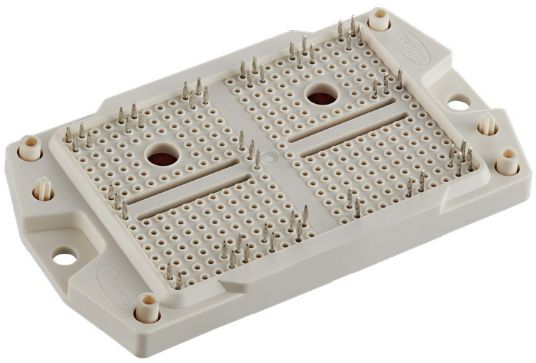
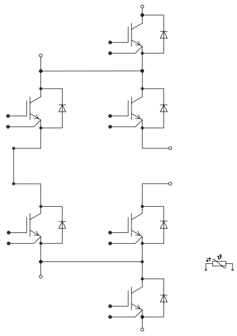
F3L400R10W3S7F_B11

EasyPACK™ 模块 采用第七代沟槽栅/场终止IGBT7和碳化硅二极管 带有pressfit压接管脚和温度检测NTC
EasyPACK™ module with TRENCHSTOP™ IGBT7 and CoolSiC™ Schottky diode and PressFIT / NTC





V_{CES} = 950V
$I_{C\ nom}$ = 400A / I_{CRM} = 800A

潜在应用
- 三电平应用
- 太阳能应用

Potential Applications
- 3-level-applications
- Solar applications

电气特性
- CoolSiC™ 碳化硅肖特基二极管第5代
- 低开关损耗
- 低电感设计
- 沟槽栅IGBT7

Electrical Features
- CoolSiC™ Schottky diode gen 5
- Low switching losses
- Low inductive design
- Trenchstop™ IGBT7

机械特性
- PressFIT 压接技术
- 封装的 CTI > 400
- 集成NTC温度传感器

Mechanical Features
- PressFIT contact technology
- Package with CTI > 400
- Integrated NTC temperature sensor

Module Label Code

Barcode Code 128

0000012345600000000000

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

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}	950	V
集电极电流 Implemented collector current		I_{CN}	400	A
连续集电极直流电流 Continuous DC collector current	T_H = 65°C, $T_{vj\,max}$ = 175°C	I_{CDC}	220	A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	800	A
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 = 150 A V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\,sat}$		1,40 1,48 1,50	1,60	V V V
栅极阈值电压 Gate threshold voltage	I_C = 6,50 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	4,35	5,10	5,85	V
栅极电荷 Gate charge	V_{GE} = -15 / 15 V, V_{CE} = 600 V		Q_G		0,90		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		0,75		Ω
输入电容 Input capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		25,2		nF
反向传输电容 Reverse transfer capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,078		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 950 V, V_{GE} = 0 V	T_{vj} = 25°C	I_{CES}			0,071	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 = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,on}$		0,094 0,094 0,094		µs µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,033 0,033 0,033		µs µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Goff} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,off}$		0,74 0,81 0,82		µs µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Goff} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,033 0,057 0,07		µs µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 150 A, V_{CE} = 500 V, $L\sigma$ = 35 nH di/dt = 4200 A/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		4,30 4,30 4,30		mJ mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 150 A, V_{CE} = 500 V, $L\sigma$ = 35 nH du/dt = 4600 V/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Goff} = 20 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		5,00 6,60 7,30		mJ mJ mJ
短路数据 SC data	$V_{GE} \leq$ 15 V, V_{CC} = 600 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	$t_P \leq$ 0 µs, T_{vj} = 150°C	I_{SC}		1200		A
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个 IGBT / per IGBT		R_{thJH}		0,240		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\,op}$	-40		150	°C

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}	950	V
集电极电流 Implemented collector current		I_{CN}	400	A
连续集电极直流电流 Continuous DC collector current	T_H = 65°C, $T_{vj\,max}$ = 175°C	I_{CDC}	295	A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	800	A
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 = 150 A V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\,sat}$		1,07 1,04 1,02	1,15	V V V
栅极阈值电压 Gate threshold voltage	I_C = 6,50 mA, V_{CE} = 20 V, T_{vj} = 25°C		V_{GEth}	4,15	4,90	5,65	V
栅极电荷 Gate charge	V_{GE} = -15 / 15 V, V_{CE} = 600 V		Q_G		4,10		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		0,75		Ω
输入电容 Input capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		49,2		nF
反向传输电容 Reverse transfer capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,228		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 950 V, V_{GE} = 0 V	T_{vj} = 25°C	I_{CES}			0,071	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 = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,on}$		0,21 0,19 0,18		µs µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,034 0,038 0,039		µs µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Goff} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,off}$		0,85 0,96 0,98		µs µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Goff} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,24 0,45 0,50		µs µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 150 A, V_{CE} = 500 V, Lσ = 35 nH di/dt = 4500 A/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		3,35 3,46 3,49		mJ mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 150 A, V_{CE} = 500 V, Lσ = 35 nH du/dt = 1350 V/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Goff} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		24,8 35,6 37,9		mJ mJ mJ
短路数据 SC data	V_{GE} ≤ 15 V, V_{CC} = 600 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 0 µs, T_{vj} = 150°C	I_{SC}		1200		A
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个 IGBT / per IGBT		R_{thJH}		0,280		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\,op}$	-40		150	°C

IGBT, T5 / T6 / IGBT, T5 / T6

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}	950	V
集电极电流 Implemented collector current		I_{CN}	200	A
连续集电极直流电流 Continuous DC collector current	T_H = 65°C, $T_{vj\,max}$ = 175°C	I_{CDC}	115	A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	400	A
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 = 150 A V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\,sat}$		1,68 1,88 1,92	2,00	V V V
栅极阈值电压 Gate threshold voltage	I_C = 3,25 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	4,35	5,10	5,85	V
栅极电荷 Gate charge	V_{GE} = -15 / 15 V, V_{CE} = 600 V		Q_G		0,45		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		1,5		Ω
输入电容 Input capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		12,6		nF
反向传输电容 Reverse transfer capacitance	f = 100 kHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,039		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 950 V, V_{GE} = 0 V	T_{vj} = 25°C	I_{CES}			0,1	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 = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,on}$		0,086 0,093 0,094		µs µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,027 0,03 0,03		µs µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Goff} = 30 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,off}$		0,57 0,615 0,625		µs µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 150 A, V_{CE} = 500 V V_{GE} = -15 / 15 V R_{Goff} = 30 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,024 0,052 0,073		µs µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 150 A, V_{CE} = 500 V, Lσ = 35 nH di/dt = 4000 A/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Gon} = 5,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		6,35 7,60 8,00		mJ mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 150 A, V_{CE} = 500 V, Lσ = 35 nH du/dt = 5800 V/µs (T_{vj} = 150°C) V_{GE} = -15 / 15 V, R_{Goff} = 30 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		5,00 6,30 6,80		mJ mJ mJ
短路数据 SC data	$V_{GE} \leq$ 15 V, V_{CC} = 600 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	$t_P \leq$ 0 µs, T_{vj} = 150°C	I_{SC}		600		A
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个 IGBT / per IGBT		R_{thJH}		0,451		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}	950	V
正向电流 Implemented forward current		I_{FN}	200	A
连续正向直流电流 Continuous DC forward current		I_F	150	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	400	A
I2t-值 I^2t - 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	I^2t	1620 1530	A^2s A^2s

特征值 / Characteristic Values

				min.	typ.	max.	
正向电压 Forward voltage	I_F = 150 A, V_{GE} = 0 V I_F = 150 A, V_{GE} = 0 V I_F = 150 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		2,33 2,12 2,08	2,54	V V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 150 A, - di_F/dt = 4000 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		90,0 130 140		A A A
恢复电荷 Recovered charge	I_F = 150 A, - di_F/dt = 4000 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		5,50 10,0 12,5		µC µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 150 A, - di_F/dt = 4000 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		1,50 3,30 3,95		mJ mJ mJ
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个二极管 / per diode		R_{thJH}		0,570		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}	950	V
正向电流 Implemented forward current		I_{FN}	200	A
连续正向直流电流 Continuous DC forward current		I_F	150	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	400	A
I2t-值 I^2t - 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	I^2t	1620 1530	A^2s A^2s

特征值 / Characteristic Values

				min.	typ.	max.	
正向电压 Forward voltage	I_F = 150 A, V_{GE} = 0 V I_F = 150 A, V_{GE} = 0 V I_F = 150 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		2,33 2,12 2,06	2,54	V V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 150 A, - di_F/dt = 4500 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		133 180 195		A A A
恢复电荷 Recovered charge	I_F = 150 A, - di_F/dt = 4500 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		6,00 13,0 15,5		µC µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 150 A, - di_F/dt = 4500 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		2,40 5,70 6,80		mJ mJ mJ
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个二极管 / per diode		R_{thJH}		0,570		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\ op}$	-40		150	°C

二极管, D5-D6 / Diode, D5-D6

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	100	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	200	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	I^2t	1650 1550	A²s A²s

特征值 / Characteristic Values

				min.	typ.	max.	
正向电压 Forward voltage	I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		1,45 1,75 1,85	1,75	V V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 100 A, - di_F/dt = 3200 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		60,0 60,0 60,0		A A A
恢复电荷 Recovered charge	I_F = 100 A, - di_F/dt = 3200 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		1,85 1,85 1,85		µC µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 100 A, - di_F/dt = 3200 A/µs (T_{vj}=150°C) V_R = 500 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		0,68 0,68 0,68		mJ mJ mJ
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个二极管 / per diode		R_{thJH}		0,474		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_{NTC} = 25°C	R_{25}		5,00		kΩ
R100 偏差 Deviation of R100	T_{NTC} = 100°C, R_{100} = 493 Ω	ΔR/R	-5		5	%
耗散功率 Power dissipation	T_{NTC} = 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

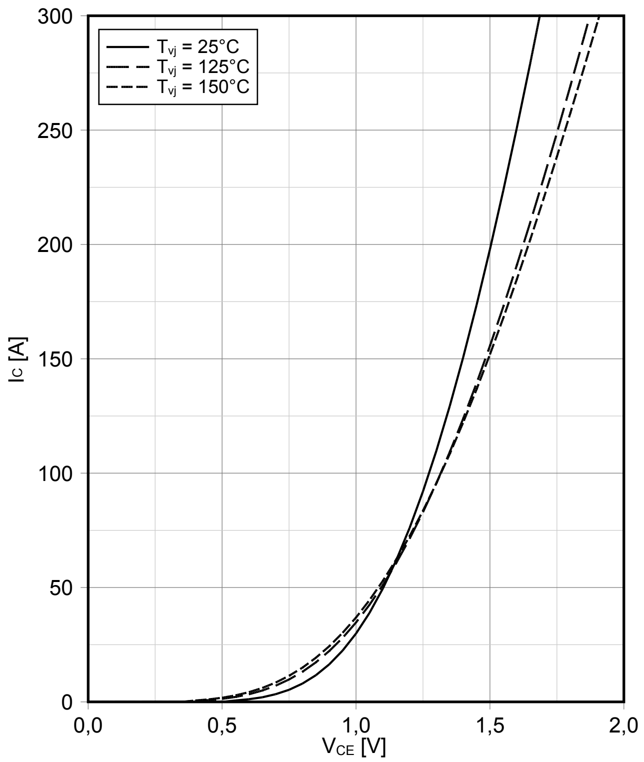
根据应用手册标定
Specification according to the valid application note.

