



Sixpack Open Emitter

SK30GD07E3ETE1

Features*

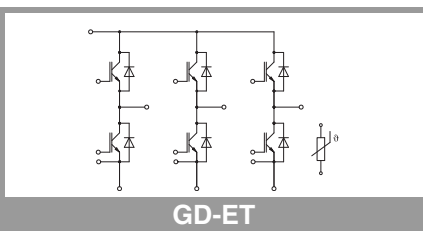
- Optimized design for superior thermal performance
- Low inductive design
- Press-Fit contact technology
- 650V Trench IGBT3 (E3)
- Robust and soft switching CAL4F diode technology
- Integrated NTC temperature sensor
- UL recognized file no. E 63 532

Typical Applications

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

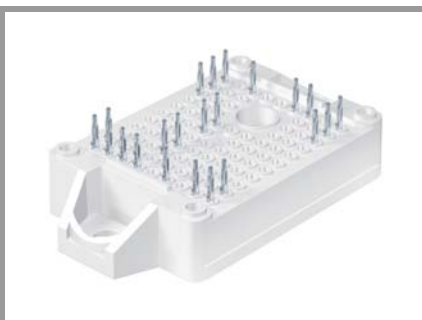
Remarks

- Recommended $T_{j,op} = -40 \dots +150 \text{ °C}$



Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
Inverter - IGBT			
V_{CES}	$T_j = 25 \text{ °C}$	650	V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 70 \text{ °C}$	32
	$T_j = 175 \text{ °C}$	$T_s = 100 \text{ °C}$	26
I_C	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 70 \text{ °C}$	39
	$T_j = 175 \text{ °C}$	$T_s = 100 \text{ °C}$	31
I_{Cnom}		30	A
I_{CRM}		60	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 360 \text{ V}$ $V_{GE} \leq 15 \text{ V}$ $V_{CES} \leq 650 \text{ V}$	$T_j = 150 \text{ °C}$	6
T_j		-40 ... 175	°C
Inverse - Diode			
V_{RRM}	$T_j = 25 \text{ °C}$	650	V
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 70 \text{ °C}$	29
	$T_j = 175 \text{ °C}$	$T_s = 100 \text{ °C}$	23
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 70 \text{ °C}$	34
	$T_j = 175 \text{ °C}$	$T_s = 100 \text{ °C}$	27
I_{FRM}		60	A
I_{FSM}	$t_p = 10 \text{ ms, sin } 180^\circ, T_j = 150 \text{ °C}$	150	A
T_j		-40 ... 175	°C
Module			
$I_{t(RMS)}$	$\Delta T_{terminal}$ at PCB joint = 30 K, per pin	30	A
T_{stg}	module without TIM	-40 ... 125	°C
V_{isol}	AC, sinusoidal, $t = 1 \text{ min}$	2500	V

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 30 \text{ A}$ $V_{GE} = 15 \text{ V}$ chipelevel	$T_j = 25 \text{ °C}$	1.45	1.87	V
		$T_j = 150 \text{ °C}$	1.70	2.10	V
V_{CE0}	chipelevel	$T_j = 25 \text{ °C}$	0.90	1.00	V
		$T_j = 150 \text{ °C}$	0.82	0.90	V
r_{CE}	$V_{GE} = 15 \text{ V}$ chipelevel	$T_j = 25 \text{ °C}$	18	29	mΩ
		$T_j = 150 \text{ °C}$	29	40	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 0.43 \text{ mA}$	5.1	5.8	6.4	V
I_{CES}	$V_{GE} = 0 \text{ V}, V_{CE} = 650 \text{ V}, T_j = 25 \text{ °C}$			1	mA
C_{ies}	$V_{CE} = 25 \text{ V}$		1.63		nF
C_{oes}	$V_{GE} = 0 \text{ V}$		0.11		nF
C_{res}			0.05		nF
Q_G	$V_{GE} = -15 \text{ V} \dots 15 \text{ V}$		301		nC
R_{Gint}	$T_j = 25 \text{ °C}$		0		Ω
$t_{d(on)}$	$V_{CC} = 300 \text{ V}$		20		ns
t_r	$I_C = 30 \text{ A}$ $R_{G on} = 12 \text{ Ω}$	$T_j = 150 \text{ °C}$			
		$T_j = 150 \text{ °C}$	24		ns
E_{on}	$R_{G off} = 12 \text{ Ω}$		0.91		mJ
$t_{d(off)}$	$di/dt_{on} = 1200 \text{ A/μs}$	$T_j = 150 \text{ °C}$	174		ns
t_f	$di/dt_{off} = 620 \text{ A/μs}$ $dv/dt = 5000 \text{ V/μs}$	$T_j = 150 \text{ °C}$	39		ns
E_{off}	$V_{GE} = +15/-15 \text{ V}$	$T_j = 150 \text{ °C}$	0.81		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W/(mK)}$		1.45		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5 \text{ W/(mK)}$		1.09		K/W



