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}	650	V
DC collector current, limited by T_{vjmax} T_h = 25°C value limited by bondwire T_h = 65°C T_h = 65°C	I_C	80.0 66.0 104.0[1)]	A
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpuls}	240.0	A
Turn off safe operating area $V_{CE} \leq 650V$, $T_{vj} \leq 175°C$, t_p = 1µs	-	240.0	A
Diode forward current, limited by T_{vjmax} T_h = 25°C value limited by bondwire T_h = 65°C	I_F	80.0 74.0	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	240.0	A
Gate-emitter voltage Transient Gate-emitter voltage ($t_p \leq 10µs$, $D < 0.010$)	V_{GE}	±20 ±30	V
Power dissipation T_h = 25°C Power dissipation T_h = 65°C	P_{tot}	148.0 109.0	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
Mounting torque, M3 screw Maximum of mounting processes: 3	M	0.6	Nm
Isolation voltage RMS, f = 50/60Hz, t = 1min[2)]	V_{isol}	2500	V

Thermal Resistance

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
R_{th} Characteristics						
IGBT thermal resistance,[3)] junction - heatsink	$R_{th(j-h)}$		-	0.86	1.01	K/W
Diode thermal resistance,[3)] junction - heatsink	$R_{th(j-h)}$		-	0.97	1.14	K/W
Thermal resistance junction - ambient	$R_{th(j-a)}$		-	-	65	K/W

[1)] Equivalent current rating in TO-247-3 at T_h = 65°C using reference insulation material: 152µm, 0.9 W/mK, standard polyimide based reinforced carrier insulator
[2)] For a proper handling and assembly of the advanced isolation device in the application refer to the note at the package drawing.
[3)] At force on body F = 500N, T_a = 25°C

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

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	V_{GE} = 0V, I_C = 0.50mA	650	-	-	V
Collector-emitter saturation voltage	V_{CEsat}	V_{GE} = 15.0V, I_C = 60.0A T_{vj} = 25°C T_{vj} = 175°C	 - -	 1.65 1.95	 2.10 -	V
Diode forward voltage	V_F	V_{GE} = 0V, I_F = 60.0A T_{vj} = 25°C T_{vj} = 175°C	 - -	 1.45 1.39	 1.70 -	V
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C = 0.60mA, V_{CE} = V_{GE}	3.2	4.0	4.8	V
Zero gate voltage collector current	I_{CES}	V_{CE} = 650V, V_{GE} = 0V T_{vj} = 25°C T_{vj} = 175°C	 - -	 - -	 40 2000	µA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = 20V	-	-	100	nA
Transconductance	g_{fs}	V_{CE} = 20V, I_C = 60.0A	-	72.0	-	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 = 1000kHz	-	3600	-	pF
Output capacitance	C_{oes}		-	105	-	
Reverse transfer capacitance	C_{res}		-	13	-	
Gate charge	Q_G	V_{CC} = 520V, I_C = 60.0A, V_{GE} = 15V	-	144.0	-	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} = 400V, I_C = 60.0A, V_{GE} = 0.0/15.0V, $R_{G(on)}$ = 12.0Ω, $R_{G(off)}$ = 12.0Ω, $L\sigma$ = 30nH, $C\sigma$ = 30pF $L\sigma$, $C\sigma$ from Fig. E Energy losses include “tail” and diode reverse recovery.	-	30	-	ns
Rise time	t_r		-	35	-	ns
Turn-off delay time	$t_{d(off)}$		-	206	-	ns
Fall time	t_f		-	42	-	ns
Turn-on energy	E_{on}		-	1.80	-	mJ
Turn-off energy	E_{off}		-	0.60	-	mJ
Total switching energy	E_{ts}		-	2.40	-	mJ