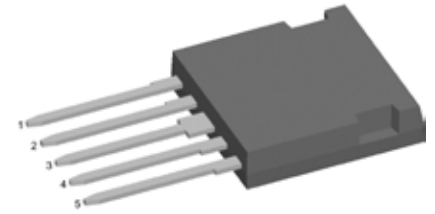
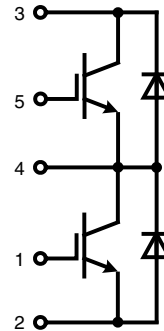


IGBT phaseleg

in ISOPLUS i4-PAC™

$$\begin{aligned} I_{C25} &= 30 \text{ A} \\ V_{CES} &= 600 \text{ V} \\ V_{CE(sat) \text{ typ.}} &= 1.9 \text{ V} \end{aligned}$$


 E72873

IGBT						
Symbol	Conditions	Maximum Ratings				
V _{CES}	T _{VJ} = 25°C to 150°C			600		V
V _{GES}				± 20		V
I _{C25}	T _C = 25°C			30		A
I _{C90}	T _C = 90°C			18		A
I _{CM}	V _{GE} = ±15 V; R _G = 47 Ω; T _{VJ} = 125°C			40		A
V _{CEK}	RBSOA Clamped inductive load; L = 100 μH			V _{CES}		
t _{SC} (SCSOA)	V _{CE} = V _{CES} ; V _{GE} = ±15 V; R _G = 47 Ω T _{VJ} = 125°C; non-repetitive			10		μs
P _{tot}	T _C = 25°C			100		W
Symbol	Conditions	Characteristic Values				
(T _{VJ} = 25°C, unless otherwise specified)						
			min.	typ.	max.	
V _{CE(sat)}	I _C = 20 A; V _{GE} = 15 V T _{VJ} = 25°C T _{VJ} = 125°C			1.9 2.2	2.4	V
V _{GE(th)}	I _C = 0.5 mA; V _{GE} = V _{CE}		4.5		6.5	V
I _{CES}	V _{CE} = V _{CES} ; V _{GE} = 0 V T _{VJ} = 25°C T _{VJ} = 125°C			0.6	0.6	mA mA
I _{GES}	V _{CE} = 0 V; V _{GE} = ± 20 V				200	nA
t _{d(on)} t _r t _{d(off)} t _f E _{on} E _{off}	Inductive load V _{CE} = 300 V; I _C = 20 A V _{GE} = ±15 V; R _G = 47 Ω T _{VJ} = 125°C			50		ns
				55		ns
				200		ns
				30		ns
				0.75		mJ
				0.6		mJ
C _{ies}	V _{CE} = 25 V; V _{GE} = 0 V; f = 1 MHz			1.1		nF
Q _{Gon}	V _{CE} = 300 V; V _{GE} = 15 V; I _C = 20 A			65		nC
R _{thJC} R _{thJH}	with heatsink compound			2.5	1.25	K/W K/W

Features

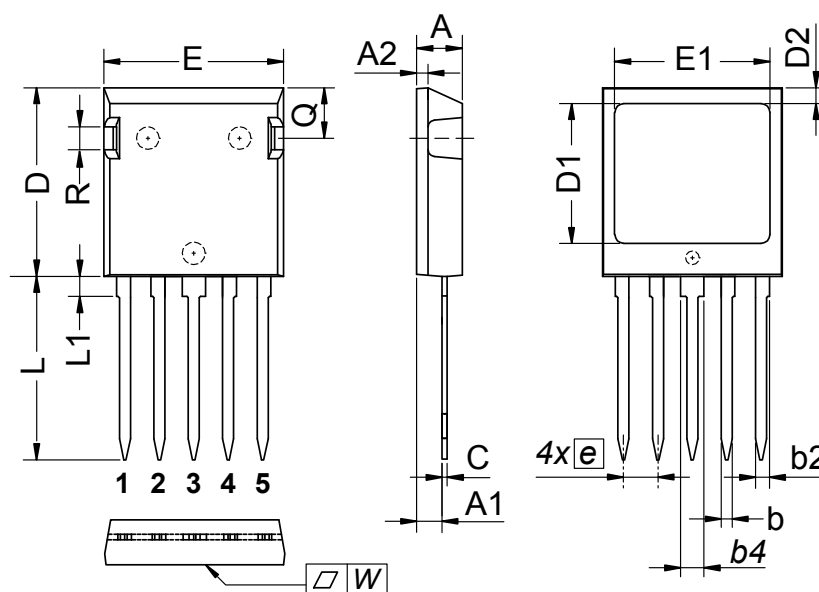
- NPT IGBT technology
 - low saturation voltage
 - positive temperature coefficient for easy paralleling
 - fast switching
- HiPerFRED™ diode
 - optimized fast and soft reverse recovery
 - low operating forward voltage
 - low leakage current
- ISOPLUS i4-PAC™ package
 - isolated back surface
 - low coupling capacity between pins and heatsink
 - enlarged creepage towards heatsink
 - application friendly pinout
 - low inductive current path
 - high reliability
 - industry standard outline
 - UL registered E 72873

