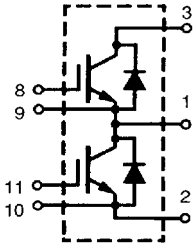
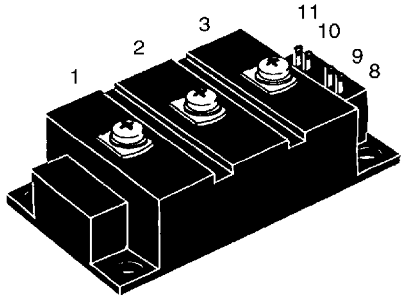
IGBT Module
Half-Bridge
Configuration

VII125-12G4

$I_{C(DC)}$ = 125 A
V_{CES} = 1200 V
$V_{CE(sat)}$ = 2.9 V

High Short Circuit
SOA Capability





Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	1200	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	125	A
I_{C100}	T_C = 100°C	110	A
I_{CM}	T_C = 25°C, t_P = 1 ms	250	A
t_{SC} (SCSOA)	V_{GE} = 15 V, V_{CE} = 0.6 • V_{CES}, T_J = 125°C R_G = 5.6 Ω, non repetitive	10	µs
RBSOA	V_{GE} = 15 V, T_J = 125°C, R_G = 5.6 Ω Clamped inductive load, L = 100 µH	I_{CM} = 250 @ 0.8 V_{CES}	A
P_{tot}	T_C = 25°C	830	W
T_J		-40 ... +150	°C
T_{Smax}		110	°C
T_{stg}		-40 ... +125	°C
V_{ISOL}	50/60 Hz, RMS t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA t = 1 s	3600	V~
	Insulating material: Al_2O_3		
M_d	Mounting torque (M6)	2.25 - 2.75	Nm
		20 - 25	lb.in.
	Terminal connection torque (M5)	2.50 - 3.70	Nm
		22 - 33	lb.in.
d_S	Creepage distance on surface	10	mm
d_A	Strike distance through air	9.6	mm
a	Max. allowable acceleration	50	m/s²
Weight	Typical, including screws	0.25	kg
		8.85	oz.

Data according to a single IGBT/FRED unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

Features

- International standard package
- Package with DCB ceramic base plate
- Isolation voltage 3600 V~
- MOS-input (voltage controlled)
- Low saturation voltage
- High short circuit capability
- No latch-up
- Ultra fast free wheeling diode
- Low conduction and commutation losses
- Recommended pulse frequency up to 5 kHz

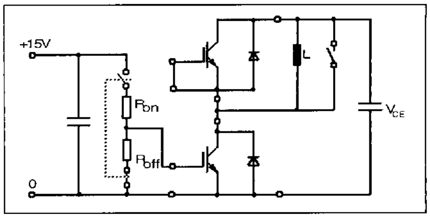
Applications

- AC motor speed control
- DC servo and robot drives
- Uninterruptible power systems (UPS)
- Switch-mode and resonant-mode power supplies
- Induction heating
- DC choppers

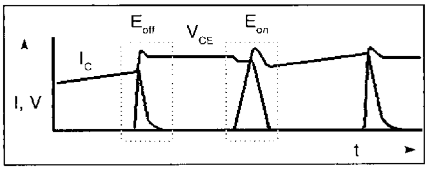
Advantages

- Space and weight savings
- Simple mounting
- Reduced protection circuits
- High $V_{GE(th)}$ for good noise immunity

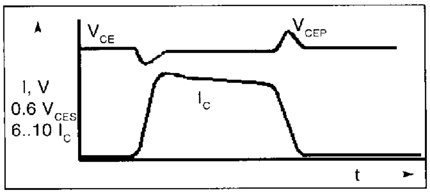
Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{(BR)CES}$	I_C = 14 mA, V_{GE} = 0 V		1200			V
$V_{GE(th)}$	I_C = 40 mA, $V_{CE} = V_{GE}$		5		8	V
I_{CES}	$V_{CE} = V_{CES}$	T_J = 25°C			14	mA
	$V_{CE} = 0.8 \bullet V_{CES}$	T_J = 125°C			44	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±500	nA
$V_{CE(sat)}$	I_C = 125 A, V_{GE} = 15 V			2.9	3.3	V
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz			18		nF
C_{oes}				2		nF
C_{res}				0.36		nF
$t_{d(on)}$	**Inductive load, T_J = 125°C**			300		ns
t_{rv}	I_C = 125 A, V_{GE} = 15 V			200		ns
$t_{d(off)}$	V_{CE} = 600 V, R_{on} = 1.8 Ω, R_{off} = 5.6 Ω			350		ns
t_{fi}	Remarks: Switching times may increase for			1800		ns
E_{on}	V_{CE} > 600 V, T_J > 125°C or increased R_G			16	20	mJ
E_{off}				37	46	mJ
R_{thJC}	for calculation of P_{tot}				0.15	K/W
R_{thJS}	with heat transfer paste				0.21	K/W



