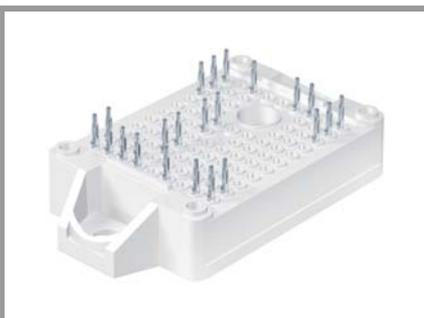


# SK25GD12T4ETE1



SEMITOP®E1

## IGBT module

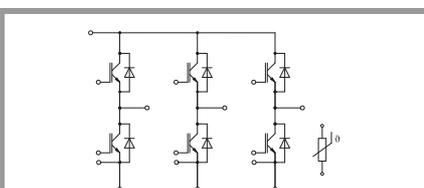
### SK25GD12T4ETE1

#### Features\*

- Low inductive design
- Press-Fit contact technology
- Rugged mounting due to integrated mounting clamps
- Heat transfer and insulation through direct copper bonded aluminium oxide ceramic (DBC)
- Trench4 IGBT technology
- Robust and soft switching CAL4F diode technology
- Integrated NTC temperature sensor
- UL recognized file no. E 63 532

#### Typical Applications

- Motor drives
- Servo drives
- Air conditioning
- Auxiliary Inverters
- UPS

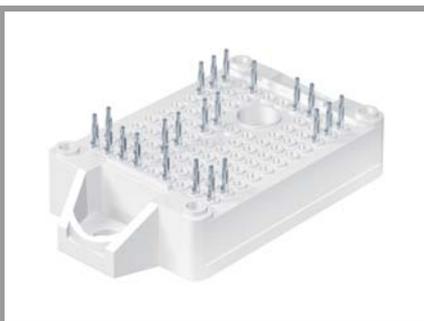


GD-ET

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
<b>IGBT 1</b>			
$V_{CES}$	$T_j = 25\text{ °C}$	1200	V
$I_C$	$\lambda_{paste}=0.8\text{ W/(mK)}$	$T_s = 25\text{ °C}$	38
	$T_j = 175\text{ °C}$	$T_s = 70\text{ °C}$	31
$I_C$	$\lambda_{paste}=2.5\text{ W/(mK)}$	$T_s = 25\text{ °C}$	45
	$T_j = 175\text{ °C}$	$T_s = 70\text{ °C}$	37
$I_{Cnom}$		25	A
$I_{CRM}$	$I_{CRM} = 3 \times I_{Cnom}$	75	A
$V_{GES}$		-20 ... 20	V
$t_{psc}$	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150\text{ °C}$	10
$T_j$		-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
<b>Diode 1</b>			
$V_{RRM}$	$T_j = 25\text{ °C}$	1200	V
$I_F$	$\lambda_{paste}=0.8\text{ W/(mK)}$	$T_s = 25\text{ °C}$	30
	$T_j = 175\text{ °C}$	$T_s = 70\text{ °C}$	24
$I_F$	$\lambda_{paste}=2.5\text{ W/(mK)}$	$T_s = 25\text{ °C}$	35
	$T_j = 175\text{ °C}$	$T_s = 70\text{ °C}$	28
$I_{Fnom}$		25	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	50	A
$I_{FSM}$	10 ms	$T_j = 25\text{ °C}$	100
	sin 180°	$T_j = 150\text{ °C}$	100
$T_j$		-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
<b>Module</b>			
$I_{t(RMS)}$	$\Delta T_{terminal}$ at PCB joint = 30 K, per pin	30	A
$T_{stg}$		-40 ... 125	°C
$V_{isol}$	AC, sinusoidal, t = 1 min	2500	V



**SEMITOP®E1**

## IGBT module

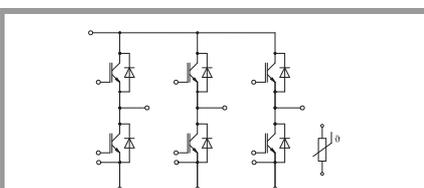
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- UPS

