Sixth generation, high speed soft switching series

Maximum Ratings

For optimum lifetime and reliability, Infineon recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet.

Parameter	Symbol	Value	Unit
Collector-emitter voltage, $T_{vj} \geq 25°C$	V_{CE}	1200	V
DC collector current, limited by T_{vjmax} $T_c = 25°C$ $T_c = 100°C$	I_C	 80.0 40.0	A
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpuls}	160.0	A
Turn off safe operating area $V_{CE} \leq 1200V$, $T_{vj} \leq 175°C$	-	160.0	A
Diode forward current, limited by T_{vjmax} $T_c = 25°C$ $T_c = 100°C$	I_F	 80.0 40.0	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	160.0	A
Gate-emitter voltage Transient Gate-emitter voltage ($t_p \leq 0.5\mu s$, $D < 0.001$)	V_{GE}	±20 25	V
Power dissipation $T_c = 25°C$ Power dissipation $T_c = 100°C$	P_{tot}	500.0 250.0	W
Operating junction temperature	T_{vj}	-40...+175	°C
Storage temperature	T_{stg}	-55...+150	°C
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	°C

Thermal Resistance

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
R_{th} Characteristics						
IGBT thermal resistance, junction - case	$R_{th(j-c)}$		-	-	0.30	K/W
Diode thermal resistance, junction - case	$R_{th(j-c)}$		-	-	0.78	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		-	-	40	K/W

Electrical Characteristic, at T_{vj} = 25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Collector-emitter saturation voltage	V_{CEsat}	V_{GE} = 15.0V, I_C = 40.0A T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 175°C	 - - -	 1.85 2.15 2.25	 2.15 - -	V
Diode forward voltage	V_F	V_{GE} = 0V, I_F = 40.0A T_{vj} = 25°C T_{vj} = 175°C	 - -	 2.20 2.25	 2.55 -	V
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C = 1.90mA, V_{CE} = V_{GE}	5.1	5.7	6.3	V
Zero gate voltage collector current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V T_{vj} = 25°C T_{vj} = 175°C	 - -	 - 1600	 850 -	µA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = 20V	-	-	600	nA
Transconductance	g_{fs}	V_{CE} = 20V, I_C = 40.0A	-	32.0	-	S

Electrical Characteristic, at T_{vj} = 25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Dynamic Characteristic						
Input capacitance	C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	-	2700	-	pF
Output capacitance	C_{oes}		-	185	-	
Reverse transfer capacitance	C_{res}		-	120	-	
Gate charge	Q_G	V_{CC} = 960V, I_C = 40.0A, V_{GE} = 15V	-	285.0	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	L_E		-	13.0	-	nH

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
IGBT Characteristic, at T_{vj} = 25°C						
Turn-on delay time	$t_{d(on)}$	T_{vj} = 25°C, V_{CC} = 600V, I_C = 40.0A, V_{GE} = 0.0/15.0V, $R_{G(on)}$ = 9.0Ω, $R_{G(off)}$ = 9.0Ω, Lσ = 70nH, Cσ = 67pF Lσ, Cσ from Fig. E Energy losses include “tail” and diode reverse recovery.	-	27	-	ns
Rise time	t_r		-	27	-	ns
Turn-off delay time	$t_{d(off)}$		-	315	-	ns
Fall time	t_f		-	27	-	ns
Turn-on energy	E_{on}		-	1.45	-	mJ
Turn-off energy	E_{off}		-	1.55	-	mJ
Total switching energy	E_{ts}		-	3.00	-	mJ