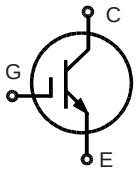
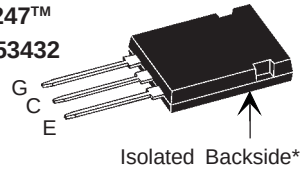
NPT³ IGBT
in ISOPLUS 247™

I_{C25} = 95 A
V_{CES} = 1200 V
$V_{CE(sat)\,typ.}$ = 2.1 V



ISOPLUS 247™
E153432



G = Gate C = Collector E = Emitter
*Patent pending

IGBT

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	95	A
I_{C90}	T_C = 90°C	60	A
I_{CM}	V_{GE} = ±15 V; R_G = 22 Ω; T_{VJ} = 125°C	100	A
V_{CEK}	RBSOA, Clamped inductive load; L = 100 µH	V_{CES}	
t_{SC} (SCSOA)	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 22 Ω; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	375	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 60 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.1	2.7	V
	T_{VJ} = 125°C		2.5		V
$V_{GE(th)}$	I_C = 2 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			0.1	mA
	T_{VJ} = 125°C		0.1		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			200	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C; V_{CE} = 600 V; I_C = 60 A; V_{GE} = ±15 V; R_G = 22 Ω		80		ns
t_r			50		ns
$t_{d(off)}$			680		ns
t_f			30		ns
E_{on}			7.2		mJ
E_{off}			4.8		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		3.8		nF
Q_{Gon}	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 50 A		350		nC
R_{thJC}				0.33	K/W
R_{thJH}			0.66		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
- ISOPLUS 247™ package
  - isolated back surface
  - low coupling capacity between pins and heatsink
  - high reliability
  - industry standard outline

Applications

- single switches
and with complementary free wheeling diodes
- choppers
- phaselegs, H bridges, three phase bridges e.g. for
  - power supplies, UPS
  - AC, DC and SR drives
  - induction heating

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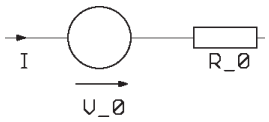
Component

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.
C_p	coupling capacity between shorted pins and mounting tab in the case		30	pF
Weight			6	g

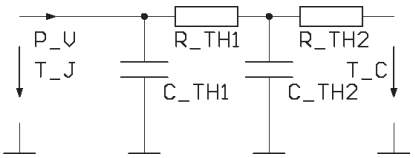
Equivalent Circuits for Simulation

Conduction



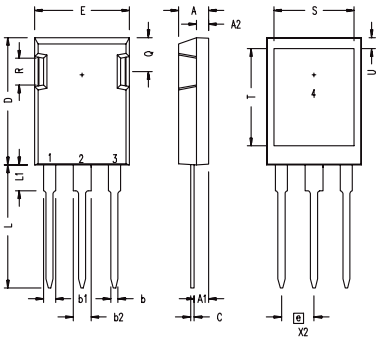
IGBT (typ. at V_{GE} = 15 V; T_J = 125°C)
V_0 = 0.99 V; R_0 = 25 mΩ

Thermal Response



IGBT (typ.)
C_{th1} = 0.13 J/K; R_{th1} = 0.06 K/W
C_{th2} = 0.32 J/K; R_{th2} = 0.27 K/W

ISOPLUS 247 OUTLINE



1 Gate, 2 Drain (Collector)
3 Source (Emitter)
4 no connection

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190
S	13.21	13.72	.520	.540
T	15.75	16.26	.620	.640
U	1.65	3.03	.065	.080

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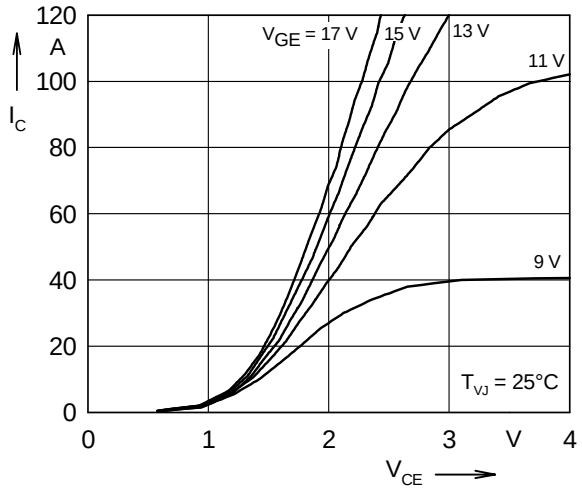