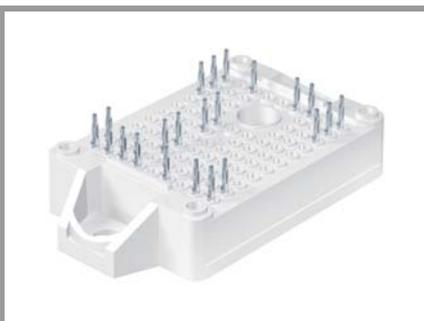


**GD-ET**

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>IGBT 1</b>						
$V_{CE(sat)}$	$I_C = 25\text{ A}$ $V_{GE} = 15\text{ V}$ chipllevel	$T_j = 25\text{ °C}$		1.85	2.10	V
		$T_j = 150\text{ °C}$		2.25	2.45	V
$V_{CE0}$	chipllevel	$T_j = 25\text{ °C}$		0.80	0.90	V
		$T_j = 150\text{ °C}$		0.70	0.80	V
$r_{CE}$	$V_{GE} = 15\text{ V}$ chipllevel	$T_j = 25\text{ °C}$		42	48	mΩ
		$T_j = 150\text{ °C}$		62	66	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 0.85\text{ mA}$		5	5.8	6.5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}, T_j = 25\text{ °C}$				1	mA
$C_{ies}$	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		1.43		nF
$C_{oes}$		$f = 1\text{ MHz}$		0.115		nF
$C_{res}$		$f = 1\text{ MHz}$		0.085		nF
$Q_G$	$V_{GE} = -15\text{ V} \dots +15\text{ V}$			184		nC
$R_{Gint}$	$T_j = 25\text{ °C}$			0		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150\text{ °C}$		34		ns
$t_r$	$I_C = 25\text{ A}$	$T_j = 150\text{ °C}$		28		ns
$E_{on}$	$V_{GE} = +15/-15\text{ V}$ $R_{G on} = 12\text{ Ω}$	$T_j = 150\text{ °C}$		1.94		mJ
$t_{d(off)}$	$R_{G off} = 12\text{ Ω}$	$T_j = 150\text{ °C}$		214		ns
$t_f$	$di/dt_{on} = 535\text{ A}/\mu\text{s}$ $di/dt_{off} = 313\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$		72		ns
$E_{off}$	$dv/dt = 4865\text{ V}/\mu\text{s}$	$T_j = 150\text{ °C}$		1.87		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8\text{ W}/(\text{mK})$			1.16		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5\text{ W}/(\text{mK})$			0.84		K/W

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>Diode 1</b>						
$V_F$	$I_F = 25\text{ A}$ chipllevel	$T_j = 25\text{ °C}$		2.41	2.74	V
		$T_j = 150\text{ °C}$		2.45	2.79	V
$V_{F0}$	chipllevel	$T_j = 25\text{ °C}$		1.30	1.50	V
		$T_j = 150\text{ °C}$		0.90	1.10	V
$r_F$	chipllevel	$T_j = 25\text{ °C}$		44	50	mΩ
		$T_j = 150\text{ °C}$		62	68	mΩ
$I_{RRM}$	$I_F = 25\text{ A}$	$T_j = 150\text{ °C}$		15		A
$Q_{rr}$	$di/dt_{off} = 535\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$		3.8		μC
$E_{rr}$	$V_{GE} = -15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 150\text{ °C}$		1.48		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8\text{ W}/(\text{mK})$			1.67		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5\text{ W}/(\text{mK})$			1.3		K/W

# SK25GD12T4ETE1



SEMITOP®E1

## IGBT module

### SK25GD12T4ETE1

#### Features\*

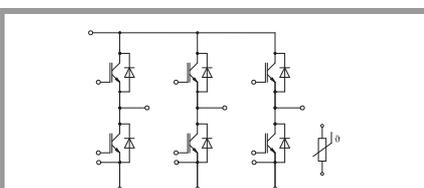
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#### Typical Applications

- Motor drives
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- UPS

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
<b>Module</b>					
$M_s$	to heatsink	1.6		2.3	Nm
w	weight		25		g

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
<b>Temperature Sensor</b>					
$R_{100}$	$T_r = 100\text{ °C}$		$493 \pm 5\%$		$\Omega$
$B_{100/125}$	$R_{(T)} = R_{100} \exp[B_{100/125}(1/T - 1/T_{100})]$ ; T[K];		$3550 \pm 2\%$		K