Test circuit for E_{on}, E_{off}, SCSOA and RBSOA
R_{on} = 1.8 Ω L = 100 μH
R_{off} = 5.6 Ω for RBSOA, E_{off}



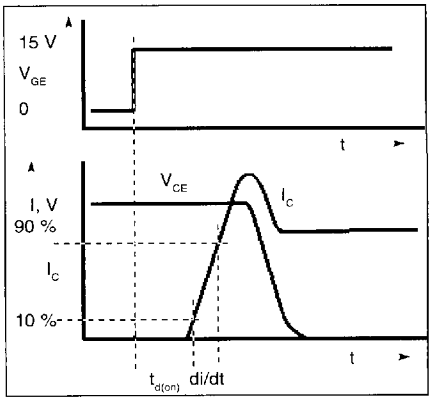
Typical V/I waveforms for inductive load



SCSOA conditions V_{CE} = 0.6 V_{CES}, V_{CEP} < V_{CES}, T_J = 125°C

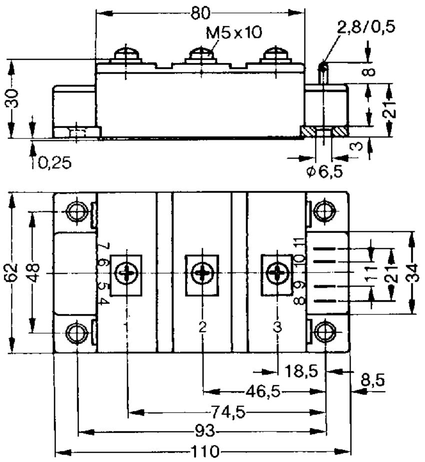
Reverse Diode (FRED)

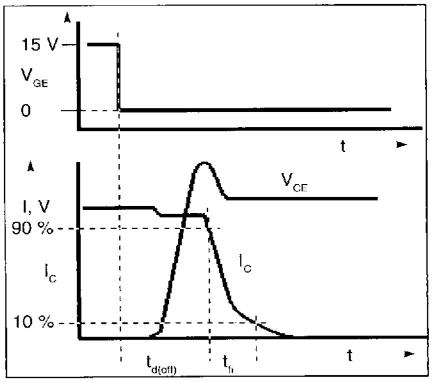
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 125 A, V_{GE} = 0 V		1.8	1.9	V
I_F	T_C = 25°C			125	A
	T_C = 100°C			91	A
I_{RM}	I_F = 125 A, V_{GE} = 0 V, -di_F/dt = 1000 A/μs			116	A
t_{rr}	T_J = 125°C, V_R = 600 V		200		ns
R_{thJC}				0.37	K/W
R_{thJS}	with heat transfer paste			0.60	K/W



Turn-on waveforms E_{on}

Dimensions in mm (1 mm = 0.0394")