Applications

- single phaseleg
 - buck-boost chopper
- H bridge
 - power supplies
 - induction heating
 - four quadrant DC drives
 - controlled rectifier
- three phase bridge
 - AC drives
 - controlled rectifier

Diode				
Symbol	Conditions	Maximum Ratings		
V_{RRM}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	600		V
I_{F25}	$T_C = 25^{\circ}\text{C}$	30		A
I_{F90}	$T_C = 90^{\circ}\text{C}$	15		A
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 20\text{ A}$		2.3	2.7
	$T_{VJ} = 25^{\circ}\text{C}$			V
	$T_{VJ} = 125^{\circ}\text{C}$		1.6	
I_{RM}	$I_F = 15\text{ A}; di_F/dt = -400\text{ A}/\mu\text{s};$ $V_R = 300\text{ V}; V_{GE} = 0\text{ V};$		7	A
t_{rr}			50	ns
R_{thJC}	(per diode)		2.3	K/W
R_{thJH}	with heatsink compound		4.6	K/W

Component				
Symbol	Conditions	Maximum Ratings		
T_{VJ}	operating	-55...+150		$^{\circ}\text{C}$
T_{stg}		-55...+125		$^{\circ}\text{C}$
V_{ISOL}	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}; t = 1\text{ s}$	2500		V~
F_C	Mounting force with clip	20...120		Nm
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
C_P	coupling capacity between shorted pins and mounting tab in the case		40	pF
d_S, d_A	pin - pin	1.7		mm
d_S, d_A	pin - backside metal	5.5		mm
Weight			6	g



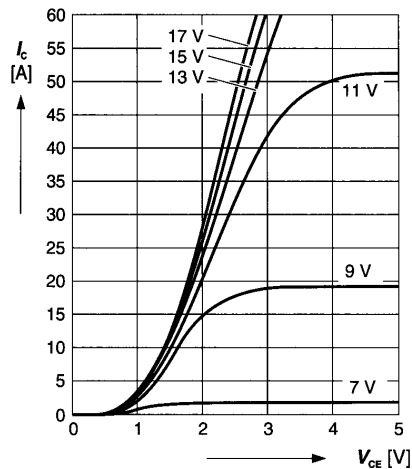
DIM.	MILLIMETER		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.59	3.00	0.102	0.118
A2	1.17	2.16	0.046	0.085
b	1.14	1.40	0.045	0.055
b2	1.47	1.73	0.058	0.068
b4	2.54	2.79	0.100	0.110
C	0.51	0.74	0.020	0.029
D	20.80	21.34	0.819	0.840
D1	14.99	15.75	0.590	0.620
D2	1.65	2.03	0.065	0.080
E	19.56	20.29	0.770	0.799
E1	16.76	17.53	0.660	0.690
e	3.81 BSC		0.15 BSC	
L	19.81	21.34	0.780	0.840
L1	2.11	2.59	0.083	0.102
Q	5.33	6.20	0.210	0.244
R	2.54	4.57	0.100	0.180
W	—	0.10	—	0.004

