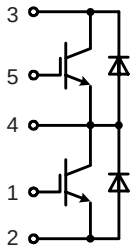
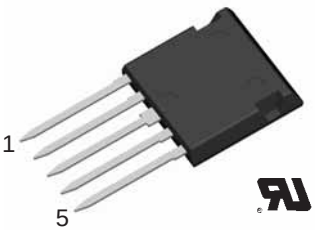
NPT³ IGBT phaseleg

in ISOPLUS i4-PAC™

I_{C25} = 50 A
V_{CES} = 1200 V
$V_{CE(sat)\,typ.}$ = 2.0 V





IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C to 150°C	1200	V
V_{GES}		± 20	V
I_{C25}	T_C = 25°C	50	A
I_{C90}	T_C = 90°C	32	A
I_{CM}	V_{GE} = ±15 V; R_G = 39 Ω; T_{VJ} = 125°C	50	A
V_{CEK}	RBSOA, Clamped inductive load; L = 100 µH	V_{CES}	
t_{SC} (SCSOA)	V_{CE} = 900V; V_{GE} = ±15 V; R_G = 39 Ω; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	200	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 30 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.0	2.6	V
	T_{VJ} = 125°C		2.3		V
$V_{GE(th)}$	I_C = 1 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			0.4	mA
	T_{VJ} = 125°C		0.4		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			200	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C		85		ns
t_r	V_{CE} = 600 V; I_C = 30 A		50		ns
$t_{d(off)}$	V_{GE} = ±15 V; R_G = 39 Ω		440		ns
t_f			50		ns
E_{on}			4.6		mJ
E_{off}			2.2		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		2		nF
Q_{Gon}	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 30 A		250		nC
R_{thJC}				0.6	K/W
R_{thJH}	with heatsink compound		1.2		K/W

Features

- NPT³ IGBT
  - low saturation voltage
  - positive temperature coefficient for easy paralleling
  - fast switching
  - short tail current for optimized performance in resonant circuits
- HiPerFRED™ diode
  - fast reverse recovery
  - low operating forward voltage
  - low leakage current
- ISOPLUS i4-PAC™ package
  - isolated back surface
  - 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

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Diodes

Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C	48	A
I_{F90}	T_C = 90°C	25	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 30 A; T_{VJ} = 25°C		2.4	2.8	V
	T_{VJ} = 125°C		1.8		V
I_{RM}	I_F = 30 A; di_F/dt = -1100 A/µs; T_{VJ} = 125°C		51		A
t_{rr}	V_R = 600 V; V_{GE} = 0 V		180		ns
$E_{rec(off)}$			1.8		mJ
R_{thJC}	(per diode)			1.3	K/W
R_{thJS}			1.6		K/W

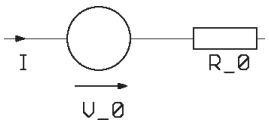
Component

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-55...+150	°C
T_{stg}		-55...+125	°C
V_{ISOL}	$I_{ISOL} \leq$ 1 mA; 50/60 Hz	2500	V~
F_C	mounting force with clip	20...120	N

Symbol	Conditions	Characteristic Values min.	typ.	max.	
d_S,d_A	pin - pin	1.7			mm
d_S,d_A	pin - backside metal	5.5			mm
Weight			9		g