GD-ET

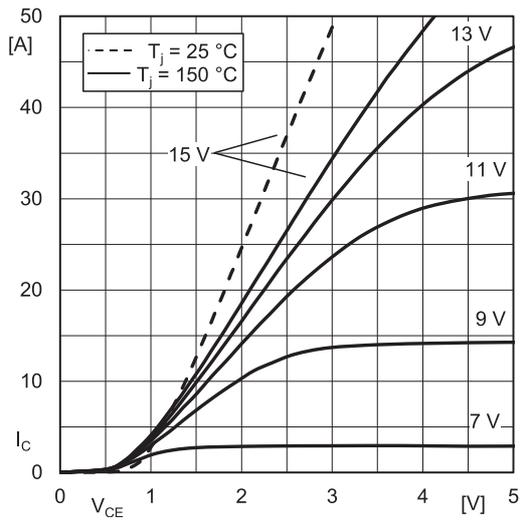


Fig. 1: Typ. IGBT output characteristic, incl.  $R_{CC'+EE'}$

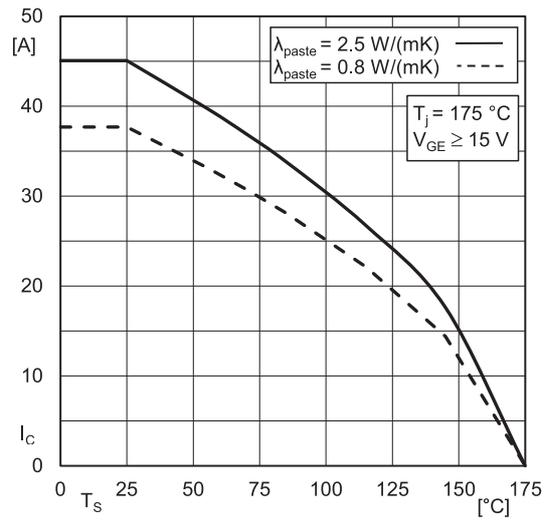


Fig. 2: IGBT rated current vs. temperature  $I_c=f(T_s)$

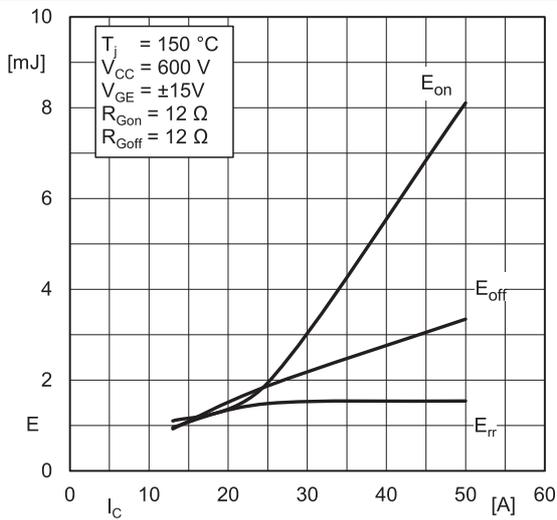


Fig. 3: Typ. turn-on /-off energy =  $f(I_c)$

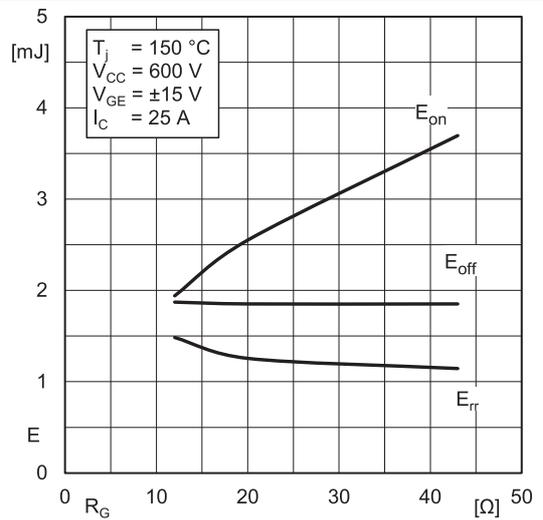


Fig. 4: Typ. turn-on /-off energy =  $f(R_G)$

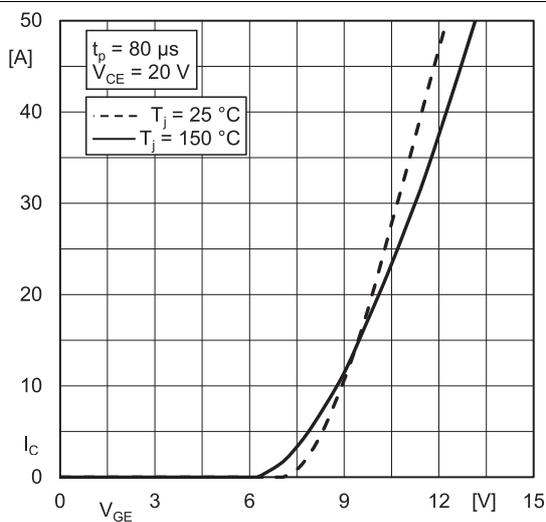


Fig. 5: Typ. IGBT transfer characteristic