Die konvexe Form des Substrates ist typ. < 0.05 mm über der Kunststoffoberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side

Typ. output characteristics

$$I_C = f(V_{CE})$$

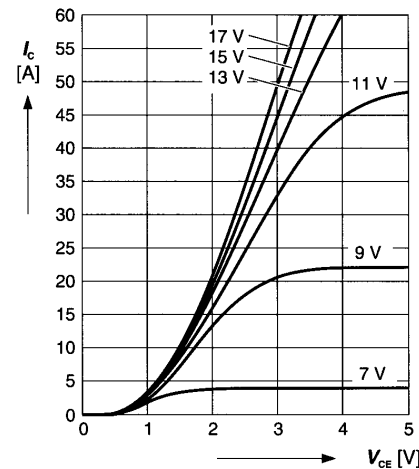
parameter: $t_p = 250 \mu s$; $T_j = 25^\circ C$



Typ. output characteristics

$$I_C = f(V_{CE})$$

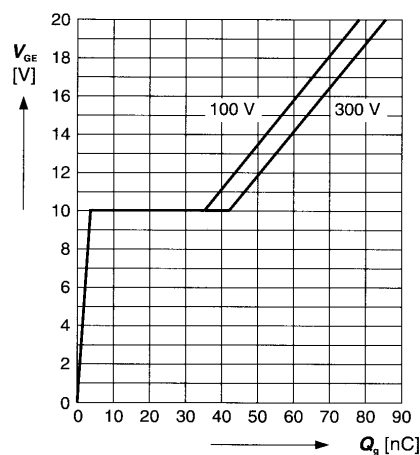
parameter: $t_p = 250 \mu s$; $T_j = 125^\circ C$