Fig. 1 Typ. output characteristics

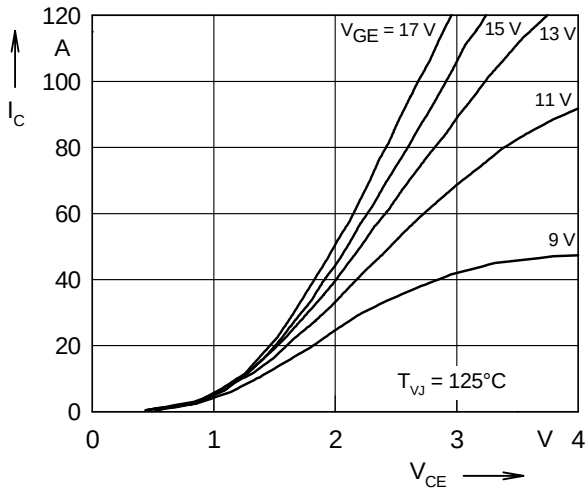

Fig. 2 Typ. output characteristics

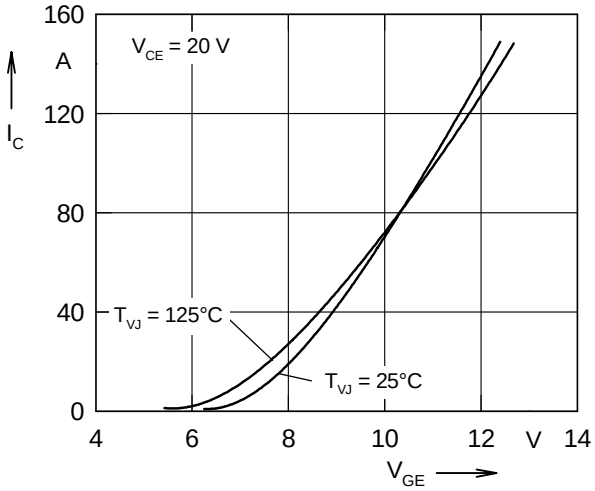

Fig. 3 Typ. transfer characteristics

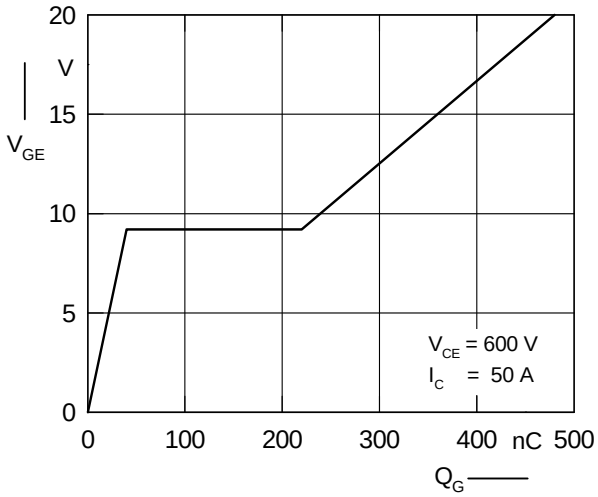

Fig. 4 Typ. turn on gate charge

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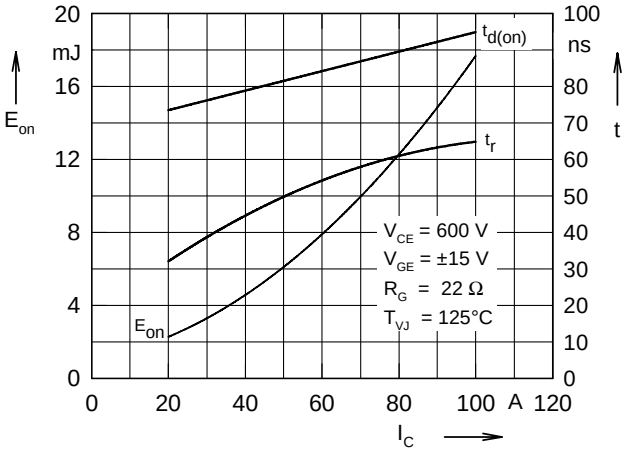