模块 / Module

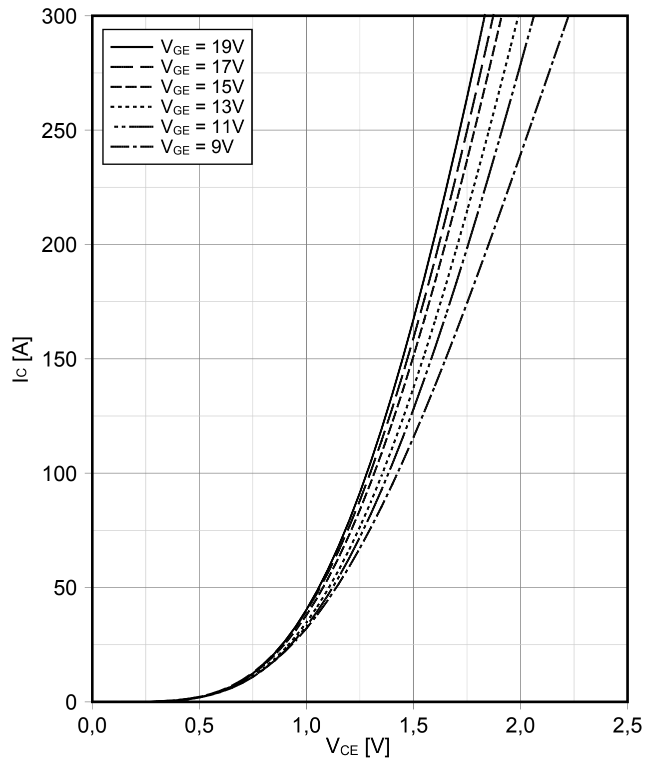
绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}	3,2			kV
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)		Al_2O_3			
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		11,5 6,8			mm
电气间隙 Clearance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		9,4 5,5			mm
相对电痕指数 Comperative tracking index		CTI	> 400			
相对温度指数 (电) RTI Elec.	住房 housing	RTI	140			°C
			min.	typ.	max.	
杂散电感,模块 Stray inductance module		L_{sCE}		15		nH
储存温度 Storage temperature		T_{stg}	-40		125	°C
模块安装的安装扭距 Mounting torque for modul mounting	螺丝 根据相应的应用手册进行安装 Screw - Mounting according to valid application note	M	1,30		1,50	Nm
重量 Weight		G		78		g

Der Strom im Dauerbetrieb ist auf 25 A effektiv pro Anschlusspin begrenzt.
The current under continuous operation is limited to 25 A rms per connector pin.
IGBT- und Dioden-RthJH-Parameter mit einer Wärmeleitpaste λ_{Paste} = 3.3 W/(m·K) gemessen
IGBT- and diode- RthJH parameters measured with thermal grease of λ_{Paste} = 3.3 W/(m·K)

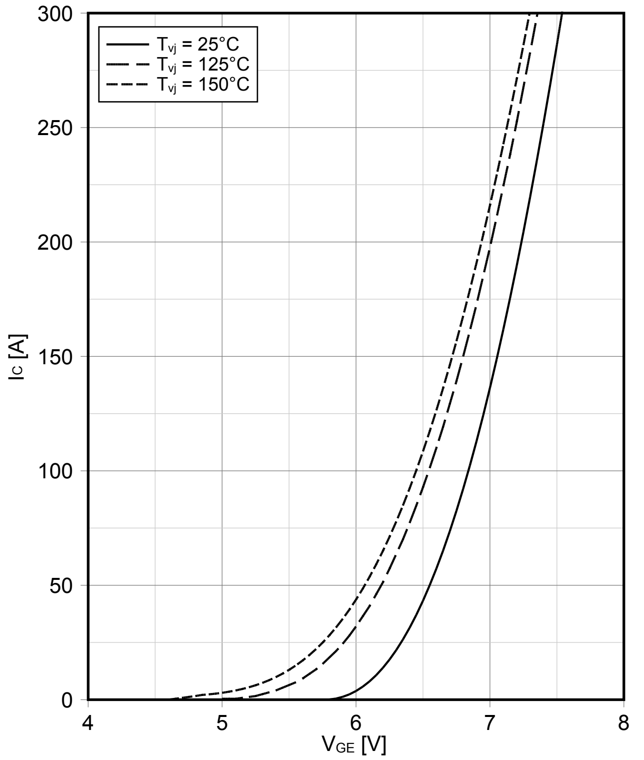
输出特性 IGBT, T1 / T4 （典型)
output characteristic IGBT, T1 / T4 (typical)
$I_C = f (V_{CE})$
$V_{GE} = 15$ V



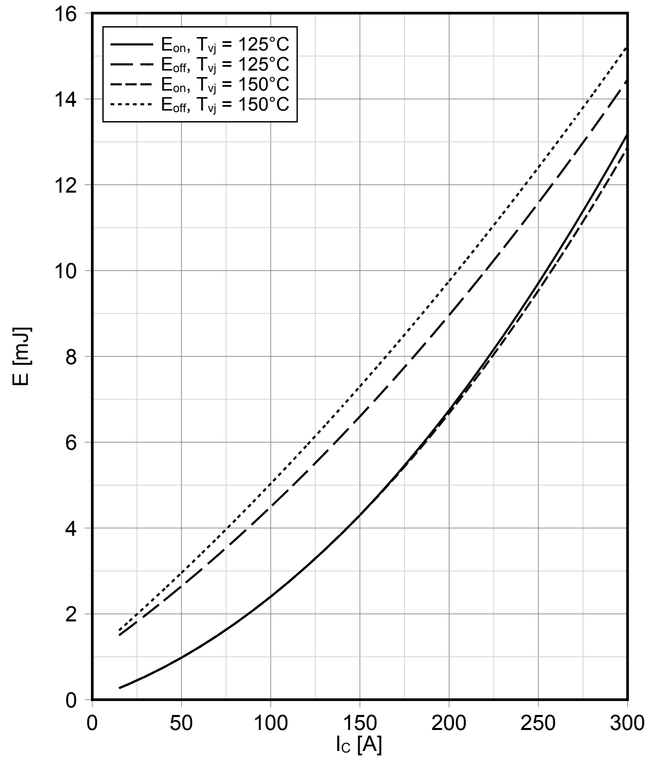
输出特性 IGBT, T1 / T4 （典型)
output characteristic IGBT, T1 / T4 (typical)
$I_C = f (V_{CE})$
$T_{vj} = 150°C$



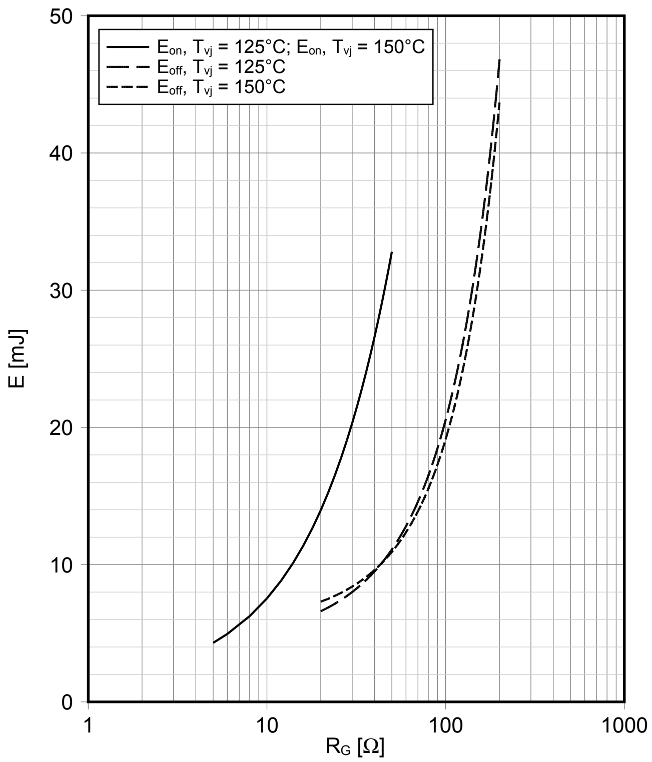
传输特性 IGBT, T1 / T4 (典型)
transfer characteristic IGBT, T1 / T4 (typical)
$I_C = f (V_{GE})$
$V_{CE} = 20$ V



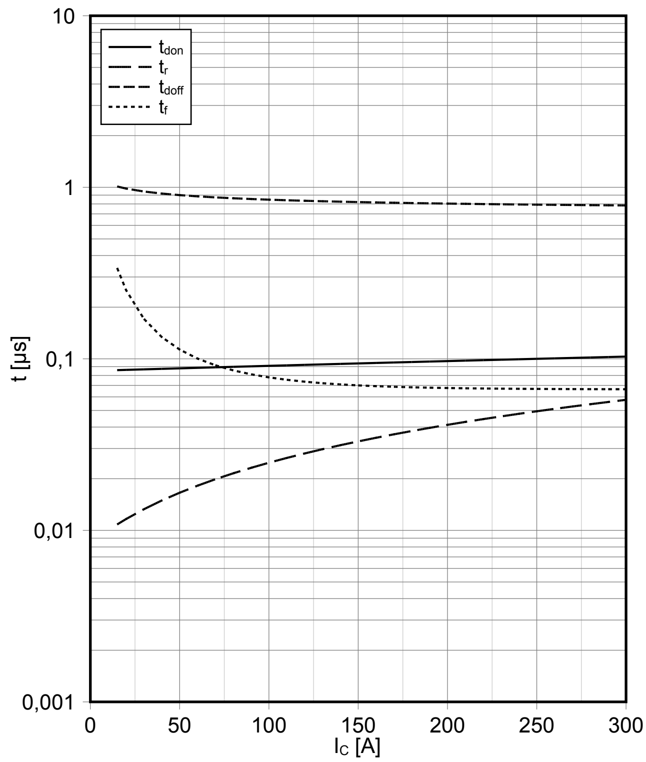
开关损耗 IGBT, T1 / T4 （典型)
switching losses IGBT, T1 / T4 (typical)
$E_{on} = f (I_C)$, $E_{off} = f (I_C)$
$V_{GE} = \pm 15$ V, $R_{Gon} = 5\ \Omega$, $R_{Goff} = 20\ \Omega$, $V_{CE} = 500$ V



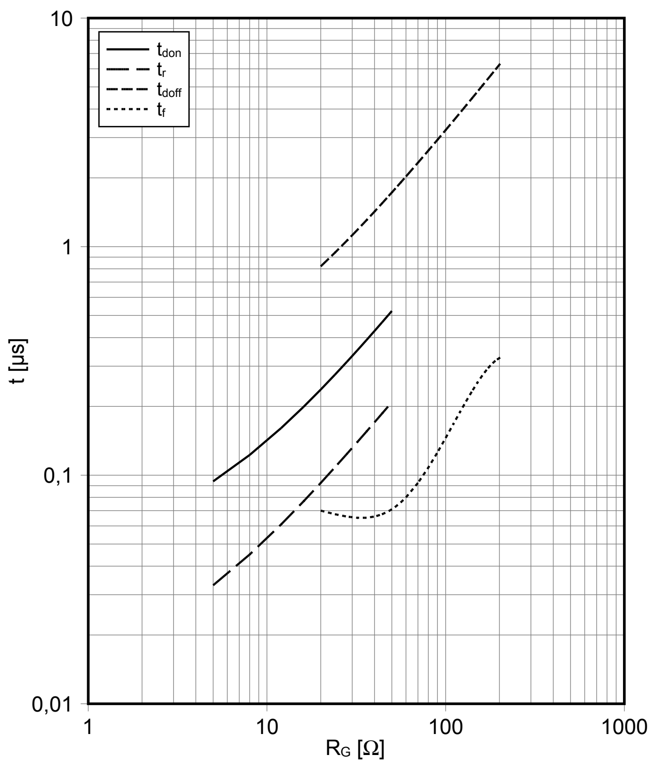
开关损耗 IGBT, T1 / T4 （典型)
switching losses IGBT, T1 / T4 (typical)
E_{on} = f (R_G), E_{off} = f (R_G)
V_{GE} = ±15 V, I_C = 150 A, V_{CE} = 500 V