Typ. gate charge

$$V_{GE} = f(Q_g)$$

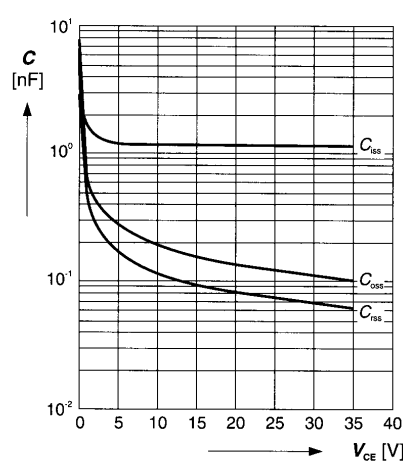
parameter: $I_{C\text{ puls}} = 20 A$



Typ. capacitances

$$C = f(V_{CE})$$

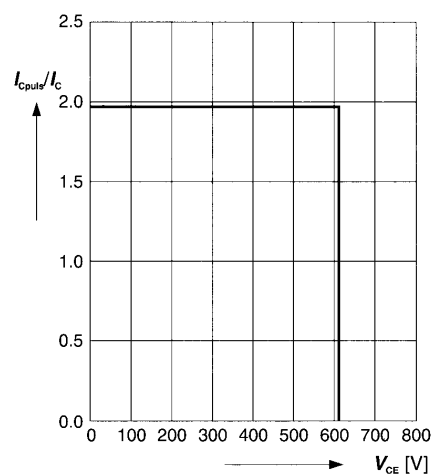
parameter: $V_{GE} = 0 V$; $f = 1 MHz$



Reverse biased safe operating area

$$I_{C\text{ puls}} = f(V_{CE}), T_j = 150^\circ C$$

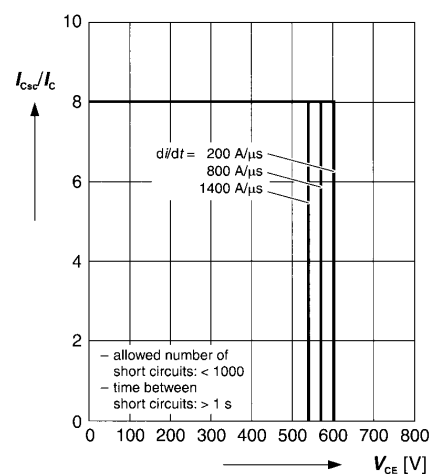
parameter: $V_{GE} = 15 V$



Short circuit safe operating area

$$I_{Csc} = f(V_{CE}), T_j = 150^\circ C$$

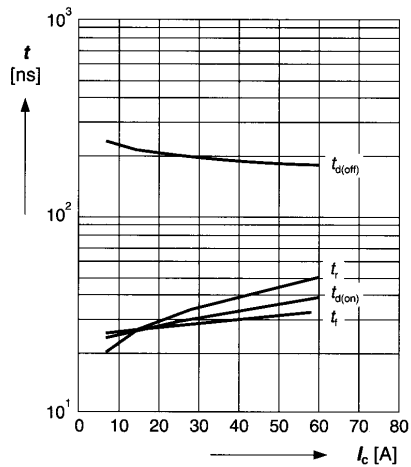
parameter: $V_{GE} = \pm 15 V$; $t_{sc} \leq 10 \mu s$; $L < 50 nH$



Typ. switching time

$t = f(I_C)$, inductive load, $T_J = 125^\circ\text{C}$

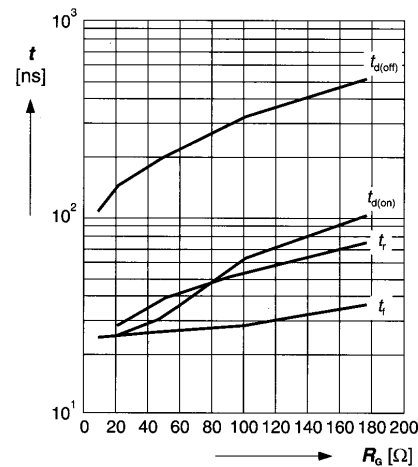
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 33\ \Omega$



Typ. switching time

$t = f(R_G)$, inductive load, $T_J = 125^\circ\text{C}$

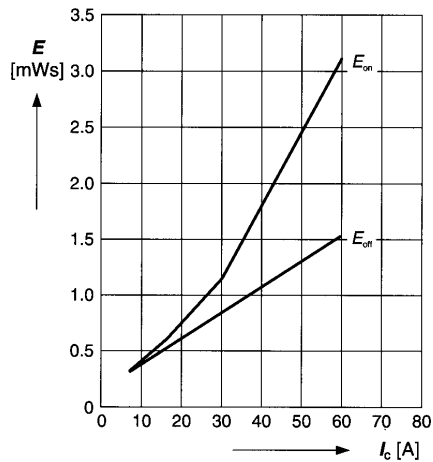
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $I_C = 30\text{ A}$



