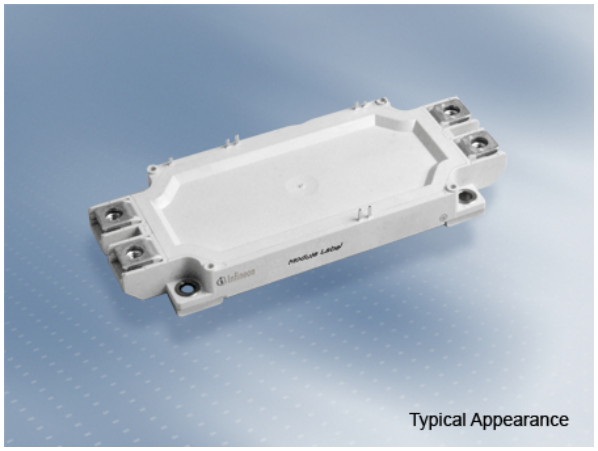
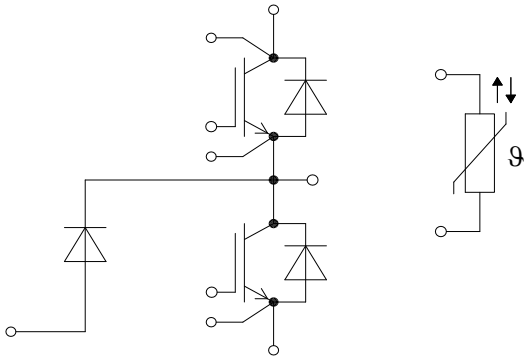
Technische Information / Technical Information

IGBT-Module
IGBT-modules

F3L400R07ME4_B22

EconoDUAL™3 Modul mit Trench/Feldstopp IGBT4 und Emitter Controlled Diode und NTC
EconoDUAL™3 module with trench/fieldstop IGBT4 and Emitter Controlled Diode and NTC





V_{CES} = 650V
$I_{C\ nom}$ = 400A / I_{CRM} = 800A

Typische Anwendungen
- 3-Level-Applikationen

Typical Applications
- 3-Level-Applications

Elektrische Eigenschaften
- Erweiterte Sperrschichttemperatur $T_{vj\ op}$
- Niedrige Schaltverluste
- Niedriges V_{CEsat}
- Sehr große Robustheit
- $T_{vj\ op}$ = 150°C
- V_{CEsat} mit positivem Temperaturkoeffizienten

Electrical Features
- Extended Operation Temperature $T_{vj\ op}$
- Low Switching Losses
- Low V_{CEsat}
- Unbeatable Robustness
- $T_{vj\ op}$ = 150°C
- V_{CEsat} with positive Temperature Coefficient

Mechanische Eigenschaften
- Isolierte Bodenplatte
- Standardgehäuse

Mechanical Features
- Isolated Base Plate
- Standard Housing

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

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IGBT,Wechselrichter / IGBT,Inverter

Höchstzulässige Werte / Maximum Rated Values

Kollektor-Emitter-Sperrspannung Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	650	V
Kollektor-Dauergleichstrom Continuous DC collector current	T_C = 50°C, $T_{vj\,max}$ = 175°C T_C = 25°C, $T_{vj\,max}$ = 175°C	$I_{C\,nom}$ I_C	400 450	A A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	t_P = 1 ms	I_{CRM}	800	A
Gesamt-Verlustleistung Total power dissipation	T_C = 25°C, $T_{vj\,max}$ = 175°C	P_{tot}	1150	W
Gate-Emitter-Spitzenspannung Gate-emitter peak voltage		V_{GES}	+/-20	V

Charakteristische Werte / Characteristic Values

			min.	typ.	max.	
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage	I_C = 400 A, V_{GE} = 15 V I_C = 400 A, V_{GE} = 15 V I_C = 400 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\,sat}$		1,55 1,70 1,75	1,95	V V V
Gate-Schwellenspannung Gate threshold voltage	I_C = 6,40 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	4,9	5,8	6,5	V
Gateladung Gate charge	V_{GE} = -15 V ... +15 V		Q_G		4,30		µC
Interner Gatewiderstand Internal gate resistor	T_{vj} = 25°C		R_{Gint}		1,0		Ω
Eingangskapazität Input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		26,0		nF
Rückwirkungskapazität Reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,76		nF
Kollektor-Emitter-Reststrom Collector-emitter cut-off current	V_{CE} = 650 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1,0	mA
Gate-Emitter-Reststrom Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
Einschaltverzögerungszeit, induktive Last Turn-on delay time, inductive load	I_C = 400 A, V_{CE} = 300 V V_{GE} = ±15 V R_{Gon} = 3,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,on}$		0,12 0,12 0,12		µs µs µs
Anstiegszeit, induktive Last Rise time, inductive load	I_C = 400 A, V_{CE} = 300 V V_{GE} = ±15 V R_{Gon} = 3,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,125 0,13 0,135		µs µs µs
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	I_C = 400 A, V_{CE} = 300 V V_{GE} = ±15 V R_{Goff} = 3,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,off}$		0,64 0,685 0,69		µs µs µs
Fallzeit, induktive Last Fall time, inductive load	I_C = 400 A, V_{CE} = 300 V V_{GE} = ±15 V R_{Goff} = 3,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,06 0,08 0,09		µs µs µs
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	I_C = 400 A, V_{CE} = 300 V, L_S = 35 nH V_{GE} = ±15 V, di/dt = 3000 A/µs (T_{vj} = 150°C) R_{Gon} = 3,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		10,0 12,0 12,5		mJ mJ mJ
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	I_C = 400 A, V_{CE} = 300 V, L_S = 35 nH V_{GE} = ±15 V, du/dt = 1950 V/µs (T_{vj} = 150°C) R_{Goff} = 3,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		20,0 25,5 26,5		mJ mJ mJ
Kurzschlußverhalten SC data	V_{GE} ≤ 15 V, V_{CC} = 360 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 10 µs, T_{vj} = 25°C t_P ≤ 10 µs, T_{vj} = 150°C	I_{SC}		1900 1500		A A
Wärmewiderstand, Chip bis Gehäuse Thermal resistance, junction to case	pro IGBT / per IGBT		R_{thJC}			0,13	K/W
Wärmewiderstand, Gehäuse bis Kühlkörper Thermal resistance, case to heatsink	pro IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}			0,027	K/W
Temperatur im Schaltbetrieb Temperature under switching conditions			$T_{vj\,op}$	-40		150	°C

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