Turn-off waveforms E_{off} RBSOA

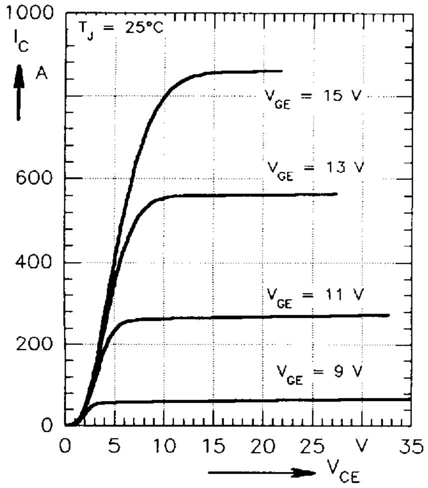


Fig. 1 Typ. output characteristics

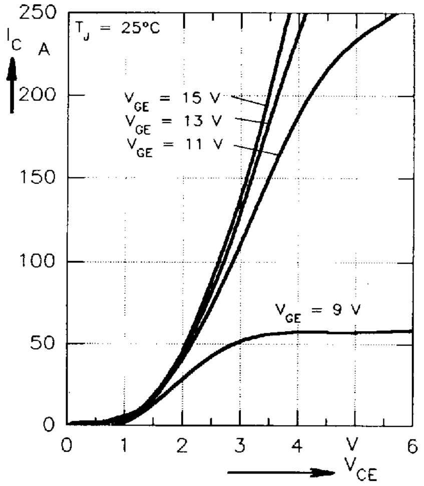


Fig. 2 Typ. output characteristics

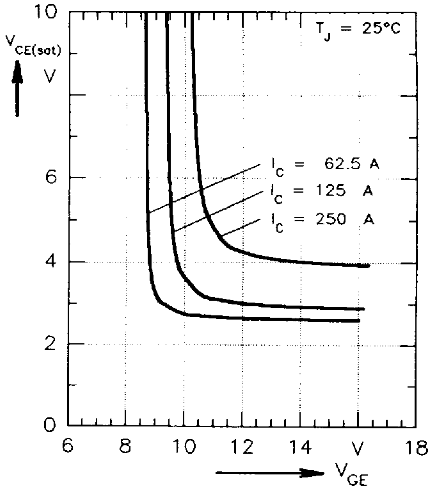


Fig. 3 Typ. on-state characteristics

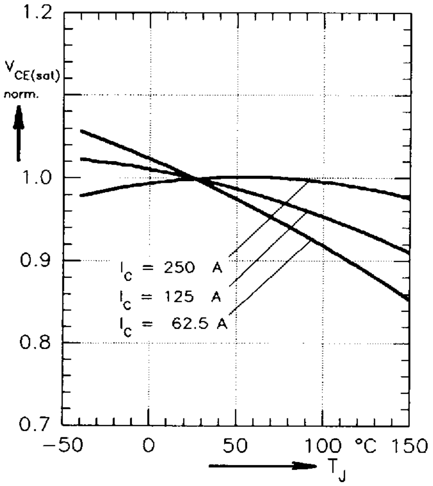


Fig. 4 Typ. temperature dependence of normalized $V_{CE(sat)}$

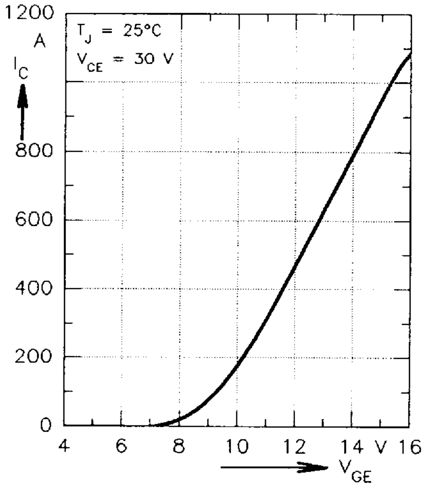


Fig. 5 Typ. transfer characteristics