Fig. 5 Typ. turn on energy and switching times versus collector current

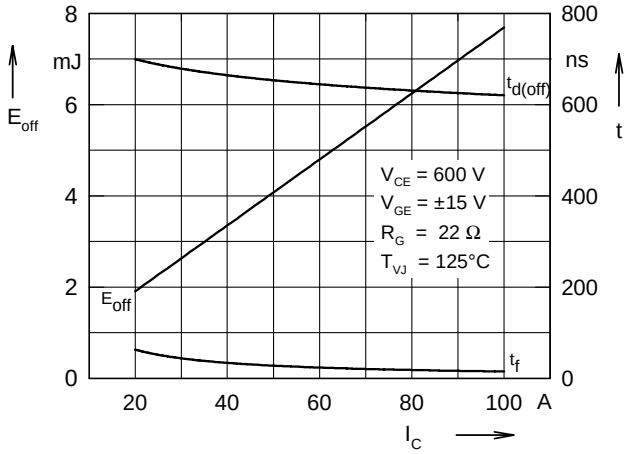

Fig. 6 Typ. turn off energy and switching times versus collector current

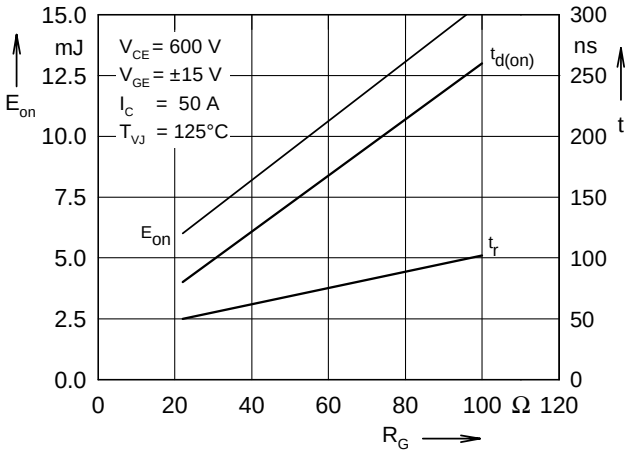

Fig. 7 Typ. turn on energy and switching times versus gate resistor

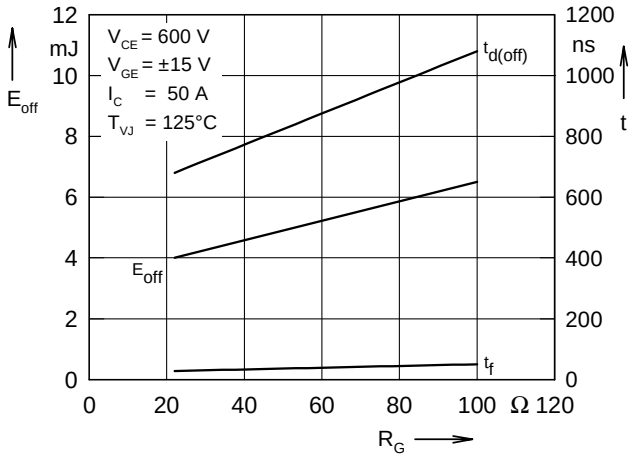

Fig. 8 Typ. turn off energy and switching times versus gate resistor

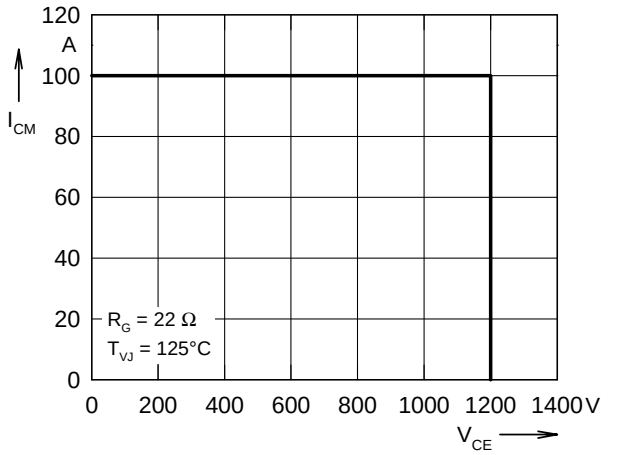

Fig. 9 Reverse biased safe operating area RBSOA

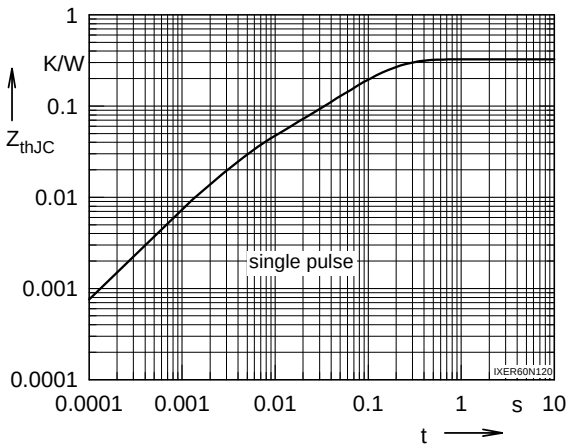

Fig. 10 Typ. transient thermal impedance

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