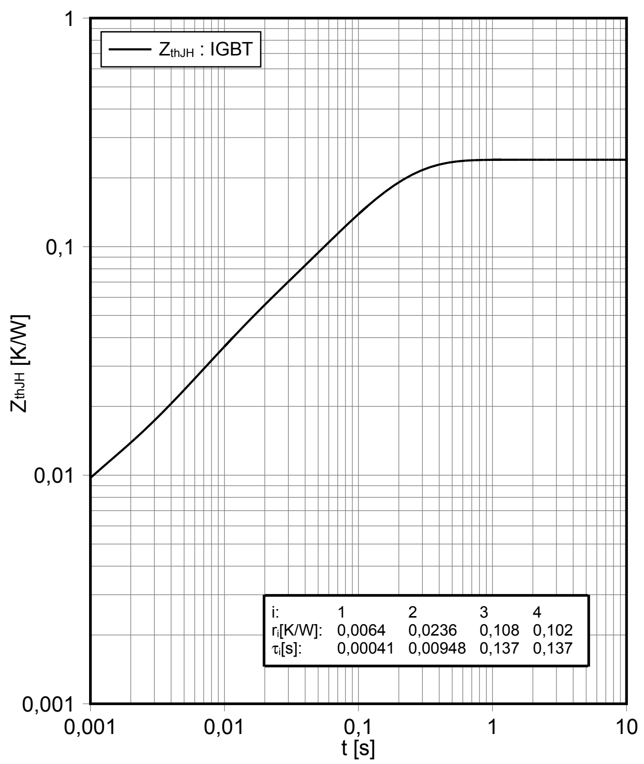
??? IGBT, T1 / T4 （典型)
switching times IGBT, T1 / T4 (typical)
t_{don} = f (I_C), t_r = f (I_C), t_{doff} = f (I_C), t_f = f (I_C)
V_{GE} = ±15 V, R_{Gon} = 5 Ω, R_{Goff} = 20 Ω, V_{CE} = 500 V, Tvj = 150°C



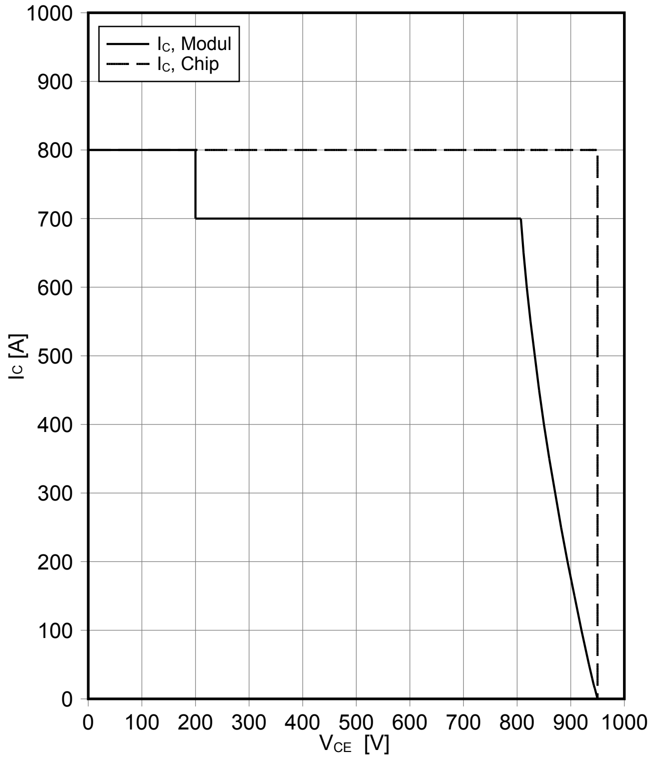
??? IGBT, T1 / T4 （典型)
switching times IGBT, T1 / T4 (typical)
t_{don} = f (R_G), t_r = f (R_G), t_{doff} = f (R_G), t_f = f (R_G)
V_{GE} = ±15 V, I_C = 150 A, V_{CE} = 500, Tvj = 150°C



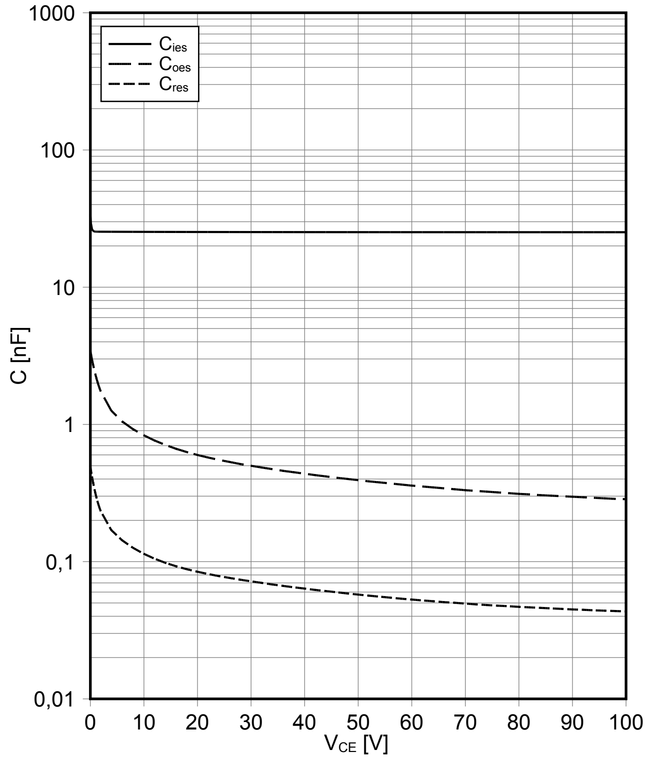
瞬态热阻抗 IGBT, T1 / T4
transient thermal impedance IGBT, T1 / T4
Z_{thJH} = f (t)



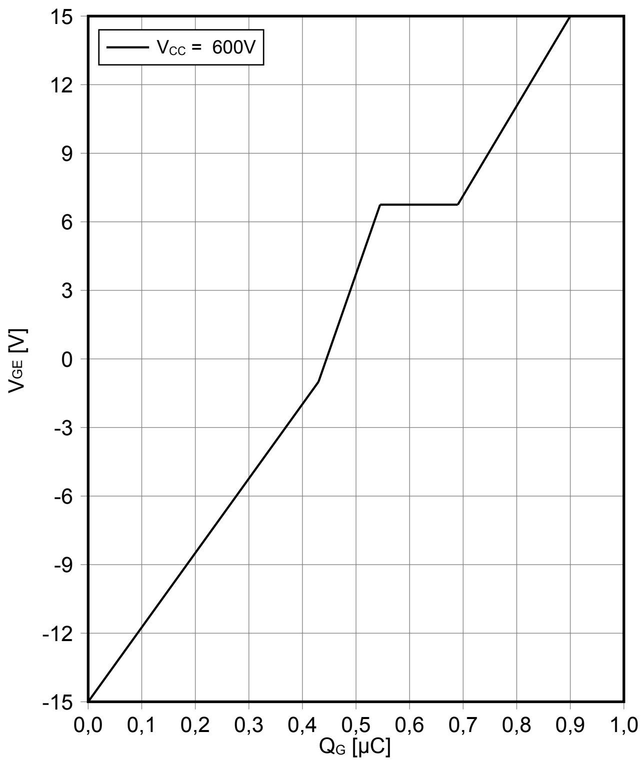
反偏安全工作区 IGBT, T1 / T4 （RBSOA）
reverse bias safe operating area IGBT, T1 / T4 (RBSOA)
I_C = f (V_{CE})
V_{GE} = ±15 V, R_{Goff} = 20 Ω, T_{vj} = 150°C



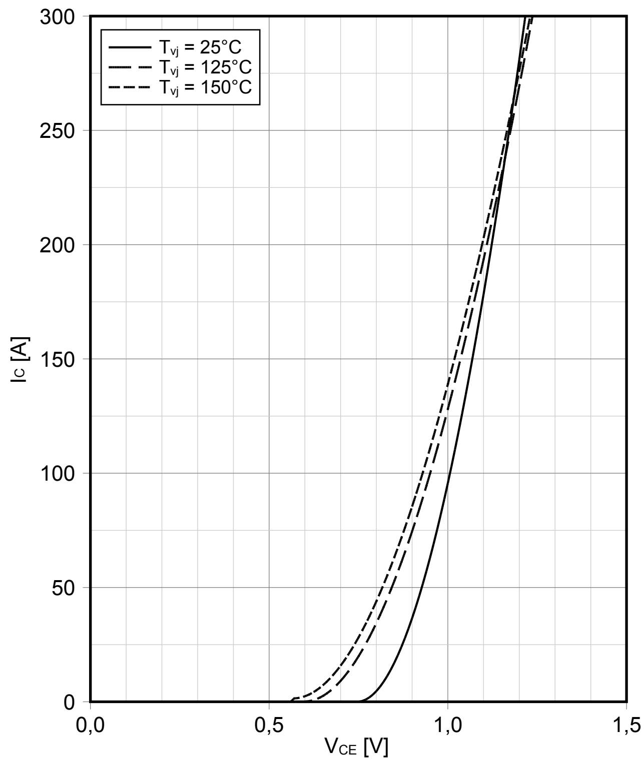
电容特性 IGBT, T1 / T4 （典型)
capacity characteristic IGBT, T1 / T4 (typical)
C = f(V_{CE})
V_{GE} = 0 V, T_{vj} = 25°C, f = 100kHz



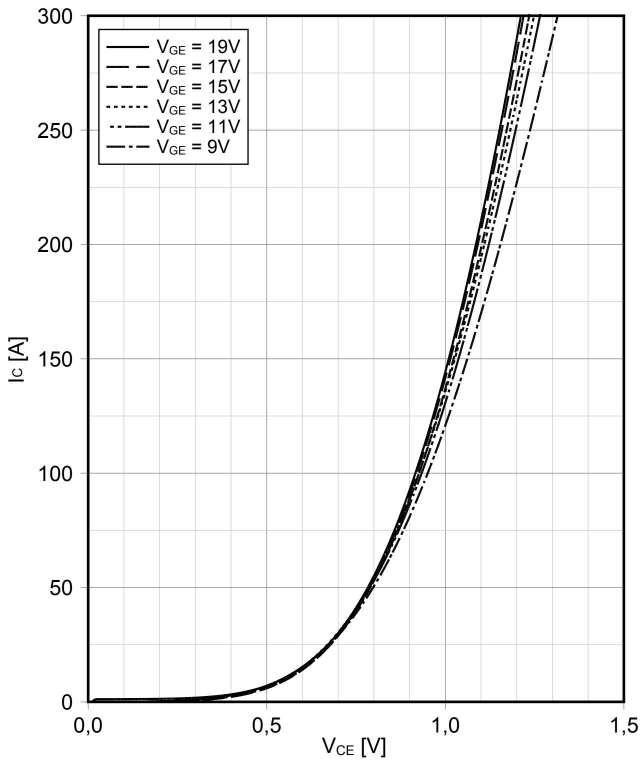
栅极电荷特性 IGBT, T1 / T4 （典型)
gate charge characteristic IGBT, T1 / T4 (typical)
V_{GE} = f(Q_G)
I_C = 400 A, T_{vj} = 25°C



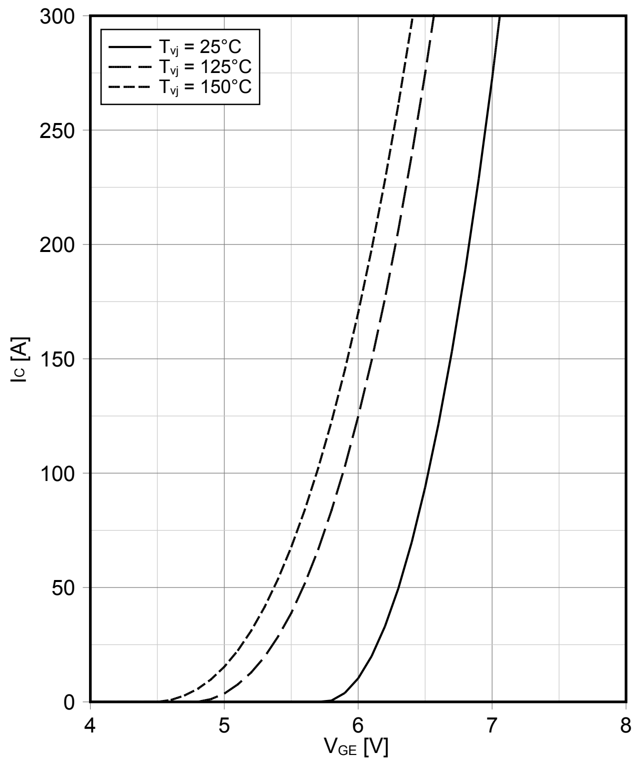
输出特性 IGBT, T2 / T3 （典型)
output characteristic IGBT, T2 / T3 (typical)
I_C = f (V_{CE})
V_{GE} = 15 V