Equivalent Circuits for Simulation

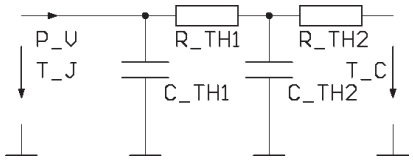
Conduction



IGBT (typ. at V_{GE} = 15 V; T_J = 125°C)
V_0 = 0.95 V; R_0 = 45 mΩ

Diode (typ. at T_J = 125°C)
V_0 = 1.26V; R_0 = 15 mΩ

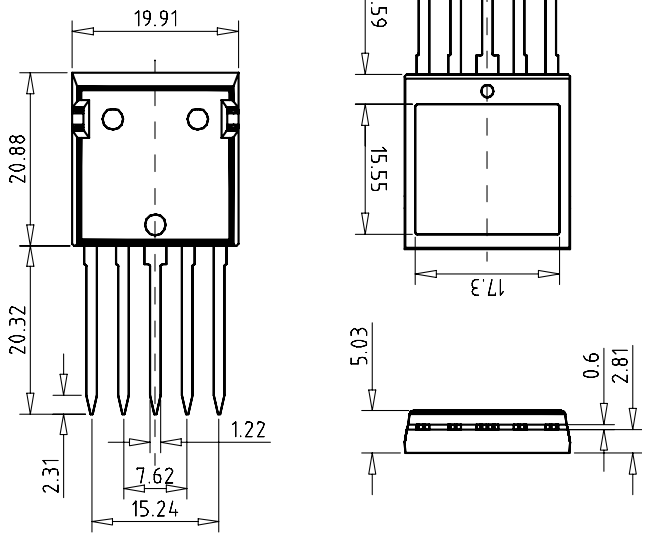
Thermal Response



IGBT
C_{th1} = 0.067 J/K; R_{th1} = 0.108 K/W
C_{th2} = 0.175 J/K; R_{th2} = 0.491 K/W

Diode
C_{th1} = 0.039 J/K; R_{th1} = 0.337 K/W
C_{th2} = 0.090 J/K; R_{th2} = 0.963 K/W

Dimensions in mm (1 mm = 0.0394")



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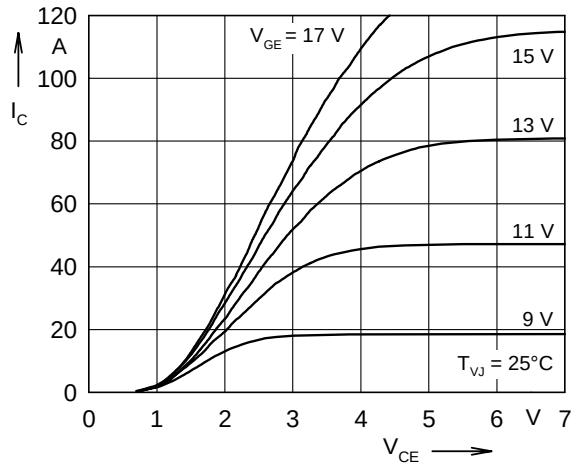


