

**SEMITOP® 3**

## MOSFET Module

**SK80MBBB055**

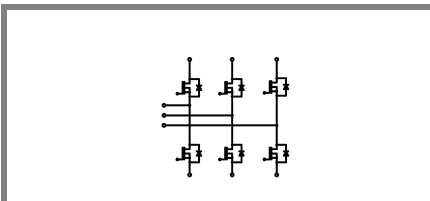
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### Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonding aluminium oxide ceramic (DBC)
- Trench-gate technology
- Short internal connections and low inductance case

### Typical Applications

- Low power SMPS
  - EV vehicles
- 1) Maximum PCB temperature, at pins contact, = 85°C
  - 2)  $R_{ds(on)}$  = chip level value



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Absolute Maximum Ratings		$T_s = 25\text{ °C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>MOSFET</b>			
$V_{DSS}$		55	V
$V_{GSS}$		$\pm 20$	V
$I_D$	$T_s = 25\text{ (80) °C}; 1$	117 (87)	A
$I_{DM}$	$t_p < 1\text{ ms}; T_s = 25\text{ (80) °C}$	234 (174)	A
$T_j$		- 40 ... + 150	°C
<b>Inverse diode</b>			
$I_F = -I_D$	$T_s = 25\text{ (80) °C}$	117 (87)	A
$I_{FM} = -I_{DM}$	$t_p < 1\text{ ms}; T_s = 25\text{ (80) °C}$	234 (174)	A
$T_j$		- 40 ... + 150	°C
<b>Freewheeling CAL diode</b>			
$I_F = -I_D$	$T_s = \text{°C}$		A
$T_j$			°C
$T_{stg}$		- 40 ... + 125	°C
$T_{sol}$	Terminals, 10 s	260	°C
$V_{isol}$	AC, 1 min (1s)	2500 / 3000	V

Characteristics		$T_s = 25\text{ °C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>MOSFET</b>					
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}; I_D = 0,25\text{ mA}$	55			V
$V_{GS(th)}$	$V_{GS} = V_{DS}; I_D = 0,25\text{ mA}$	2,5	3,2	4,5	V
$I_{DSS}$	$V_{GS} = 0\text{ V}; V_{DS} = V_{DSS}; T_j = 25\text{ °C}$			1	$\mu\text{A}$
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}; V_{DS} = 0\text{ V}$			100	nA
$R_{DS(on)}$	$I_D = 20\text{ A}; V_{GS} = 10\text{ V}; T_j = 25\text{ °C}$		2,2	2,9	m $\Omega$
$R_{DS(on)}$	$I_D = 20\text{ A}; V_{GS} = 10\text{ V}; T_j = 125\text{ °C}$		3,4	4,5	m $\Omega$
$C_{CHC}$	per MOSFET				pF
$C_{iss}$	under following conditions:		10,6		nF
$C_{oss}$	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$		1,65		nF
$C_{rss}$			0,8		nF
$L_{DS}$					nH
$t_{d(on)}$	under following conditions:		438		ns
$t_r$	$V_{DD} = 25\text{ V}; V_{GS} = 15\text{ V}; I_D = 90\text{ A}$		398		ns
$t_{d(off)}$	$R_G = 100\text{ }\Omega$		1444		ns
$t_f$			349		ns
$R_{th(j-s)}$	per MOSFET (per module)			1,1	K/W
<b>Inverse diode</b>					
$V_{SD}$	$I_F = 50\text{ A}; V_{GS} = 0\text{ V}; T_j = 25\text{ °C}$		0,9		V
$I_{RRM}$	under following conditions:				A
$Q_{rr}$	$I_F = \text{A}; T_{vj} = \text{°C}; R_G = \Omega$				$\mu\text{C}$
$t_{rr}$	$V_R = \text{A}; di/dt = \text{A}/\mu\text{s}$				ns
<b>Free-wheeling diode</b>					
$V_F$	$I_F = \text{A}; V_{GS} = \text{V}$				V
$I_{RRM}$	under following conditions:				A
$Q_{rr}$	$I_F = \text{A}; T_{vj} = \text{°C}$				$\mu\text{C}$
$t_{rr}$	$V_f = \text{A}; di/dt = \text{A}/\mu\text{s}$				ns
<b>Mechanical data</b>					
M1	mounting torque	2,25		2,5	Nm
w			30		g
Case	SEMITOP® 3		T 47		