SEMITOP®E1

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Typical Applications

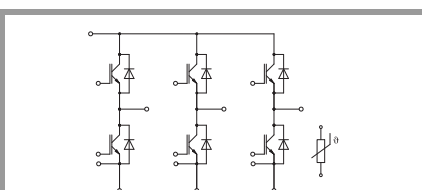
- Motor drives
- Servo drives
- Air conditioning
- Auxiliary Inverters
- UPS

Remarks

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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	$I_F = 30 \text{ A}$	$T_j = 25 \text{ °C}$		1.60	2.06	V
		chipelevel	$T_j = 150 \text{ °C}$	1.69	2.21	V
V_{F0}	chipelevel	$T_j = 25 \text{ °C}$		1.04	1.24	V
		$T_j = 150 \text{ °C}$		0.85	0.99	V
r_F	chipelevel	$T_j = 25 \text{ °C}$		19	27	mΩ
		$T_j = 150 \text{ °C}$		28	41	mΩ
I_{RRM}	$I_F = 30 \text{ A}$	$T_j = 150 \text{ °C}$		33		A
Q_{rr}	$V_{GE} = -15 \text{ V}$ $V_{CC} = 300 \text{ V}$	$T_j = 150 \text{ °C}$		2.7		μC
E_{rr}	$di/dt_{off} = 1000 \text{ A/μs}$	$T_j = 150 \text{ °C}$		0.48		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 0.8 \text{ W/(mK)}$			1.75		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 2.5 \text{ W/(mK)}$			1.38		K/W
Module						
L_{CE}				30		nH
M_s	to heatsink		1.6		2.3	Nm
w				25		g

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Temperature Sensor						
R_{100}	$T_c = 100 \text{ °C}$ ($R_{25} = 5 \text{ kΩ}$)			$493 \pm 5\%$		Ω
$B_{25/85}$	$R_{(T)} = R_{25} \cdot \exp[B_{25/85} \cdot (1/T - 1/298)]$, T[K]			3420		K



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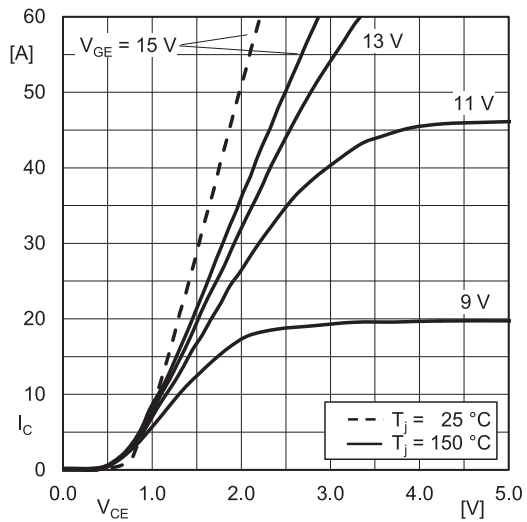