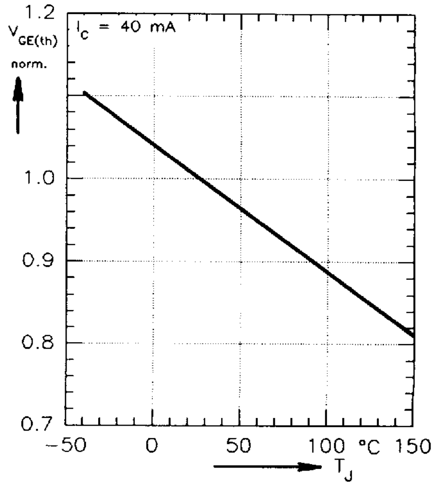


Fig. 6 Temperature dependence of normalized $V_{GE(th)}$

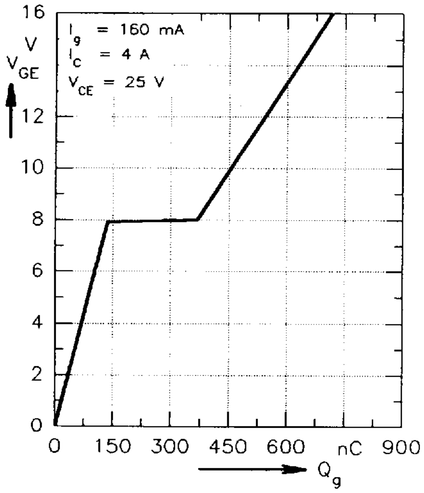


Fig. 7 Typ. turn-on gate charge characteristics

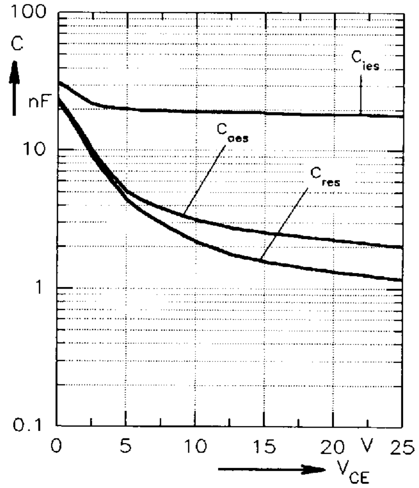


Fig. 8 Typ. capacitances

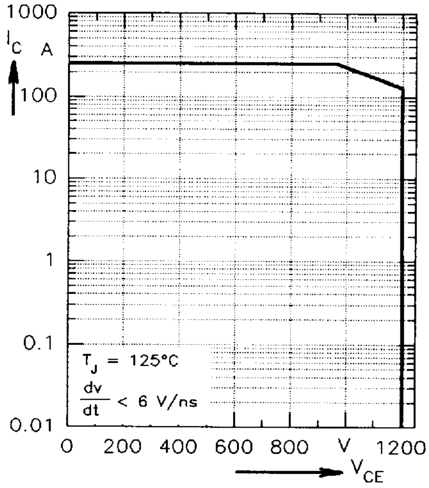


Fig. 9 Reverse biased SOA

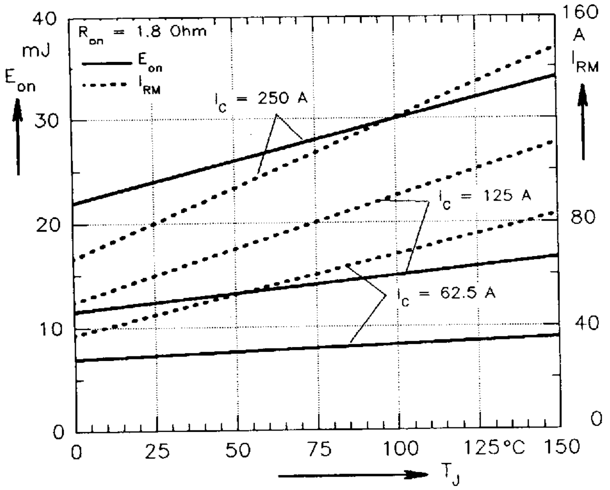


Fig. 10 Typ. turn-on energy per pulse

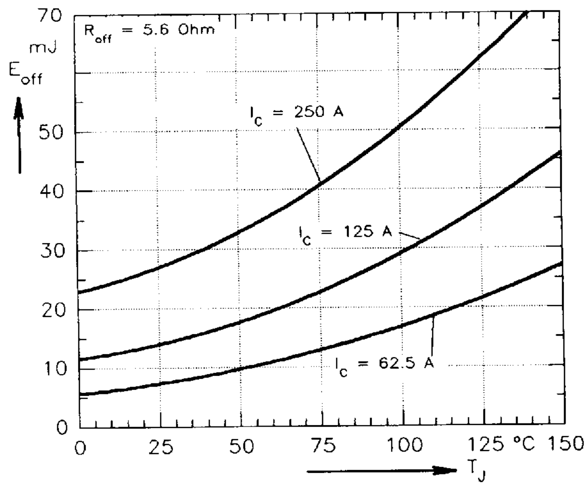