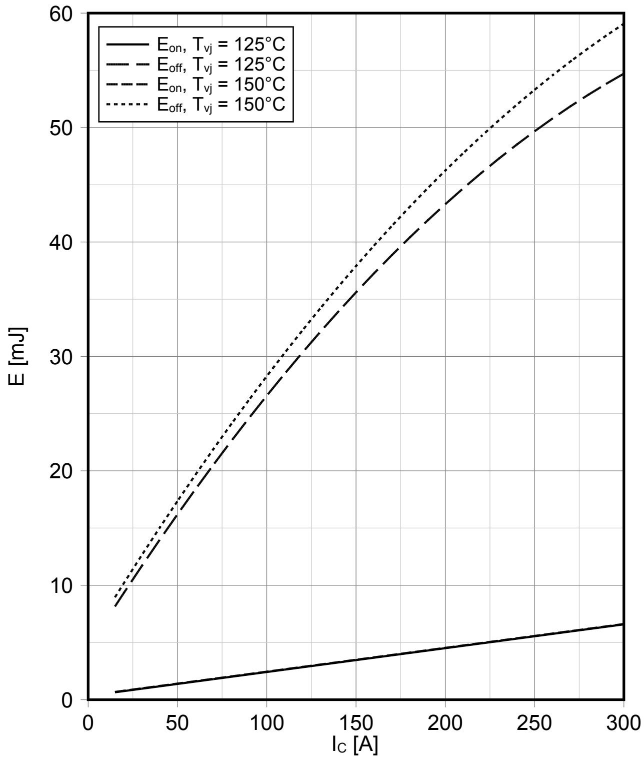
输出特性 IGBT, T2 / T3 （典型)
output characteristic IGBT, T2 / T3 (typical)
$I_C = f(V_{CE})$
$T_{vj} = 150°C$



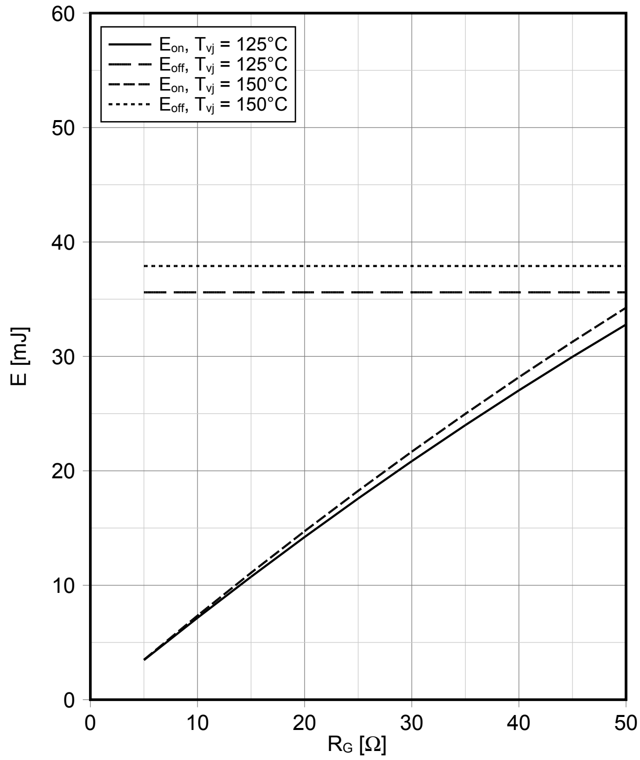
传输特性 IGBT, T2 / T3 (典型)
transfer characteristic IGBT, T2 / T3 (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20$ V



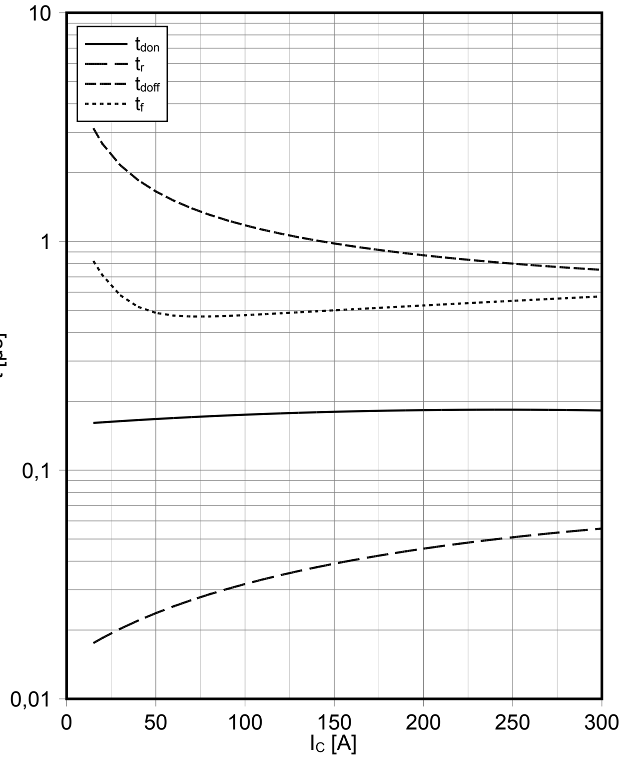
开关损耗 IGBT, T2 / T3 （典型)
switching losses IGBT, T2 / T3 (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm15$ V, $R_{Gon} = 5\ \Omega$, $R_{Goff} = 5\ \Omega$, $V_{CE} = 500$ V



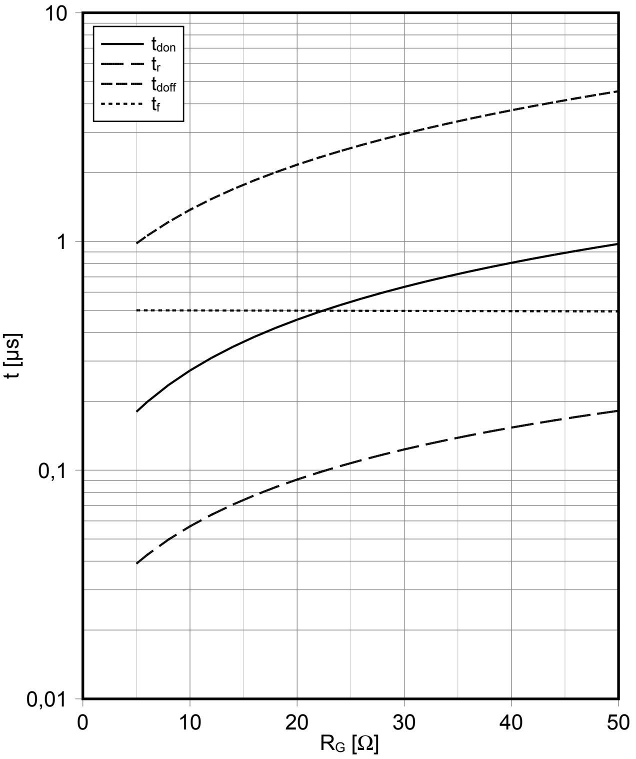
开关损耗 IGBT, T2 / T3 （典型)
switching losses IGBT, T2 / T3 (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm15$ V, $I_C = 150$ A, $V_{CE} = 500$ V



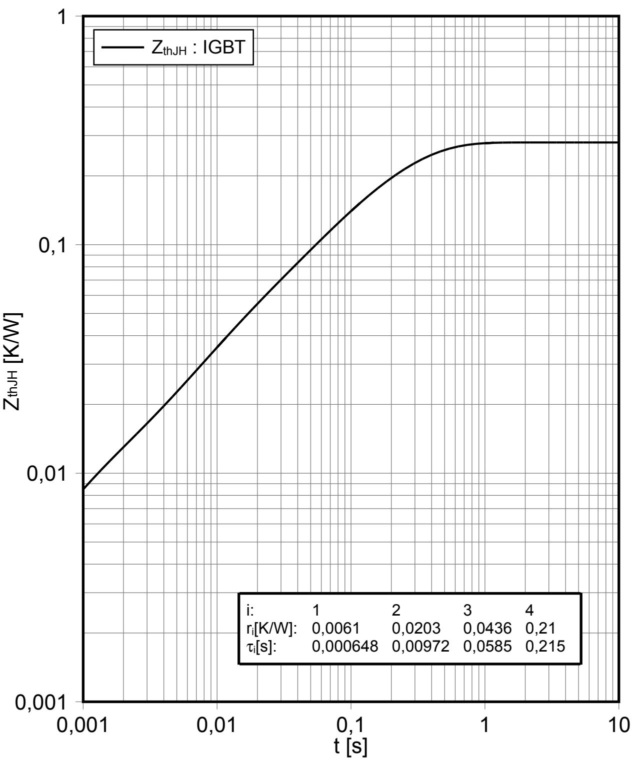
??? IGBT, T2 / T3 （典型）
switching times IGBT, T2 / T3 (typical)
t_{don} = f (I_C), t_r = f (I_C), t_{doff} = f (I_C), t_f = f (I_C)
V_{GE} = ±15 V, R_{Gon} = 5 Ω, R_{Goff} = 5 Ω, V_{CE} = 500 V, Tvj = 150°C



??? IGBT, T2 / T3 （典型）
switching times IGBT, T2 / T3 (typical)
t_{don} = f (R_G), t_r = f (R_G), t_{doff} = f (R_G), t_f = f (R_G)
V_{GE} = ±15 V, I_C = 150 A, V_{CE} = 500 V, Tvj = 150°C

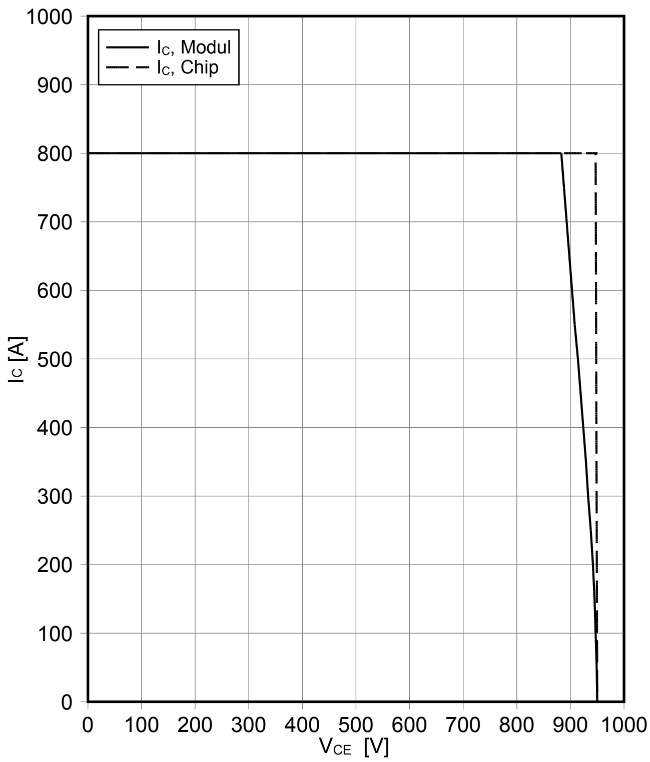


瞬态热阻抗 IGBT, T2 / T3
transient thermal impedance IGBT, T2 / T3
Z_{thJH} = f (t)

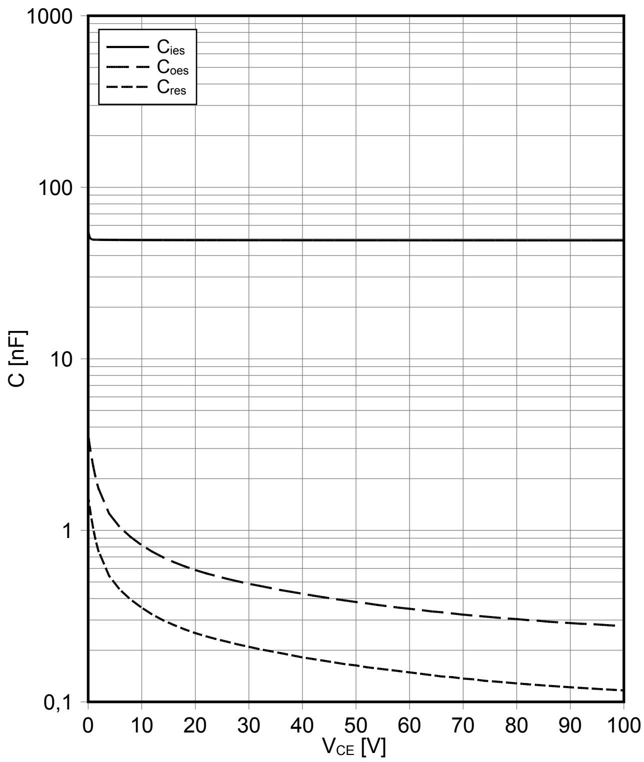


i:	1	2	3	4
r_i[K/W]:	0,0061	0,0203	0,0436	0,21
τ_i[s]:	0,000648	0,00972	0,0585	0,215