Fig. 1 Typ. output characteristics

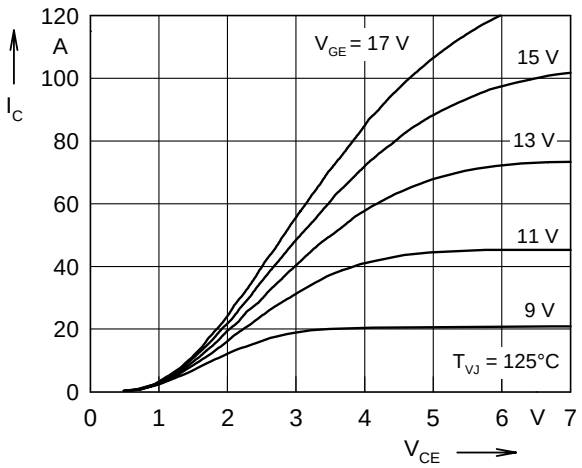


Fig. 2 Typ. output characteristics

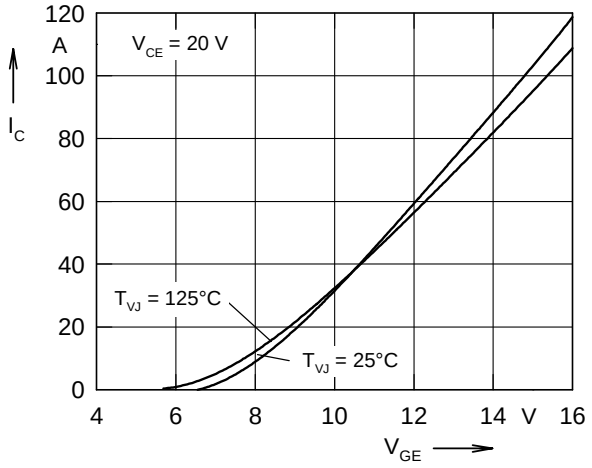


Fig. 3 Typ. transfer characteristics

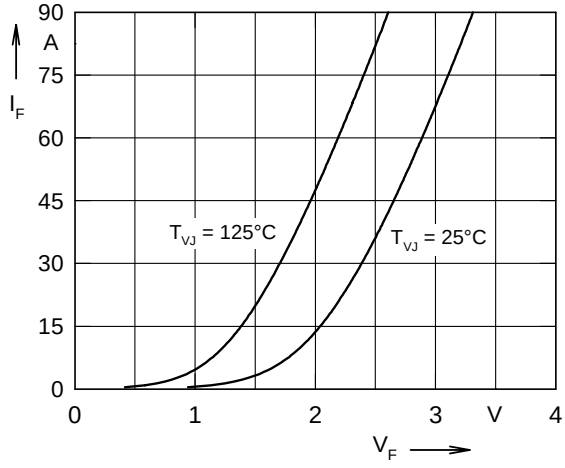


Fig. 4 Typ. forward characteristics of free wheeling diode

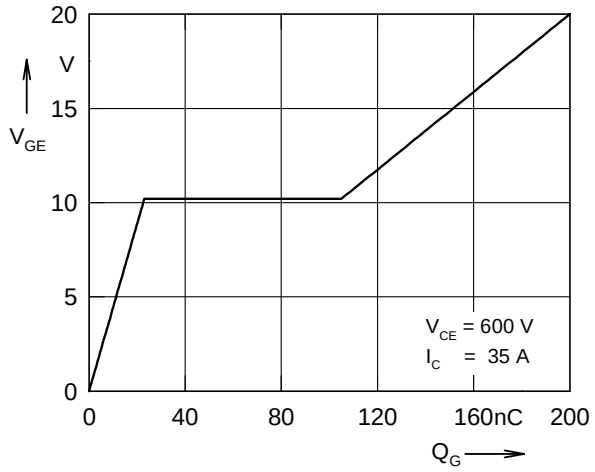


Fig. 5 Typ. turn on gate charge

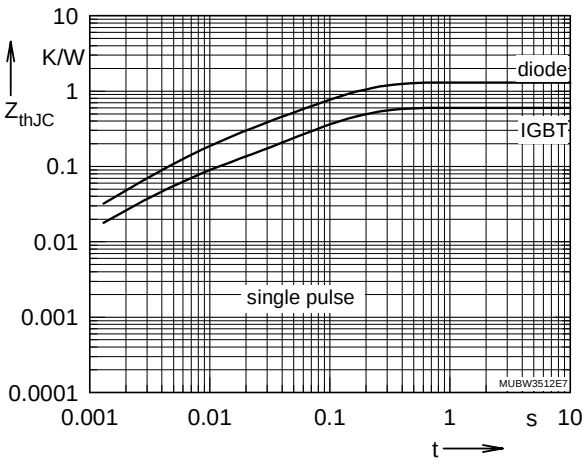


Fig. 6 Typ. transient thermal impedance

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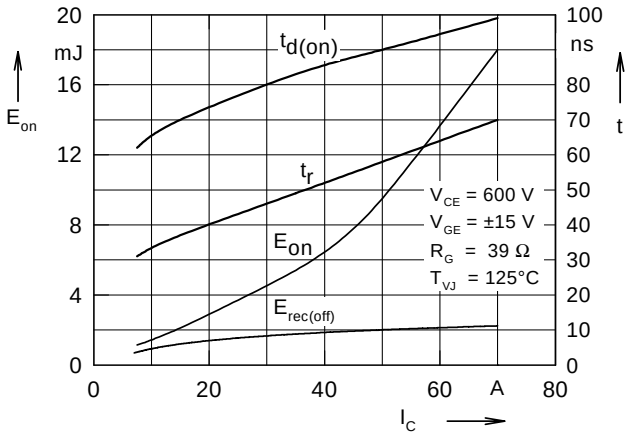