Typ. switching losses

$E = f(I_C)$, inductive load, $T_J = 125^\circ\text{C}$

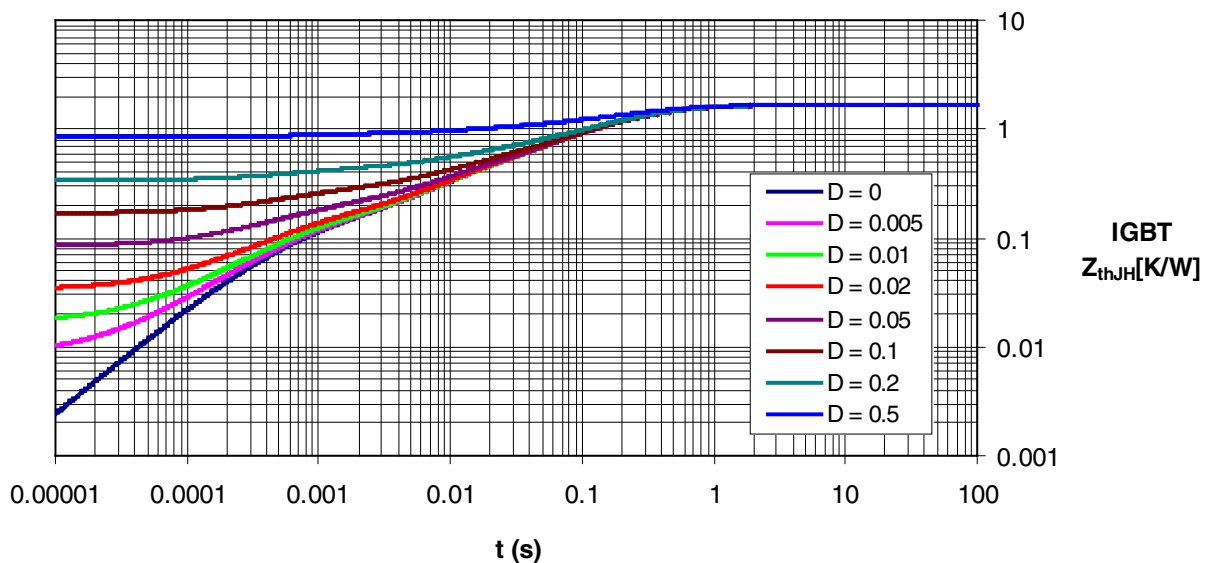
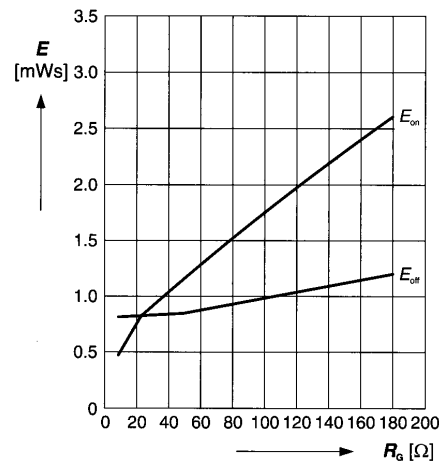
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 33\ \Omega$



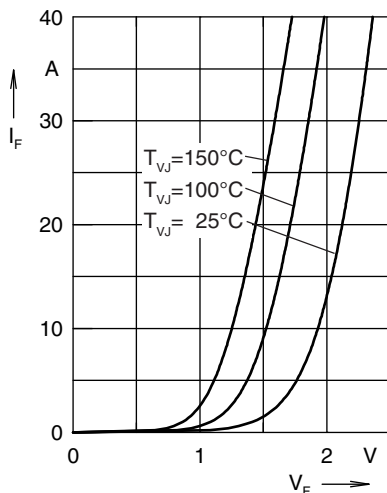
Typ. switching losses

$E = f(R_G)$, inductive load, $T_J = 125^\circ\text{C}$

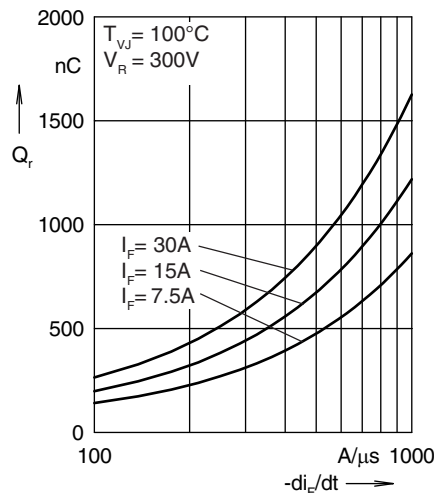
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $I_C = 30\text{ A}$