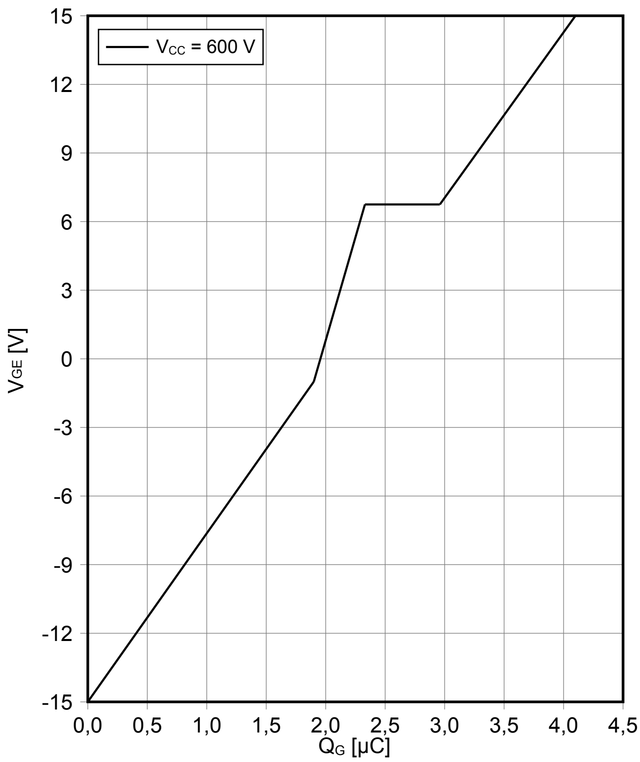
反偏安全工作区 IGBT, T2 / T3 （RBSOA）
reverse bias safe operating area IGBT, T2 / T3 (RBSOA)
I_C = f (V_{CE})
V_{GE} = ±15 V, R_{Goff} = 5 Ω, T_{vj} = 150°C



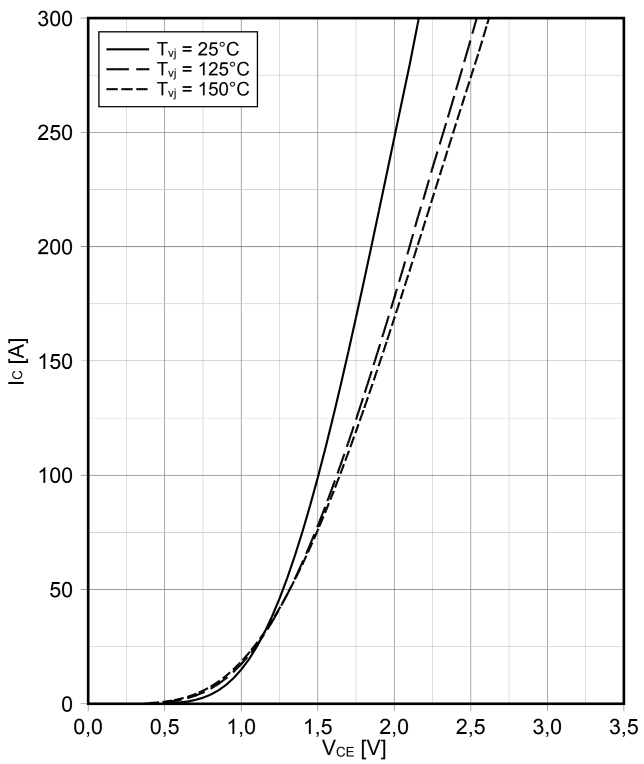
电容特性 IGBT, T2 / T3 （典型)
capacity characteristic IGBT, T2 / T3 (typical)
$C = f(V_{CE})$
$V_{GE} = 0$ V, $T_{vj} = 25°C$, f = 100kHz



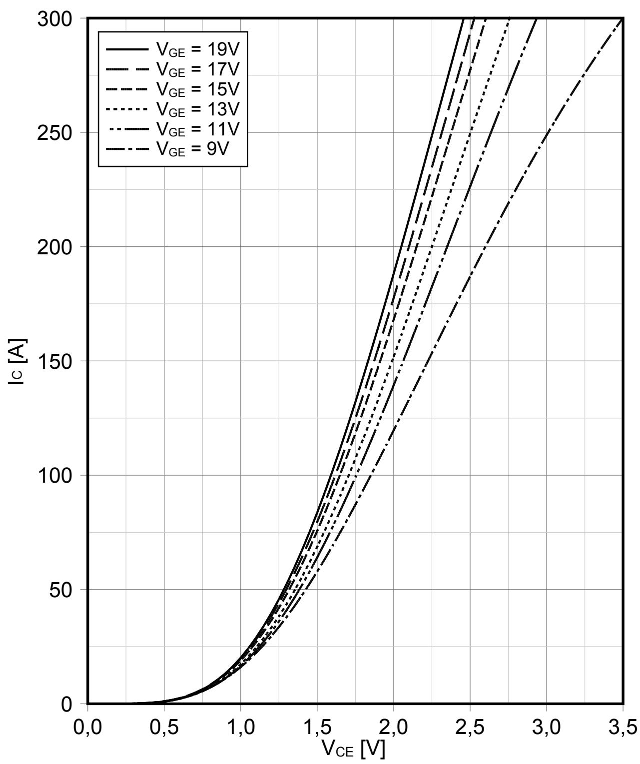
栅极电荷特性 IGBT, T2 / T3 （典型)
gate charge characteristic IGBT, T2 / T3 (typical)
$V_{GE} = f(Q_G)$
$I_C = 400$ A, $T_{vj} = 25°C$



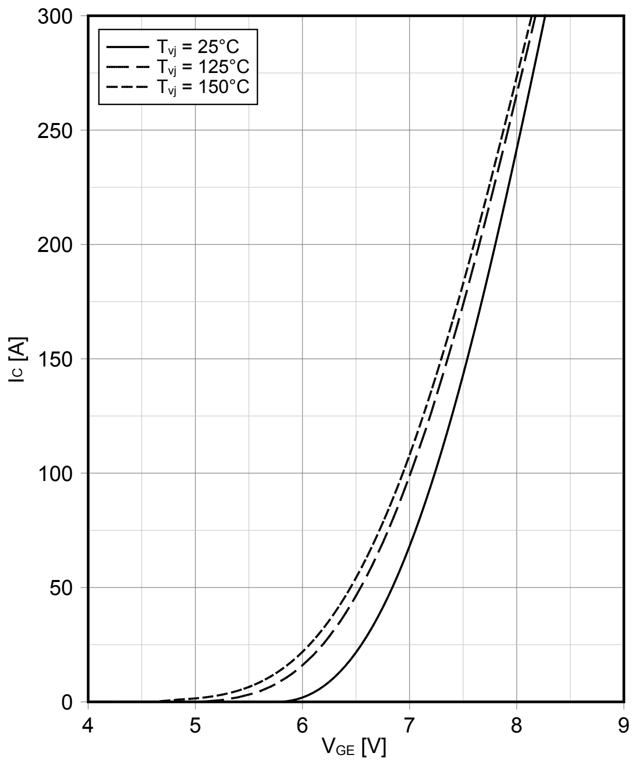
输出特性 IGBT, T5 / T6 （典型)
output characteristic IGBT, T5 / T6 (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15$ V



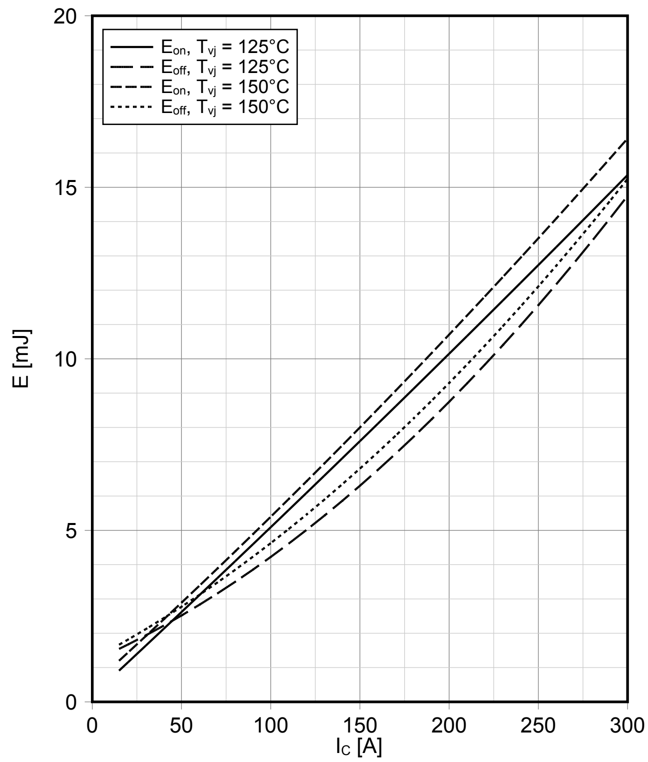
输出特性 IGBT, T5 / T6 （典型)
output characteristic IGBT, T5 / T6 (typical)
$I_C = f(V_{CE})$
$T_{vj} = 150°C$



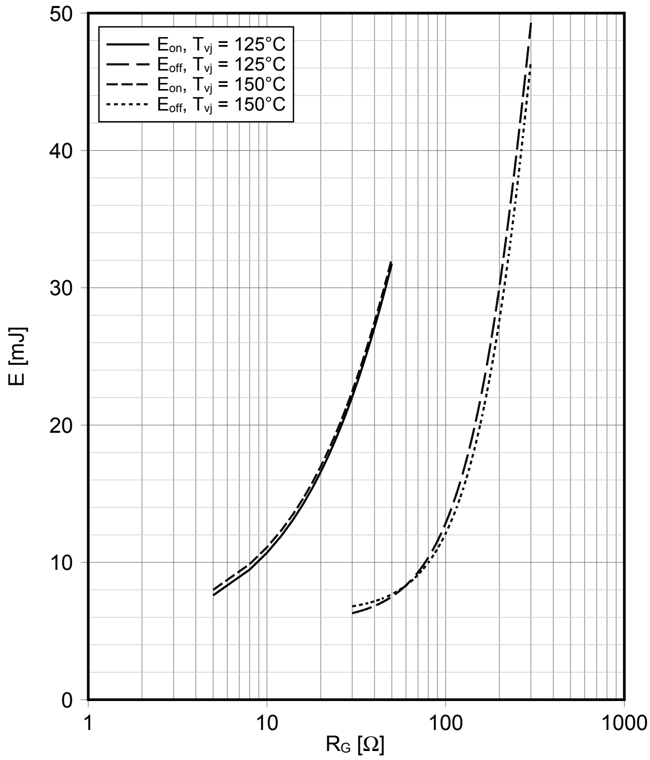
传输特性 IGBT, T5 / T6 (典型)
transfer characteristic IGBT, T5 / T6 (typical)
$I_C = f(V_{GE})$
V_{CE} = 20 V