Fig. 11 Typ. turn-off energy per pulse

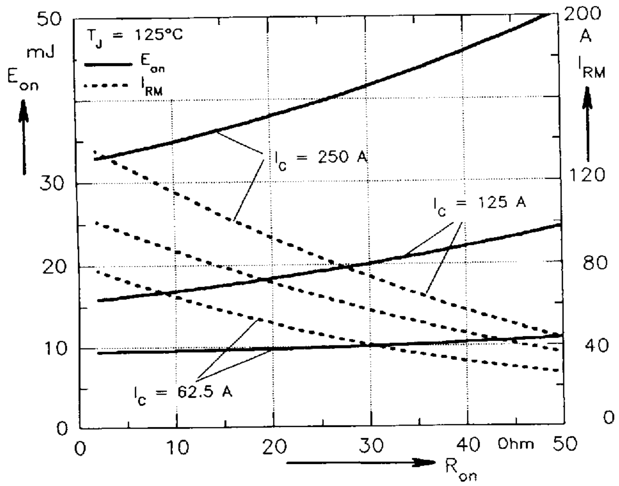


Fig. 12 Typ. turn-on energy per pulse

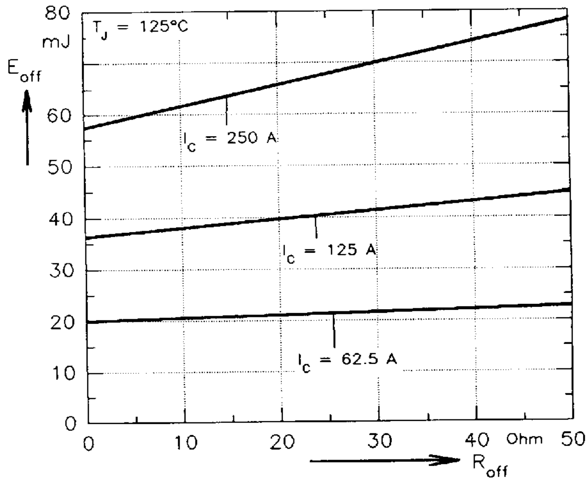


Fig. 13 Typ. turn-off energy per pulse

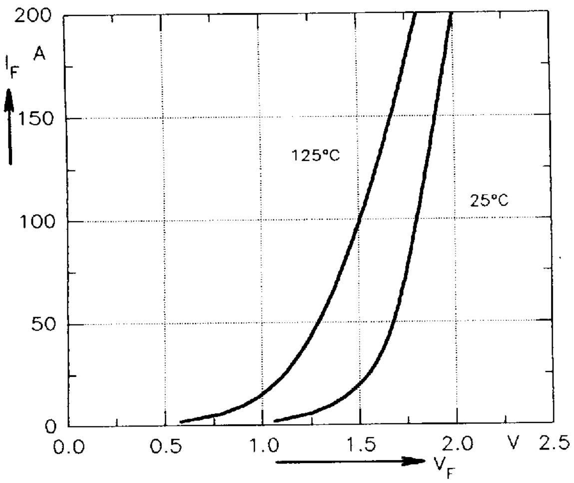


Fig. 14 Typ. forward characteristic of reverse diode

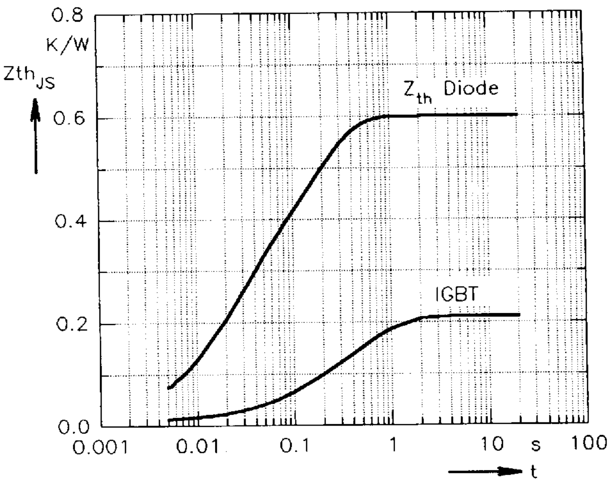


Fig. 15 Transient thermal resistance junction to heatsink of IGBT and Diode (per leg)