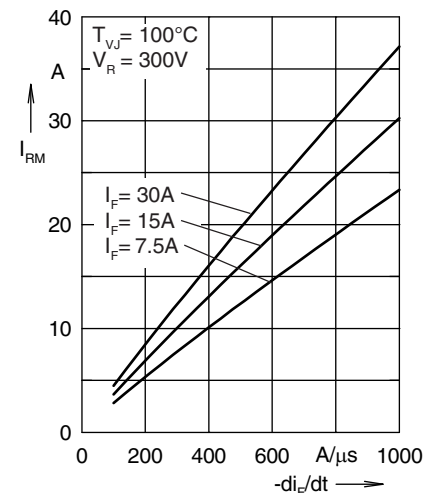
Diode



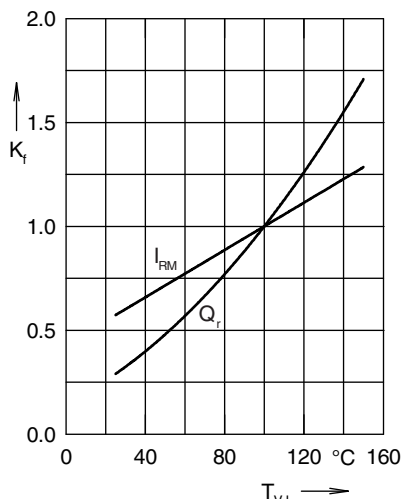
Forward current I_F versus V_F



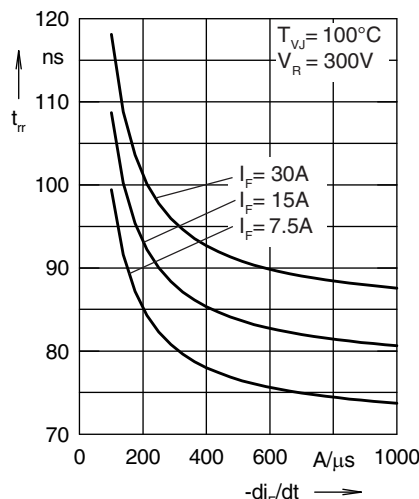
Reverse recovery charge Q_r versus $-di_F/dt$



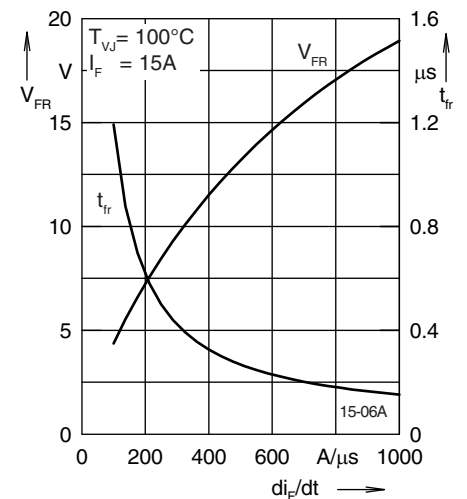
Peak reverse current I_{RM} versus $-di_F/dt$



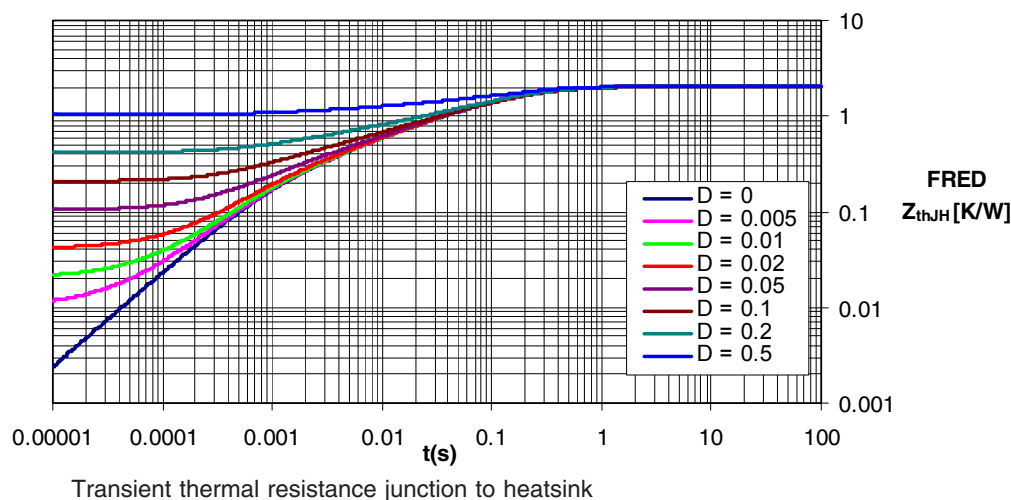
Dynamic parameters Q_r , I_{RM} versus T_{VJ}



Recovery time t_{rr} versus $-di_F/dt$



Peak forward voltage V_{FR} and t_{fr} versus di_F/dt



Transient thermal resistance junction to heatsink

AMEYA360

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