

# Technische Information / Technical Information

IGBT-Module  
IGBT-Modules

## BSM15GD120DLC E3224

eupec



### Höchstzulässige Werte / Maximum rated values

#### Elektrische Eigenschaften / Electrical properties

Kollektor-Emitter-Sperrspannung collector-emitter voltage		$V_{CES}$	1200	V
Kollektor-Dauergleichstrom DC-collector current	$T_C = 80^\circ\text{C}$	$I_{C,nom.}$	15	A
	$T_C = 25^\circ\text{C}$	$I_C$	35	A
Periodischer Kollektor Spitzenstrom repetitive peak collector current	$t_P = 1\text{ ms}, T_C = 80^\circ\text{C}$	$I_{CRM}$	30	A
Gesamt-Verlustleistung total power dissipation	$T_C=25^\circ\text{C}$ , Transistor	$P_{tot}$	145	W
Gate-Emitter-Spitzenspannung gate-emitter peak voltage		$V_{GES}$	+/- 20V	V
Dauergleichstrom DC forward current		$I_F$	15	A
Periodischer Spitzenstrom repetitive peak forw. current	$t_P = 1\text{ ms}$	$I_{FRM}$	30	A
Grenzlastintegral der Diode $I^2t$ - value, Diode	$V_R = 0V, t_p = 10\text{ms}, T_{vj} = 125^\circ\text{C}$	$I^2t$	93	$\text{A}^2\text{s}$
Isolations-Prüfspannung insulation test voltage	RMS, $f = 50\text{ Hz}, t = 1\text{ min.}$	$V_{ISOL}$	2,5	kV

### Charakteristische Werte / Characteristic values

#### Transistor / Transistor

			min.	typ.	max.	
Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage	$I_C = 15A, V_{GE} = 15V, T_{vj} = 25^\circ\text{C}$	$V_{CE\text{ sat}}$	-	2,1	2,6	V
	$I_C = 15A, V_{GE} = 15V, T_{vj} = 125^\circ\text{C}$		-	2,4	2,9	V
Gate-Schwellenspannung gate threshold voltage	$I_C = 0,6\text{mA}, V_{CE} = V_{GE}, T_{vj} = 25^\circ\text{C}$	$V_{GE(th)}$	4,5	5,5	6,5	V
Gateladung gate charge	$V_{GE} = -15V...+15V$	$Q_G$	-	0,16	-	$\mu\text{C}$
Eingangskapazität input capacitance	$f = 1\text{MHz}, T_{vj} = 25^\circ\text{C}, V_{CE} = 25V, V_{GE} = 0V$	$C_{ies}$	-	1	-	nF
Rückwirkungskapazität reverse transfer capacitance	$f = 1\text{MHz}, T_{vj} = 25^\circ\text{C}, V_{CE} = 25V, V_{GE} = 0V$	$C_{res}$	-	0,07	-	nF
Kollektor-Emitter Reststrom collector-emitter cut-off current	$V_{CE} = 1200V, V_{GE} = 0V, T_{vj} = 25^\circ\text{C}$	$I_{CES}$	-	2	76	$\mu\text{A}$
	$V_{CE} = 1200V, V_{GE} = 0V, T_{vj} = 125^\circ\text{C}$		-	200	-	$\mu\text{A}$
Gate-Emitter Reststrom gate-emitter leakage current	$V_{CE} = 0V, V_{GE} = 20V, T_{vj} = 25^\circ\text{C}$	$I_{GES}$	-	-	400	nA

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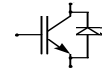
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### Charakteristische Werte / Characteristic values

#### Transistor / Transistor

			min.	typ.	max.	
Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load)	$I_C = 15A, V_{CC} = 600V$	$t_{d,on}$	-	0,07	-	$\mu s$
	$V_{GE} = \pm 15V, R_G = 56\Omega, T_{vj} = 25^\circ C$					
	$V_{GE} = \pm 15V, R_G = 56\Omega, T_{vj} = 125^\circ C$					
Anstiegszeit (induktive Last) rise time (inductive load)	$I_C = 15A, V_{CC} = 600V$	$t_r$	-	0,05	-	$\mu s$
	$V_{GE} = \pm 15V, R_G = 56\Omega, T_{vj} = 25^\circ C$					
	$V_{GE} = \pm 15V, R_G = 56\Omega, T_{vj} = 125^\circ C$					
Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load)	$I_C = 15A, V_{CC} = 600V$	$t_{d,off}$	-	0,3	-	$\mu s$
	$V_{GE} = \pm 15V, R_G = 56\Omega, T_{vj} = 25^\circ C$					
	$V_{GE} = \pm 15V, R_G = 56\Omega, T_{vj} = 125^\circ C$					
Fallzeit (induktive Last) fall time (inductive load)	$I_C = 15A, V_{CC} = 600V$	$t_f$	-	0,03	-	$\mu s$
	$V_{GE} = \pm 15V, R_G = 56\Omega, T_{vj} = 25^\circ C$					
	$V_{GE} = \pm 15V, R_G = 56\Omega, T_{vj} = 125^\circ C$					
Einschaltverlustenergie pro Puls turn-on energy loss per pulse	$I_C = 15A, V_{CC} = 600V, V_{GE} = 15V$ $R_G = 56\Omega, T_{vj} = 125^\circ C, L_S = 140nH$	$E_{on}$	-	2	-	mWs
Abschaltverlustenergie pro Puls turn-off energy loss per pulse	$I_C = 15A, V_{CC} = 600V, V_{GE} = 15V$ $R_G = 56\Omega, T_{vj} = 125^\circ C, L_S = 140nH$	$E_{off}$	-	1,5	-	mWs
Kurzschlußverhalten SC Data	$t_p \leq 10\mu sec, V_{GE} \leq 15V, R_G = 56\Omega$ $T_{vj} \leq 125^\circ C, V_{CC} = 900V, V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$	$I_{SC}$	-	130	-	A
Modulinduktivität stray inductance module		$L_{sCE}$	-	60	-	nH
Modul Leitungswiderstand, Anschlüsse – Chip module lead resistance, terminals – chip	$T_C = 25^\circ C$	$R_{CC+EE}$	-	5,9	-	m $\Omega$

### Charakteristische Werte / Characteristic values

#### Diode / Diode

			min.	typ.	max.	
Durchlaßspannung forward voltage	$I_F = 15A, V_{GE} = 0V, T_{vj} = 25^\circ C$	$V_F$	-	1,8	2,3	V
	$I_F = 15A, V_{GE} = 0V, T_{vj} = 125^\circ C$					
Rückstromspitze peak reverse recovery current	$I_F = 15A, -di_F/dt = 380A/\mu sec$	$I_{RM}$	-	14	-	A
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$					
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$					
Sperrverzögerungsladung recovered charge	$I_F = 15A, -di_F/dt = 380A/\mu sec$	$Q_r$	-	1,5	-	$\mu As$
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$					
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$					
Abschaltenergie pro Puls reverse recovery energy	$I_F = 15A, -di_F/dt = 380A/\mu sec$	$E_{rec}$	-	0,6	-	mWs
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$					
	$V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$					