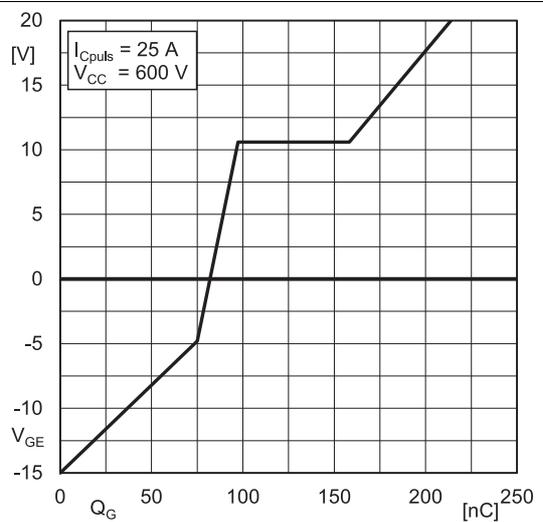


Fig. 6: Typ. IGBT gate charge characteristic

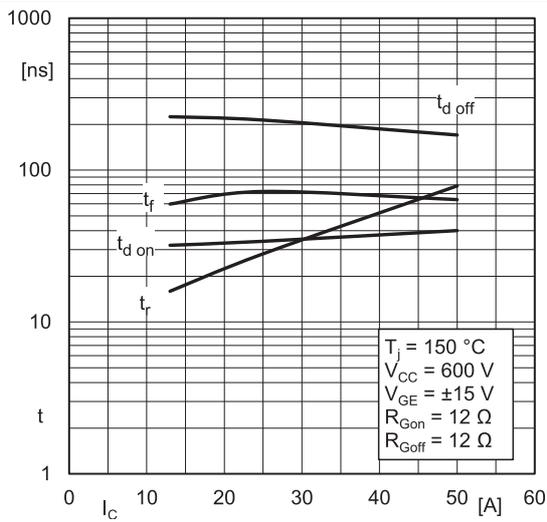


Fig. 7: Typ. switching times =  $f(I_C)$

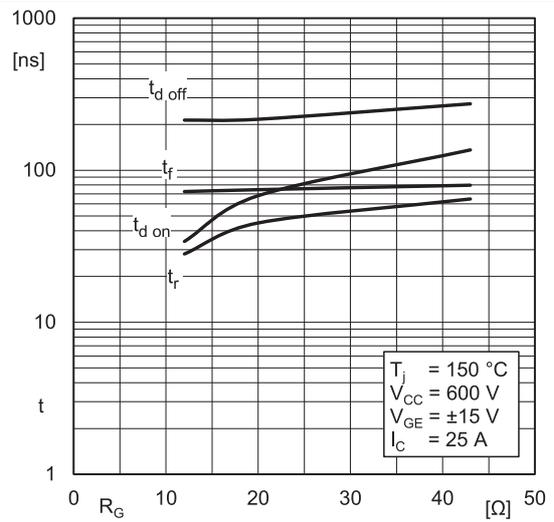


Fig. 8: Typ. switching times =  $f(R_G)$

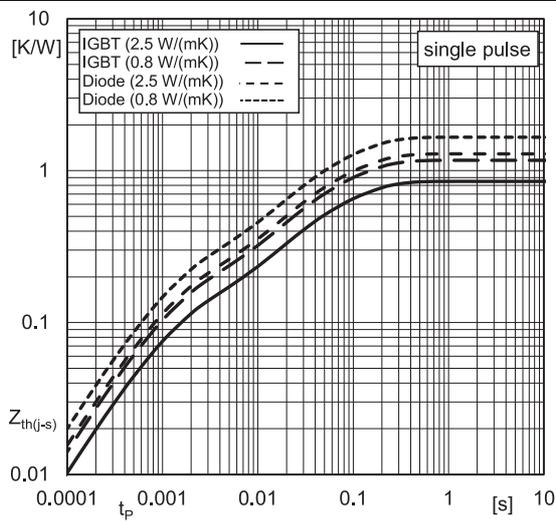


Fig. 9: Typ. transient thermal impedance

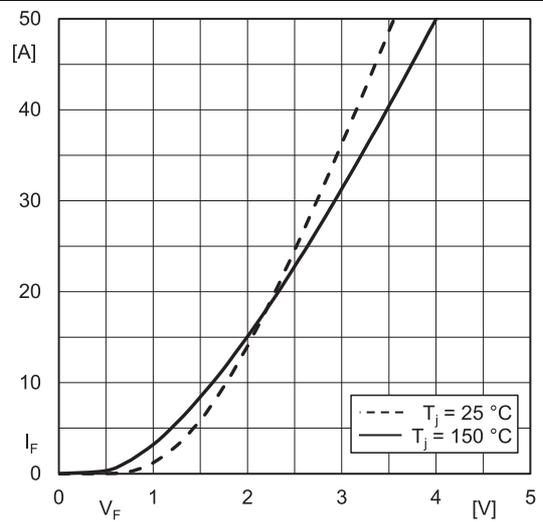


Fig. 10: Typ. Diode forward charact., incl.  $R_{CC+EE}$