Fig. 1: Typ. IGBT output characteristic, incl. $R_{CC+EE'}$

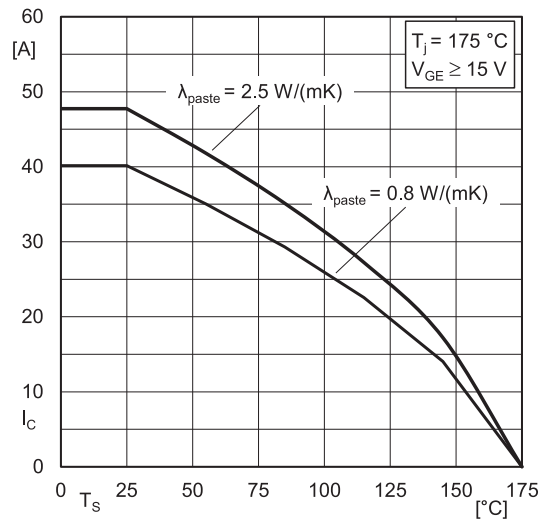


Fig. 2: IGBT rated current vs. temperature $I_C=f(T_s)$

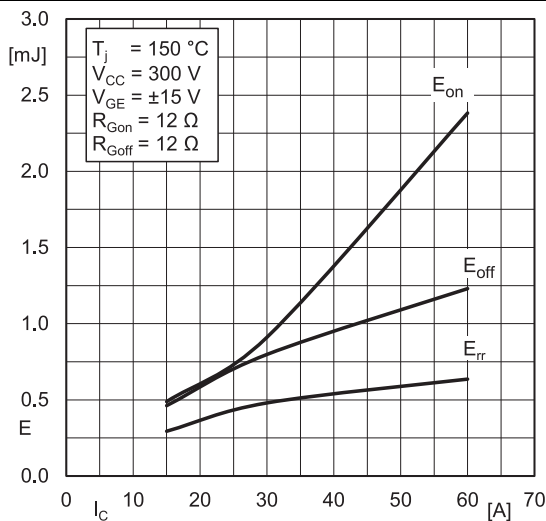


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

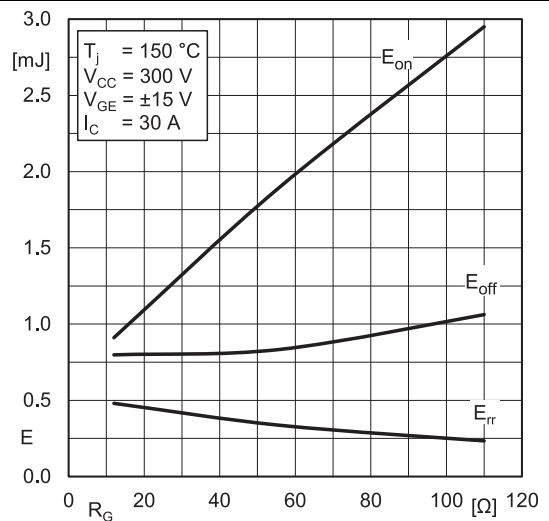


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

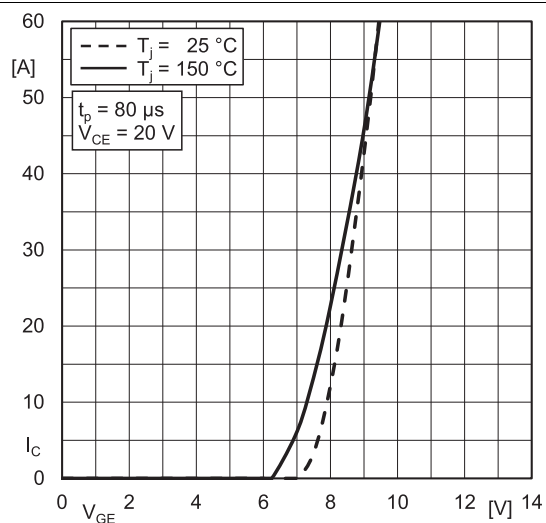


Fig. 5: Typ. IGBT transfer characteristic