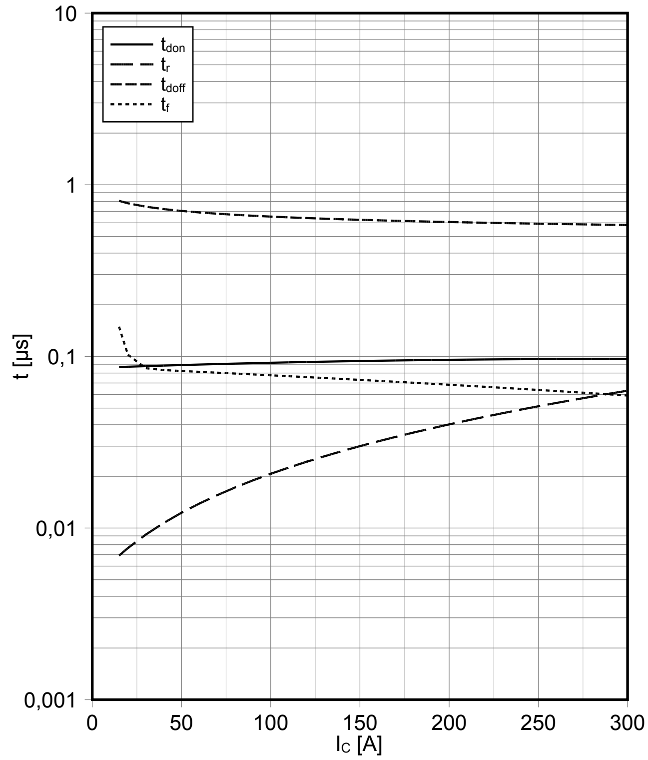
开关损耗 IGBT, T5 / T6 （典型)
switching losses IGBT, T5 / T6 (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
V_{GE} = ±15 V, R_{Gon} = 5 Ω, R_{Goff} = 30 Ω, V_{CE} = 500 V



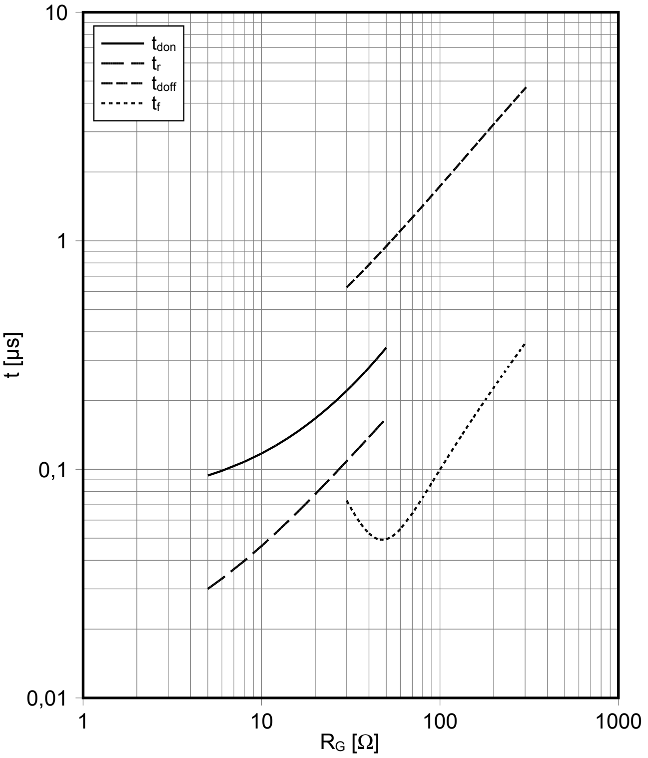
开关损耗 IGBT, T5 / T6 （典型)
switching losses IGBT, T5 / T6 (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
V_{GE} = ±15 V, I_C = 150 A, V_{CE} = 500 V



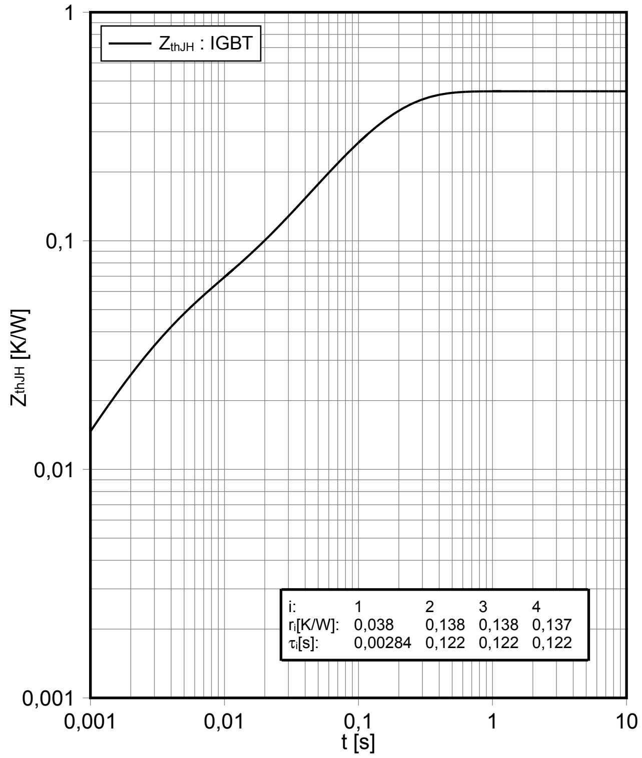
??? IGBT, T5 / T6 （典型)
switching times IGBT, T5 / T6 (typical)
$t_{don} = f(I_C)$, $t_r = f(I_C)$, $t_{doff} = f(I_C)$, $t_f = f(I_C)$
V_{GE} = ±15 V, R_{Gon} = 5 Ω, R_{Goff} = 30 Ω, V_{CE} = 500 V, Tvj = 150°C



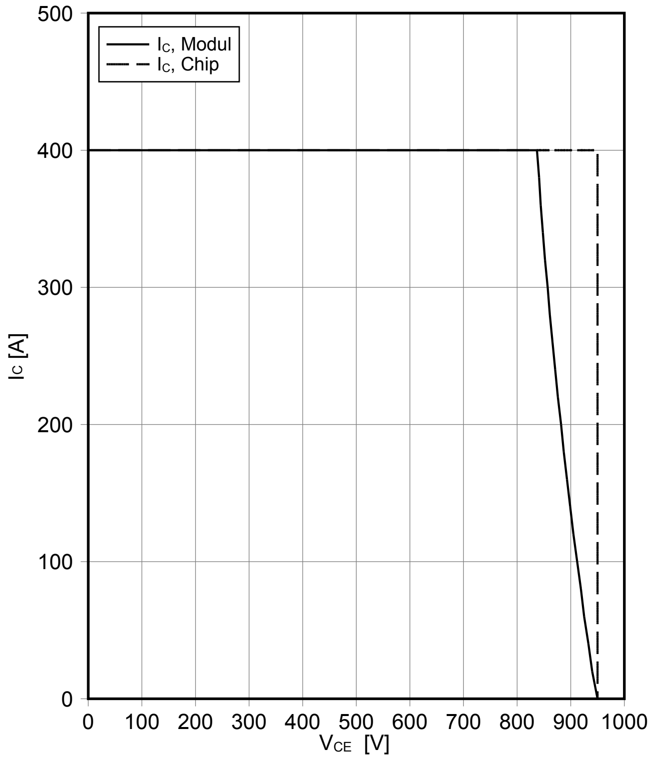
??? IGBT, T5 / T6 （典型)
switching times IGBT, T5 / T6 (typical)
$t_{don} = f(R_G)$, $t_r = f(R_G)$, $t_{doff} = f(R_G)$, $t_f = f(R_G)$
$V_{GE} = \pm 15$ V, $I_C = 150$ A, $V_{CE} = 500$ V, Tvj = 150°C



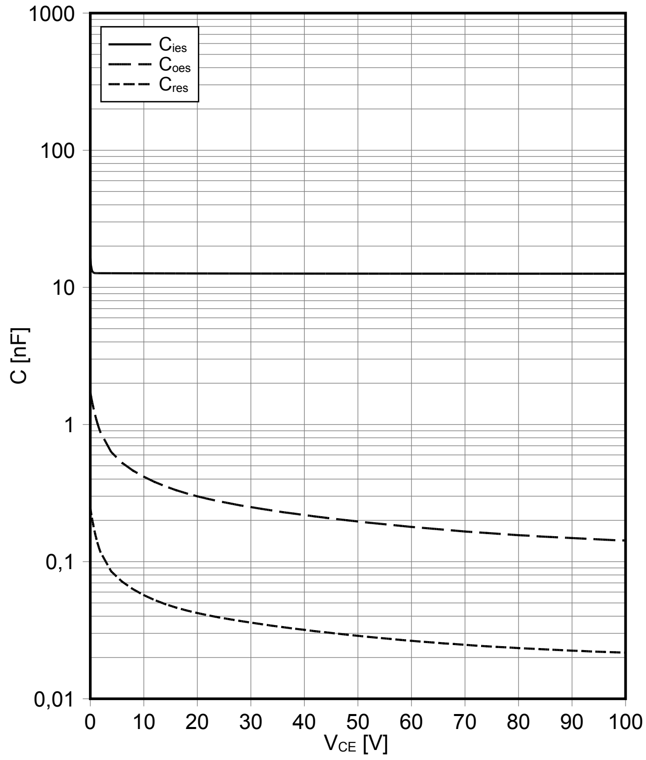
瞬态热阻抗 IGBT, T5 / T6
transient thermal impedance IGBT, T5 / T6
$Z_{thJH} = f(t)$



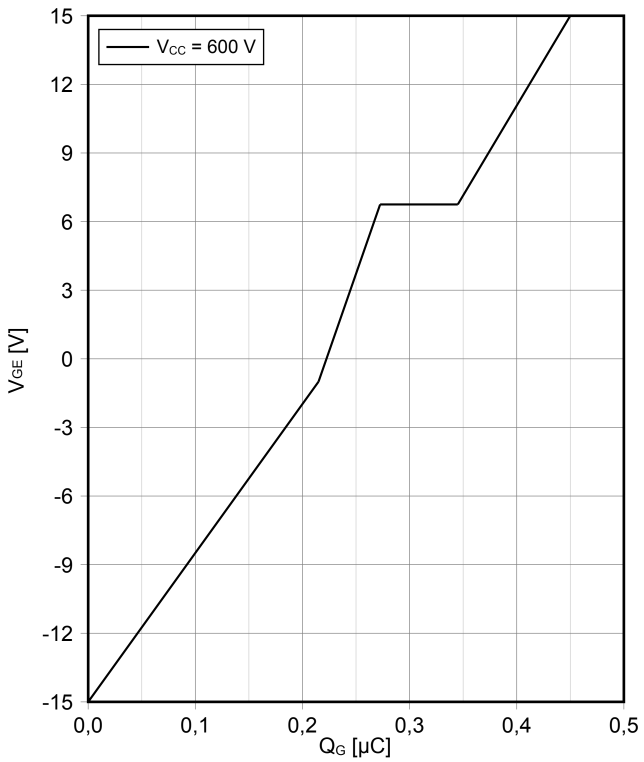
反偏安全工作区 IGBT, T5 / T6 （RBSOA）
reverse bias safe operating area IGBT, T5 / T6 (RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$ V, $R_{Goff} = 30$ Ω, $T_{vj} = 150$°C



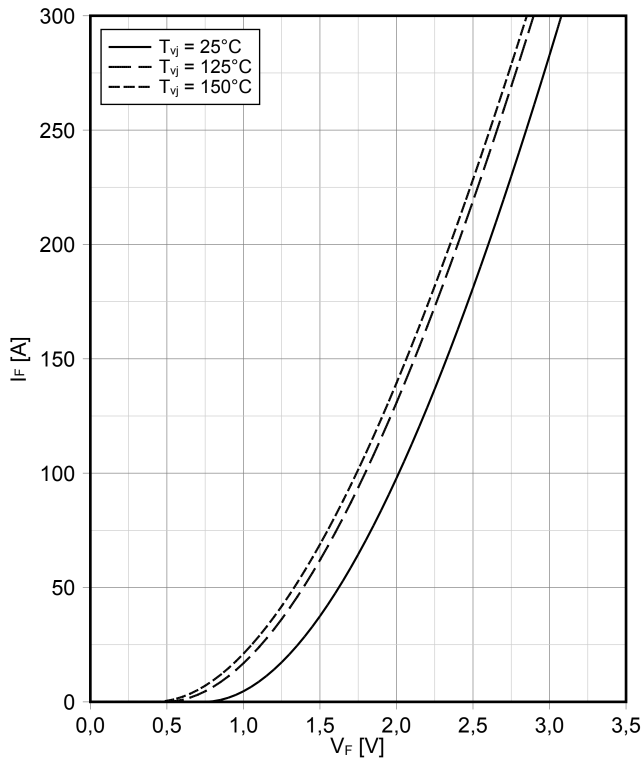
电容特性 IGBT, T5 / T6 （典型)
capacity characteristic IGBT, T5 / T6 (typical)
$C = f(V_{CE})$
$V_{GE} = 0$ V, $T_{vj} = 25$°C, f = 100kHz