Fig. 7 Typ. turn on energy and switching times versus collector current

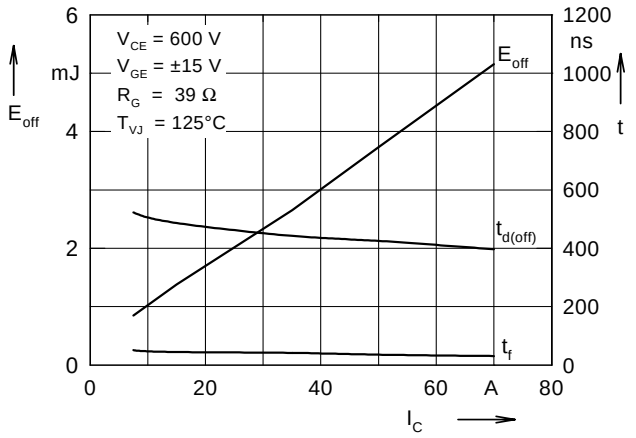


Fig. 8 Typ. turn off energy and switching times versus collector current

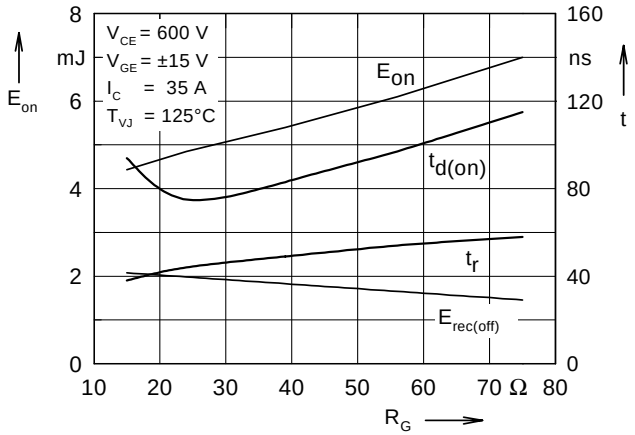


Fig. 9 Typ. turn on energy and switching times versus gate resistor

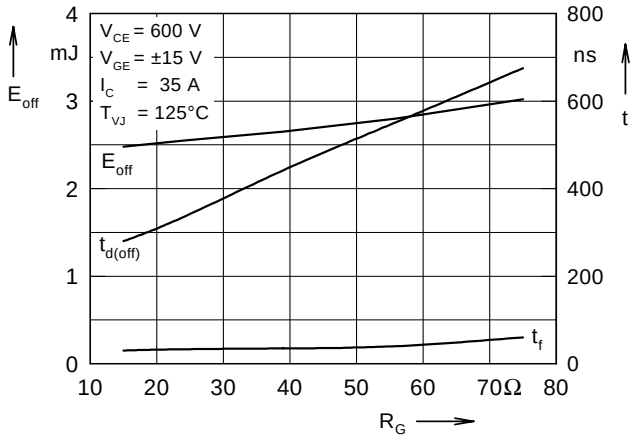


Fig.10 Typ. turn off energy and switching times versus gate resistor

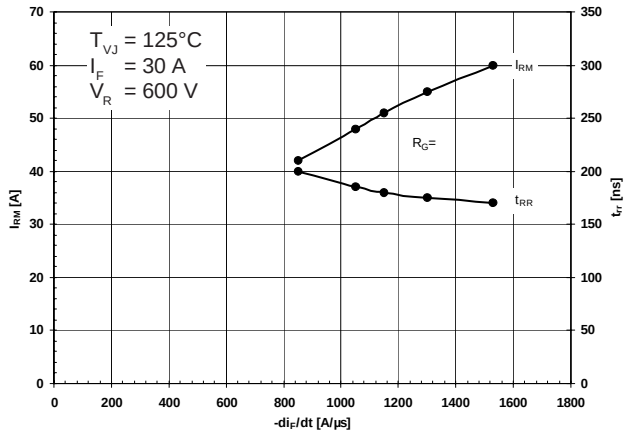


Fig. 11 Typ. turn off characteristics of free wheeling diode

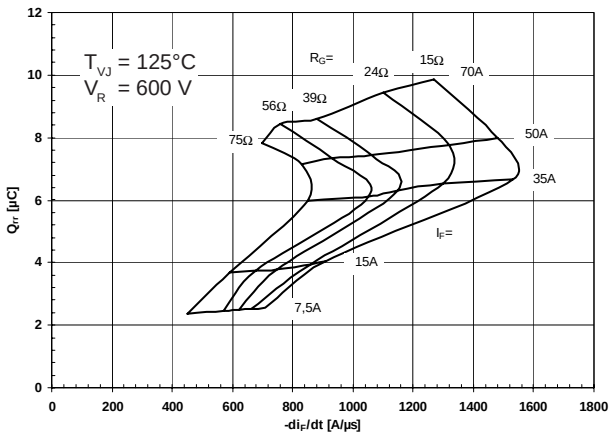


Fig. 12 Typ. turn off characteristics of free wheeling diode

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