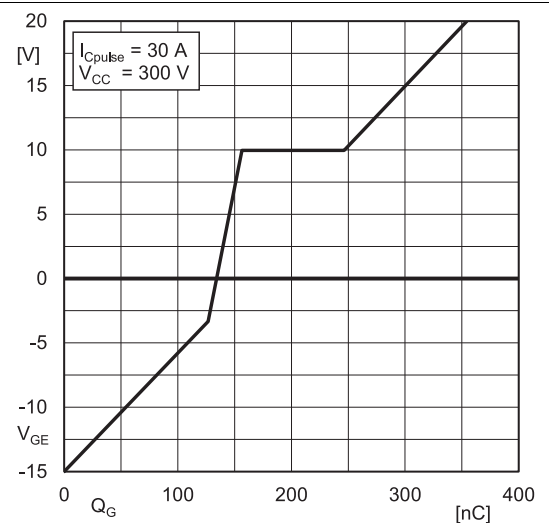


Fig. 6: Typ. IGBT gate charge characteristic

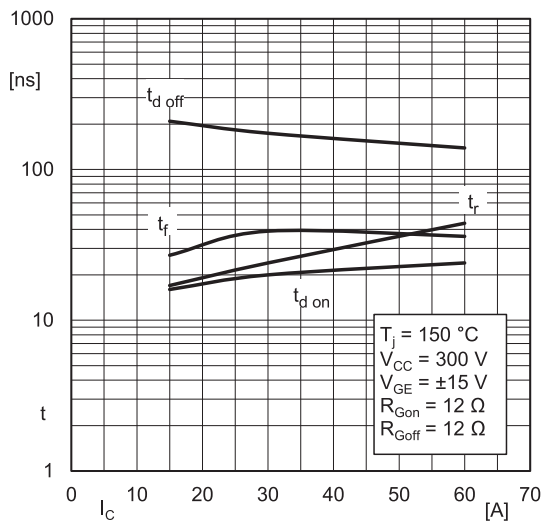


Fig. 7: Typ. switching times = $f(I_C)$

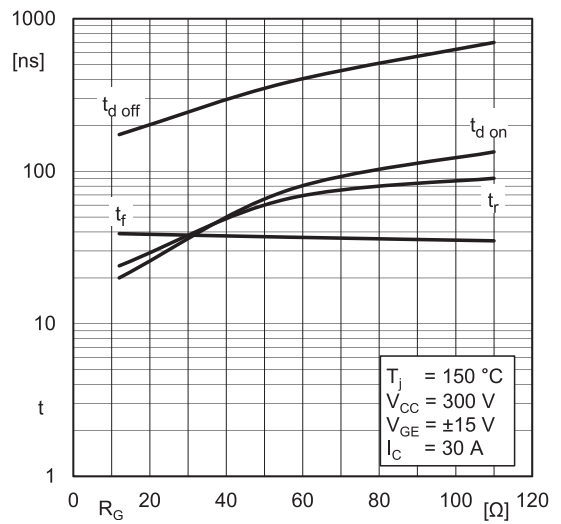


Fig. 8: Typ. switching times = $f(R_G)$

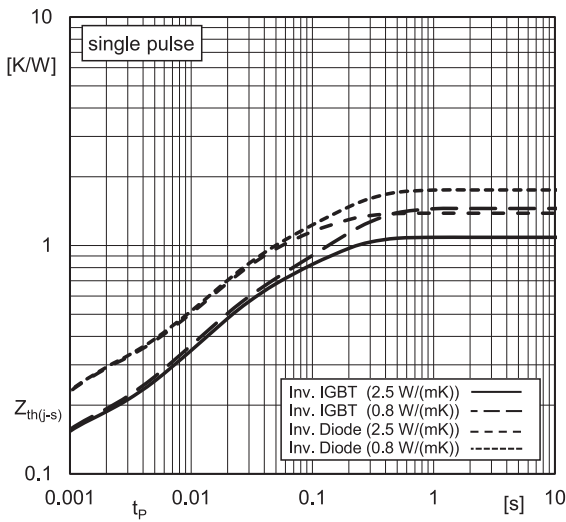


Fig. 9: Typ. transient thermal impedance

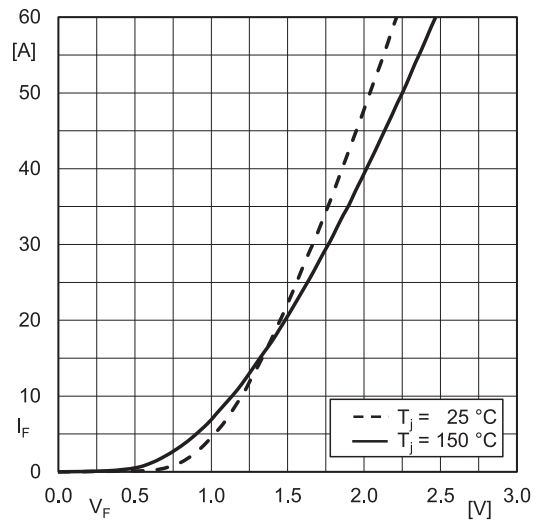


Fig. 10: Typ. Inv. diode forward charact., incl. $R_{CC+EE'}$