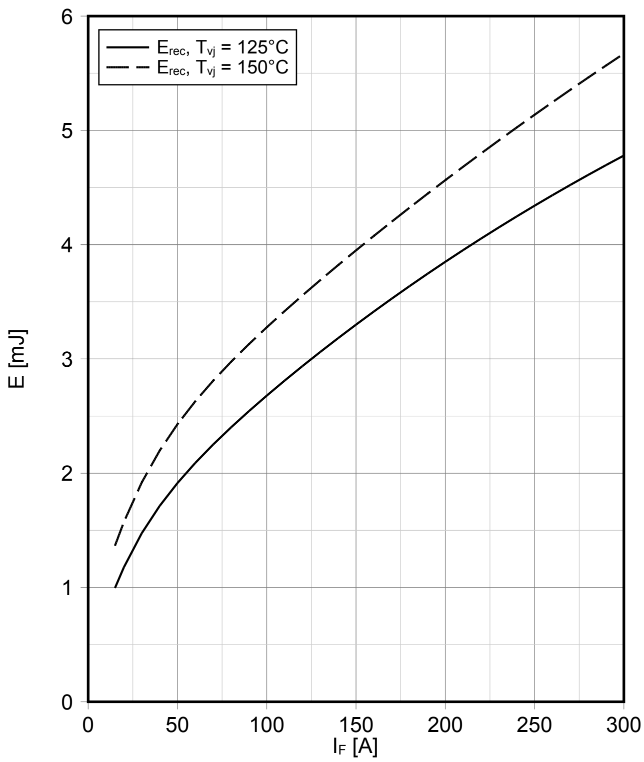
栅极电荷特性 IGBT, T5 / T6 （典型)
gate charge characteristic IGBT, T5 / T6 (typical)
$V_{GE} = f(Q_G)$
I_C = 200 A, T_{vj} = 25°C



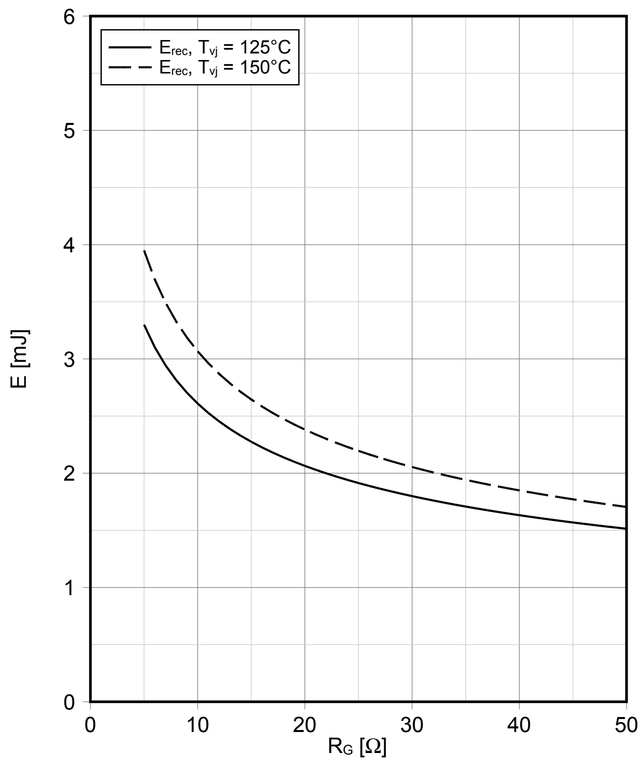
正向偏压特性 二极管, D1 / D4 （典型)
forward characteristic of Diode, D1 / D4 (typical)
$I_F = f(V_F)$



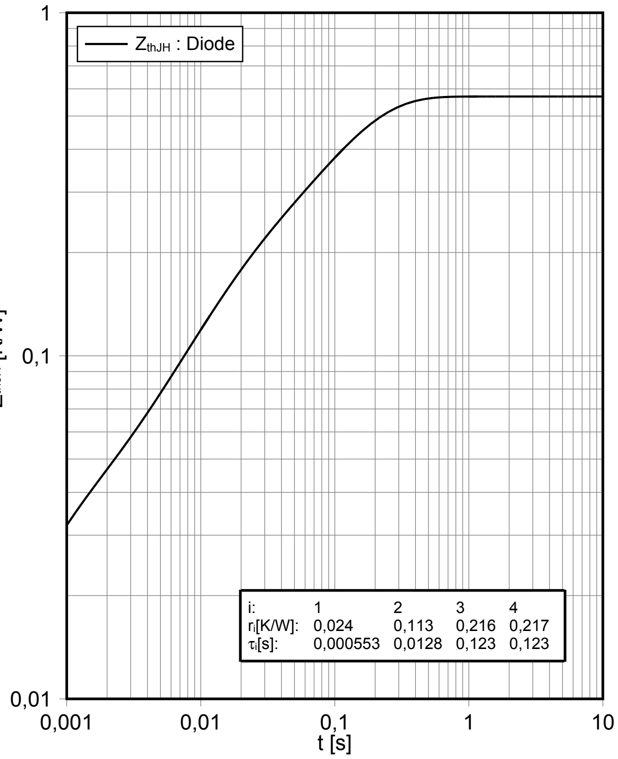
开关损耗 二极管, D1 / D4 （典型)
switching losses Diode, D1 / D4 (typical)
$E_{rec} = f(I_F)$
R_{Gon} = 5 Ω, V_{CE} = 500 V



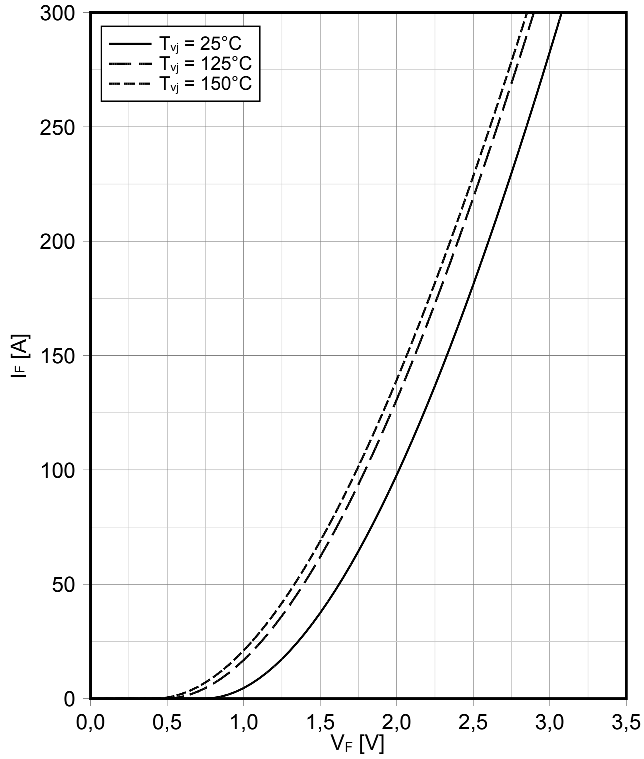
开关损耗 二极管, D1 / D4 （典型)
switching losses Diode, D1 / D4 (typical)
$E_{rec} = f(R_G)$
I_F = 150 A, V_{CE} = 500 V



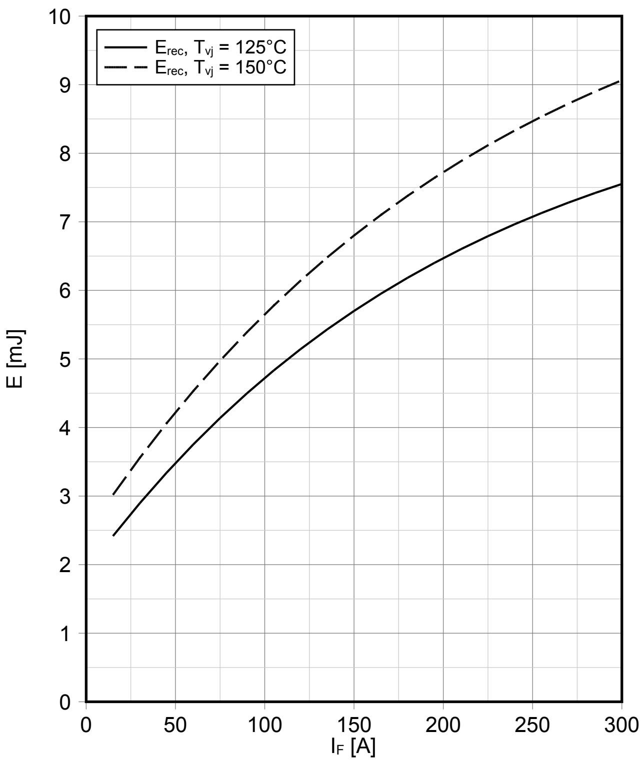
瞬态热阻抗 二极管, D1 / D4
transient thermal impedance Diode, D1 / D4
Z_{thJH} = f (t)



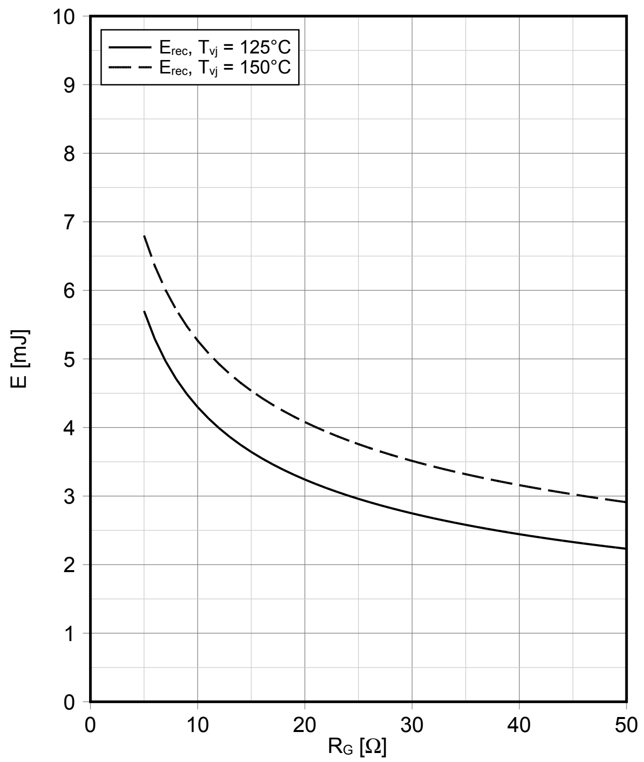
正向偏压特性 二极管, D2 / D3 （典型)
forward characteristic of Diode, D2 / D3 (typical)
I_F = f (V_F)



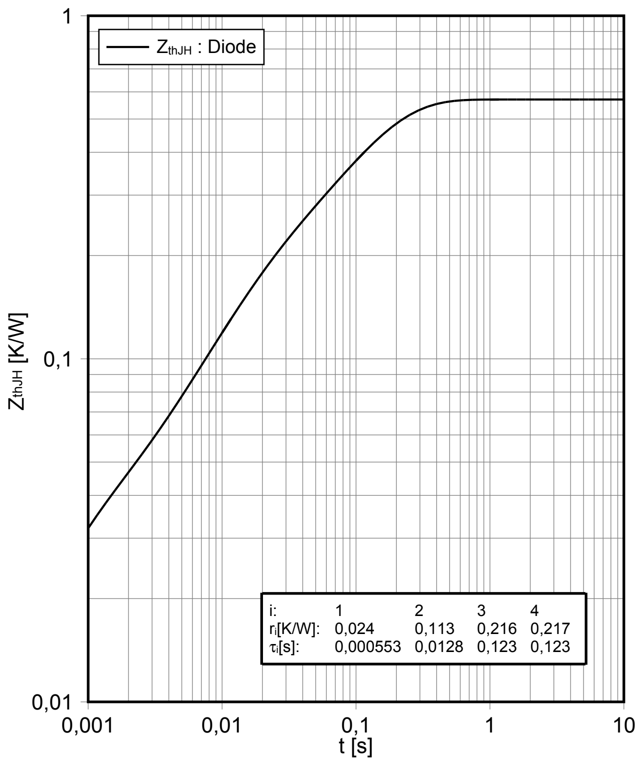
开关损耗 二极管, D2 / D3 （典型)
switching losses Diode, D2 / D3 (typical)
E_{rec} = f (I_F)
R_{Gon} = 5 Ω, V_{CE} = 500 V



