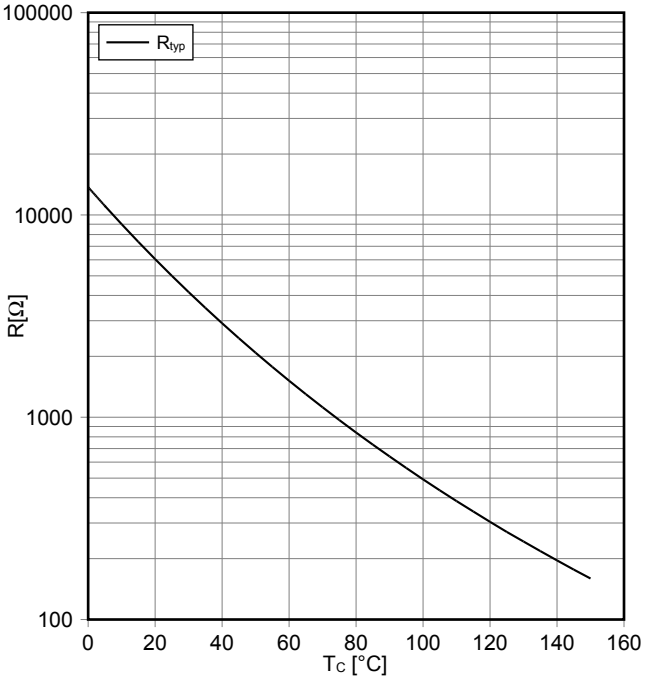
瞬态热阻抗 二极管, D2 / D3
transient thermal impedance Diode, D2 / D3
$Z_{thJH} = f(t)$



负温度系数热敏电阻 温度特性
NTC-Thermistor-temperature characteristic (typical)
$R = f(T)$



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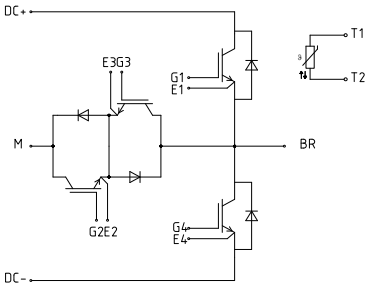
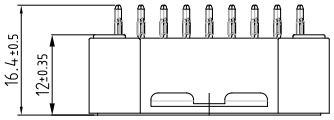
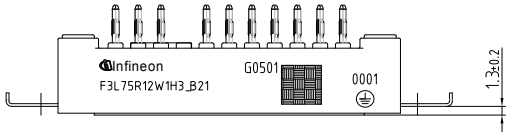
初步数据
Preliminary Data

接线图 / Circuit diagram

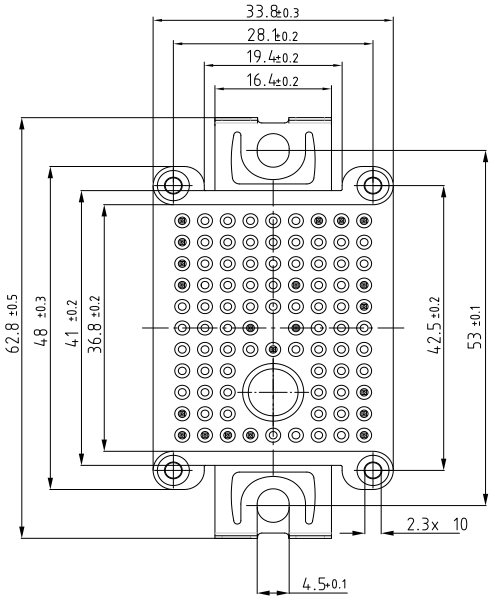


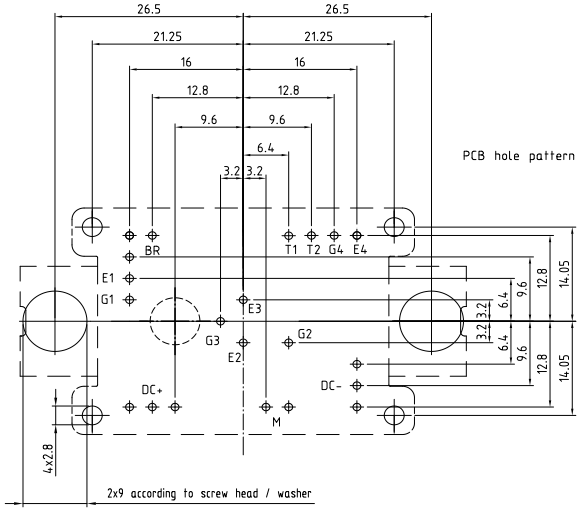
封装尺寸 / Package outlines





- Pin-Grid 3.2mm
- Tolerance of PCB hole pattern ⌖ ⌀0.1
- Hole specification for contacts see AN 2009-01
- Diameters of drill ⌀ 1.15mm
  and copper thickness in hole 25-50µm





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初步数据
Preliminary Data

使用条件和条款

使用条件和条款
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-得到质量协议的结论
- 建立联合的测试和出厂产品检查， 我们可以根据测试的实际情况供货
如果有必要，请根据实际需要将类似的说明给你的客户
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- to perform joint Risk and Quality Assessments;
- the conclusion of Quality Agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery depended on the realization of any such measures.

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