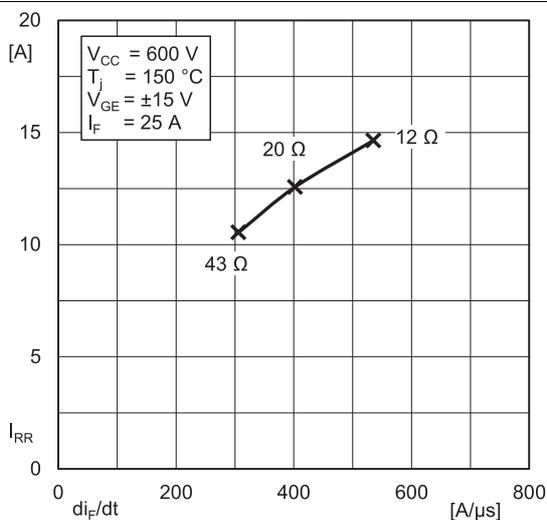


Fig. 11: Typ. Diode peak reverse recovery current

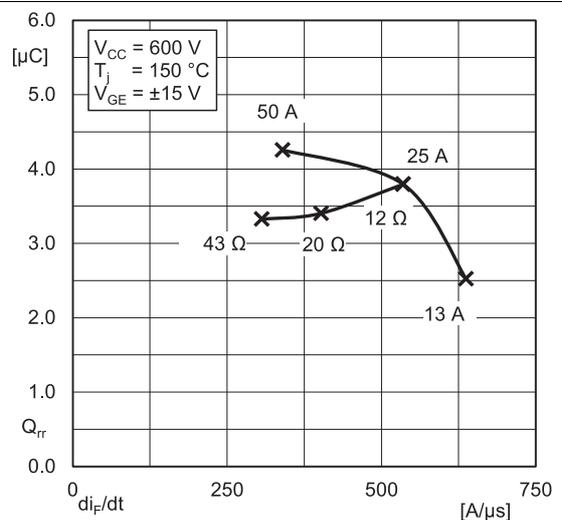


Fig. 12: Typ. Diode reverse recovery charge

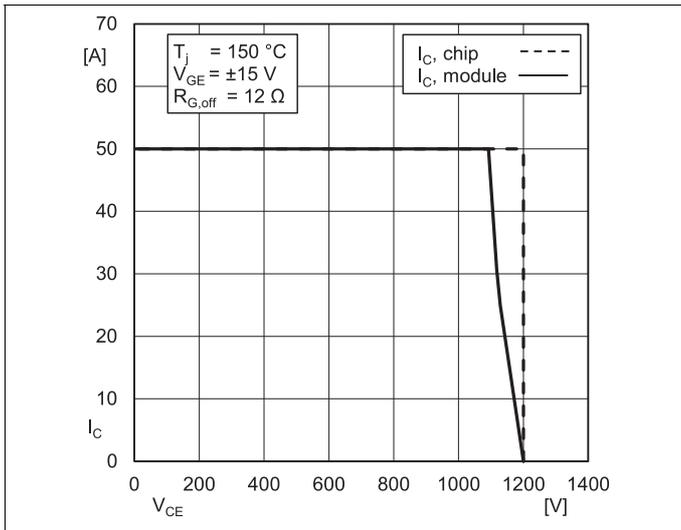
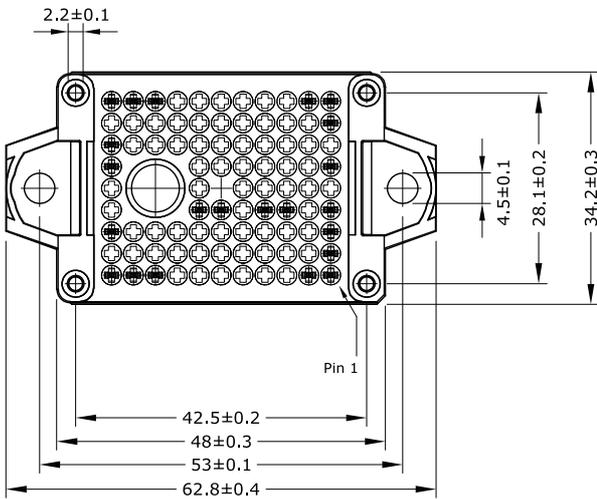
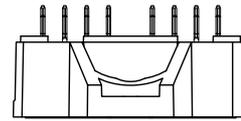
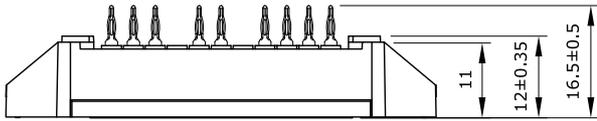
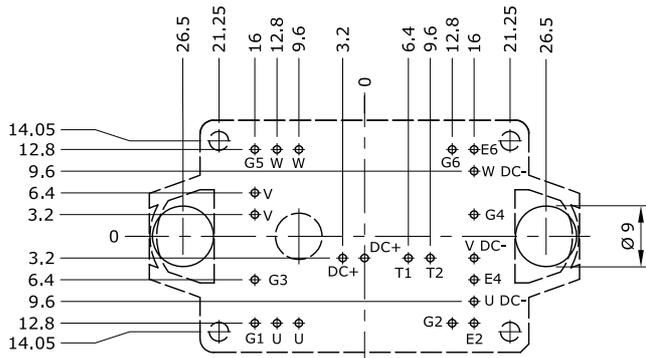


Fig. 13: IGBT Reverse Bias Safe Operating Area (RBSOA)

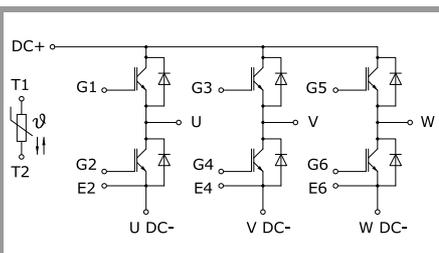
# SK25GD12T4ETE1



- Pin-Grid 3.2 mm
- Tolerance of PCB hole pattern  $\boxed{\pm 0.025}$
- Diameters of drill  $\varnothing$  1.15mm
- Copper thickness in hole 25 - 50  $\mu$ m
- Hole specification for contacts: refer to SEMITOP E1, E2 mounting instructions



SEMITOP®E1



GD-ET

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

## **\*IMPORTANT INFORMATION AND WARNINGS**

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