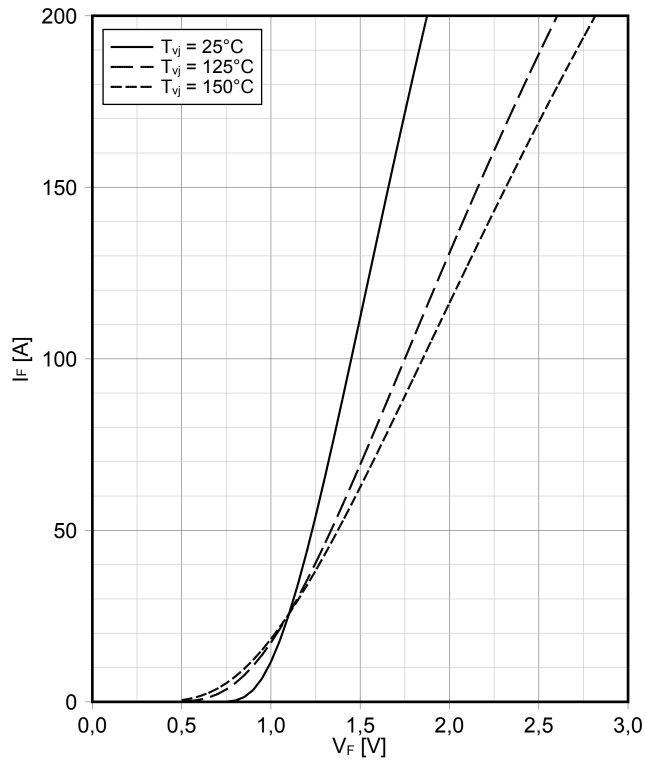
开关损耗 二极管, D2 / D3 （典型)
switching losses Diode, D2 / D3 (typical)
E_{rec} = f (R_G)
I_F = 150 A, V_{CE} = 500 V



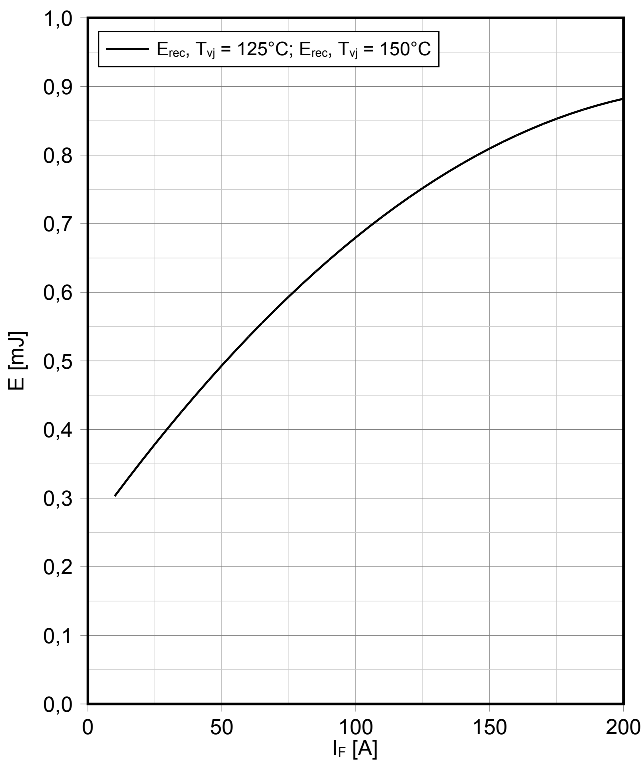
瞬态热阻抗 二极管, D2 / D3
transient thermal impedance Diode, D2 / D3
$Z_{thJH} = f(t)$



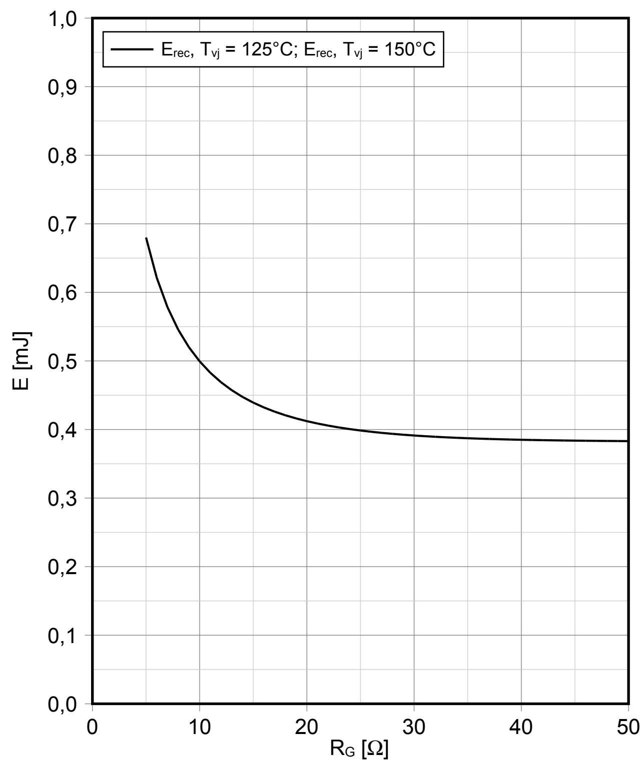
正向偏压特性 二极管, D5-D6 （典型)
forward characteristic of Diode, D5-D6 (typical)
$I_F = f(V_F)$



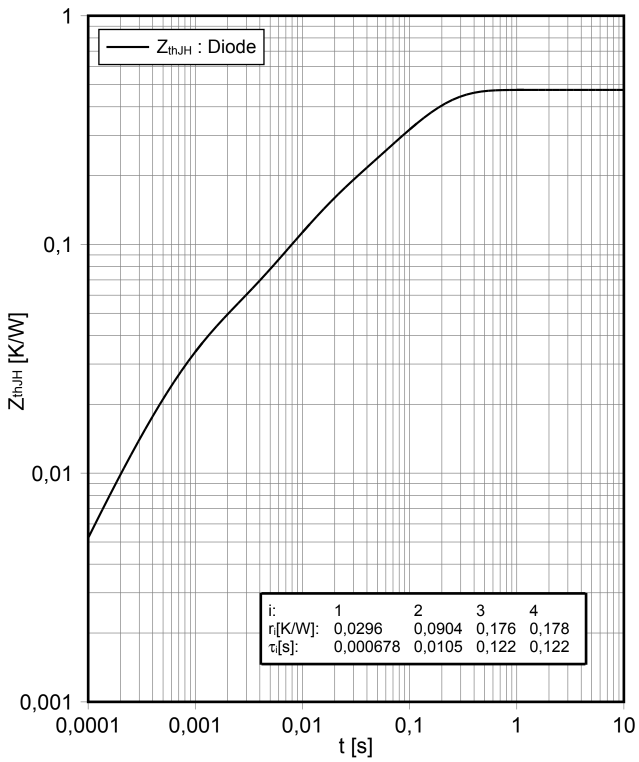
开关损耗 二极管, D5-D6 （典型)
switching losses Diode, D5-D6 (typical)
$E_{rec} = f(I_F)$
$R_{Gon} = 5\ \Omega$, $V_{CE} = 500$ V



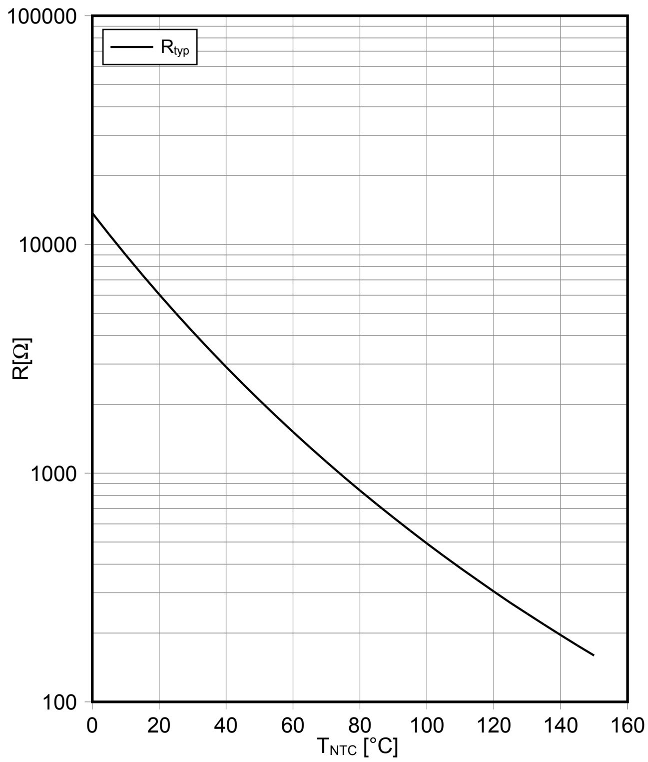
开关损耗 二极管, D5-D6 （典型)
switching losses Diode, D5-D6 (typical)
$E_{rec} = f(R_G)$
$I_F = 100$ A, $V_{CE} = 500$ V



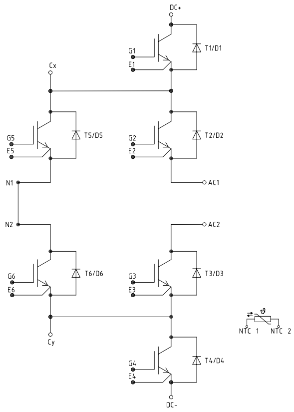
瞬态热阻抗 二极管, D5-D6
transient thermal impedance Diode, D5-D6
$Z_{thJH} = f(t)$



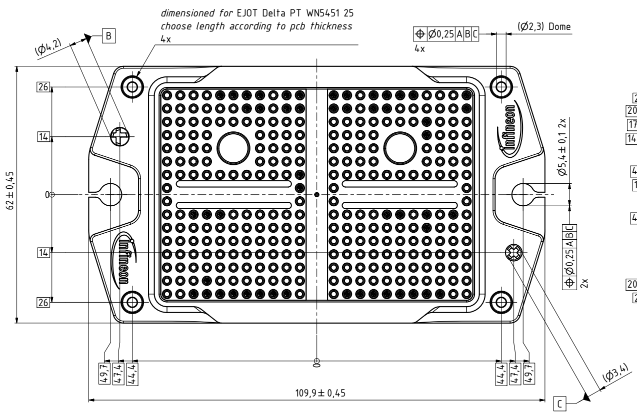
负温度系数热敏电阻 温度特性
NTC-Thermistor-temperature characteristic (typical)
$R = f(T)$

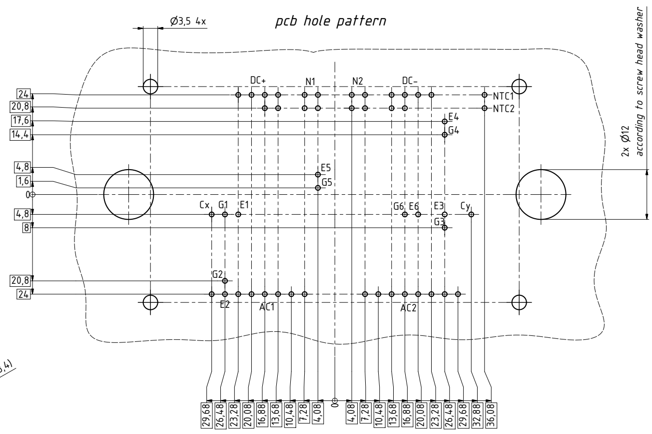


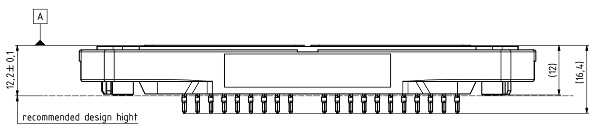
接线图 / Circuit diagram



封装尺寸 / Package outlines







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