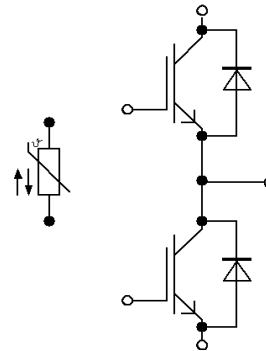
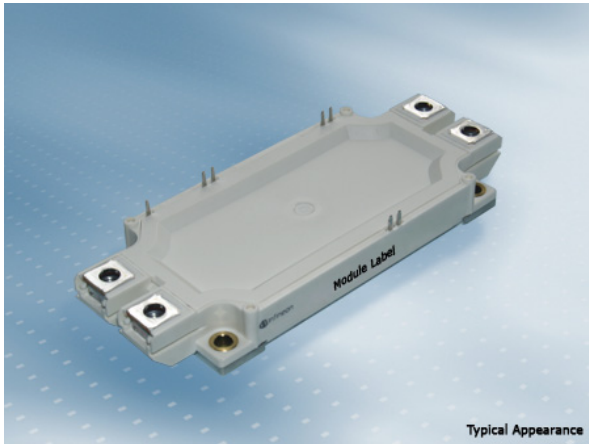


EconoDUAL™3 Modul mit Trench/Feldstopp IGBT4 und Emitter Controlled Diode und NTC
 EconoDUAL™3 module with Trench/Fieldstop IGBT4 and Emitter Controlled diode and NTC



$V_{CES} = 650V$
 $I_{C\ nom} = 600A / I_{CRM} = 1200A$

Potentielle Anwendungen

- Hybrid-Nutzfahrzeuge
- Motorantriebe
- Solar Anwendungen
- USV-Systeme

Potential Applications

- Commercial Agriculture Vehicles
- Motor drives
- Solar applications
- UPS systems

Elektrische Eigenschaften

- Erhöhte Sperrspannungsfestigkeit auf 650V
- Erhöhte Zwischenkreisspannung
- Hohe Kurzschlussrobustheit
- Hohe Stoßstromfestigkeit
- Hohe Stromdichte
- $T_{vj\ op} = 150^{\circ}C$
- Trench IGBT 4

Electrical Features

- Increased blocking voltage capability up to 650V
- Increased DC-link voltage
- High short-circuit capability
- High surge current capability
- High current density
- $T_{vj\ op} = 150^{\circ}C$
- Trench IGBT 4

Mechanische Eigenschaften

- Hohe Leistungsdichte
- Integrierter NTC Temperatur Sensor
- Isolierte Bodenplatte
- Kupferbodenplatte
- Standardgehäuse

Mechanical Features

- High power density
- Integrated NTC temperature sensor
- Isolated base plate
- Copper base plate
- Standard housing

Module Label Code

Barcode Code 128



DMX - Code



Content of the 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, Wechselrichter / IGBT, Inverter Höchstzulässige Werte / Maximum Rated Values

Kollektor-Emitter-Sperrspannung Collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	650	V
Kollektor-Dauergleichstrom Continuous DC collector current	$T_C = 60^{\circ}\text{C}, T_{vj\text{ max}} = 175^{\circ}\text{C}$	I_{CDC}	600	A
Periodischer Kollektor-Spitzenstrom Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	1200	A
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	$I_C = 600\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	1,55 1,70 1,75	1,95	V V V	
Gate-Schwellenspannung Gate threshold voltage	$I_C = 9,60\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GEth}	4,90	5,80	6,50	V
Gateladung Gate charge	$V_{GE} = -15 / 15\text{ V}$		Q_G	6,50		μC	
Interner Gatewiderstand Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	0,67		Ω	
Eingangskapazität Input capacitance	$f = 1000\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	37,0		nF	
Rückwirkungskapazität Reverse transfer capacitance	$f = 1000\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	1,10		nF	
Kollektor-Emitter-Reststrom Collector-emitter cut-off current	$V_{CE} = 650\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{CES}		1,0	mA	
Gate-Emitter-Reststrom Gate-emitter leakage current	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{GES}		100	nA	
Einschaltverzögerungszeit, induktive Last Turn-on delay time, inductive load	$I_C = 600\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 1,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,12 0,13 0,13		μs μs μs	
Anstiegszeit, induktive Last Rise time, inductive load	$I_C = 600\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 1,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,12 0,12 0,12		μs μs μs	
Abschaltverzögerungszeit, induktive Last Turn-off delay time, inductive load	$I_C = 600\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 0,33\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,43 0,46 0,46		μs μs μs	
Fallzeit, induktive Last Fall time, inductive load	$I_C = 600\text{ A}, V_{CE} = 300\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 0,33\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,08 0,11 0,11		μs μs μs	
Einschaltverlustenergie pro Puls Turn-on energy loss per pulse	$I_C = 600\text{ A}, V_{CE} = 300\text{ V}, L\sigma = 30\text{ nH}$ $di/dt = 4500\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 1,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	7,00 9,40 9,70		mJ mJ mJ	
Abschaltverlustenergie pro Puls Turn-off energy loss per pulse	$I_C = 600\text{ A}, V_{CE} = 300\text{ V}, L\sigma = 30\text{ nH}$ $du/dt = 3200\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 0,33\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	35,5 39,5 40,5		mJ mJ mJ	
Kurzschlußverhalten SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 360\text{ V}$ $V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$		I_{SC}	2700		A	
Wärmewiderstand, Chip bis Gehäuse Thermal resistance, junction to case	pro IGBT / per IGBT		R_{thJC}		0,0830	K/W	
Wärmewiderstand, Gehäuse bis Kühlkörper Thermal resistance, case to heatsink	pro IGBT / per IGBT $\lambda_{Paste} = 1\text{ W}/(\text{m}\cdot\text{K})$ / $\lambda_{grease} = 1\text{ W}/(\text{m}\cdot\text{K})$		R_{thCH}	0,0400		K/W	
Temperatur im Schaltbetrieb Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$	