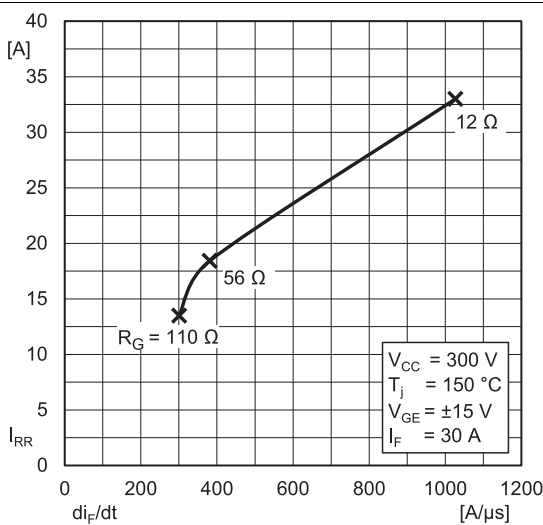


Fig. 11: Typ. Inv. diode peak reverse recovery current

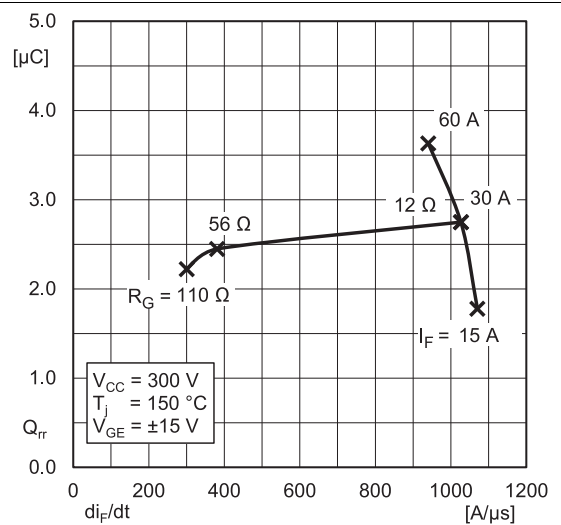


Fig. 12: Typ. Inv. diode reverse recovery charge

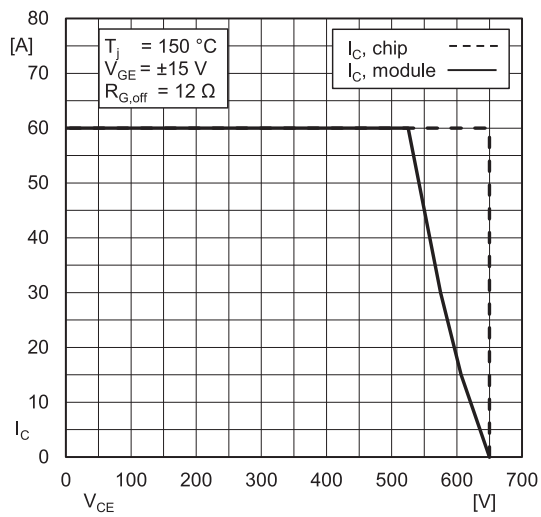
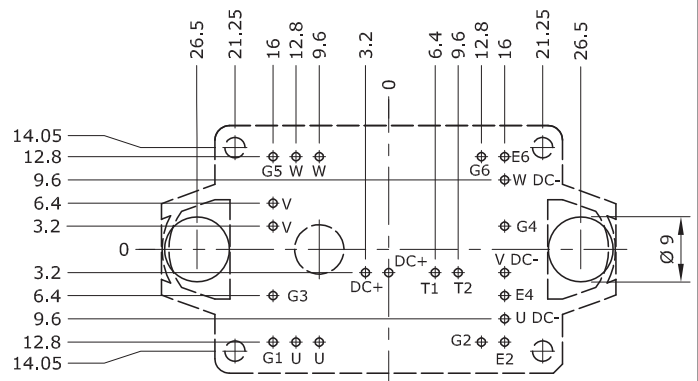
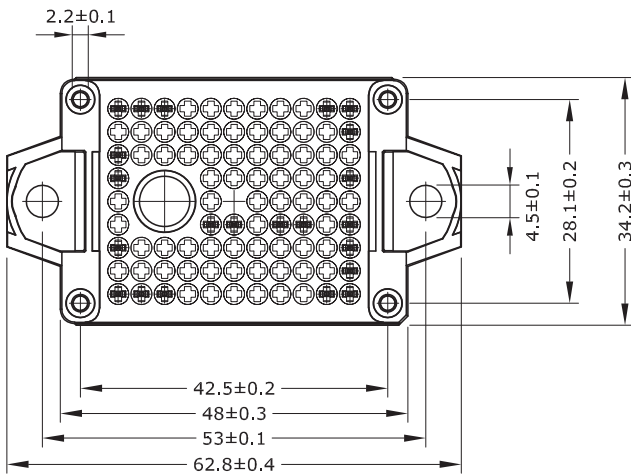
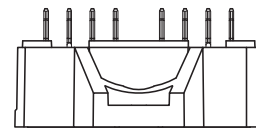
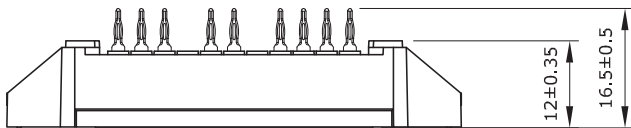


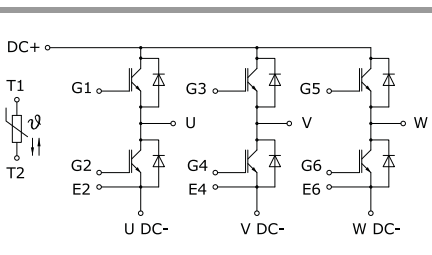
Fig. 13: IGBT Reverse Bias Safe Operating Area (RBSOA)

SK30GD07E3ETE1



- Pin-Grid 3.2 mm
- Tolerance of PCB hole pattern $\text{⌀} \pm 0.1$
- Diameters of drill $\text{⌀} 1.15\text{mm}$
- Copper thickness in hole 25 - 50 μm
- Hole specification for contacts:
refer to SEMITOP E1/E2 Mounting Instruction

SEMITOP®E1



GD-ET

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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