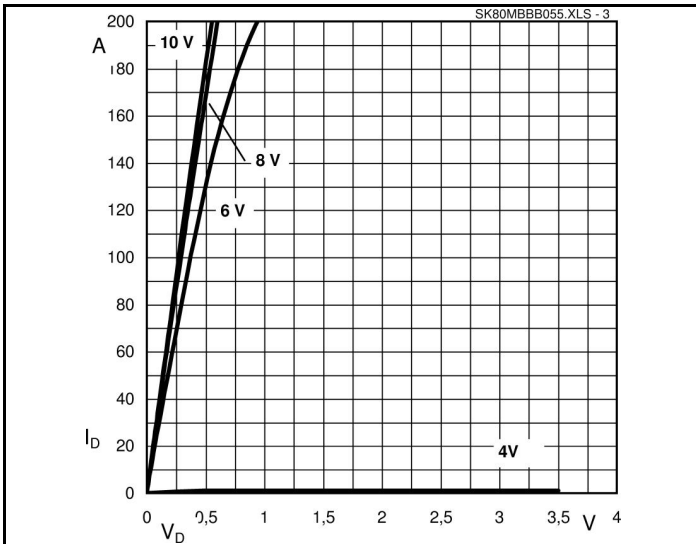


Fig. 3 Output characteristic,  $t_p = 80 \mu s$ ,  $T_j = 25^\circ C$

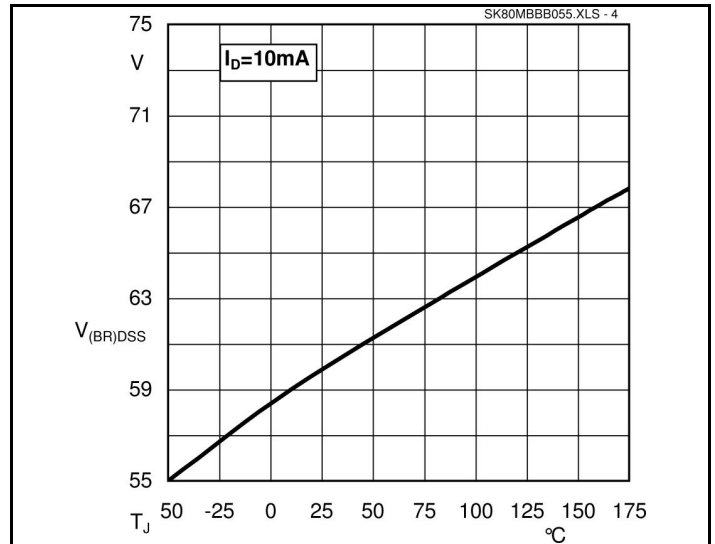


Fig. 4 Breakdown voltage vs. temperature

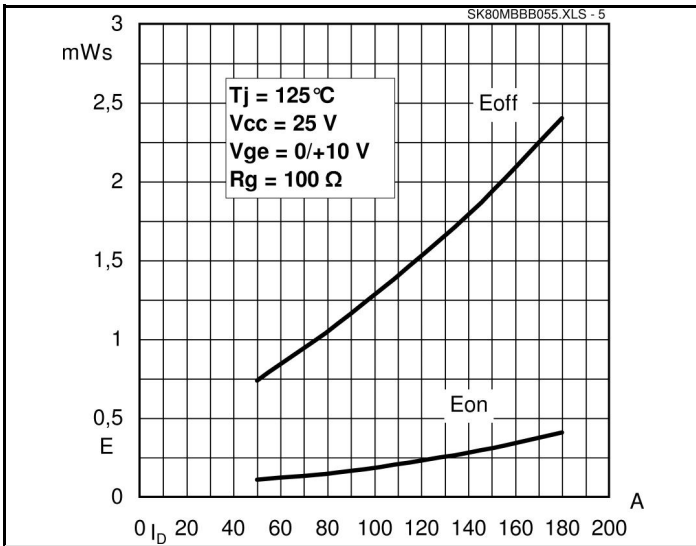


Fig. 5 Typ. Turn-on/off energy=f(Ic)

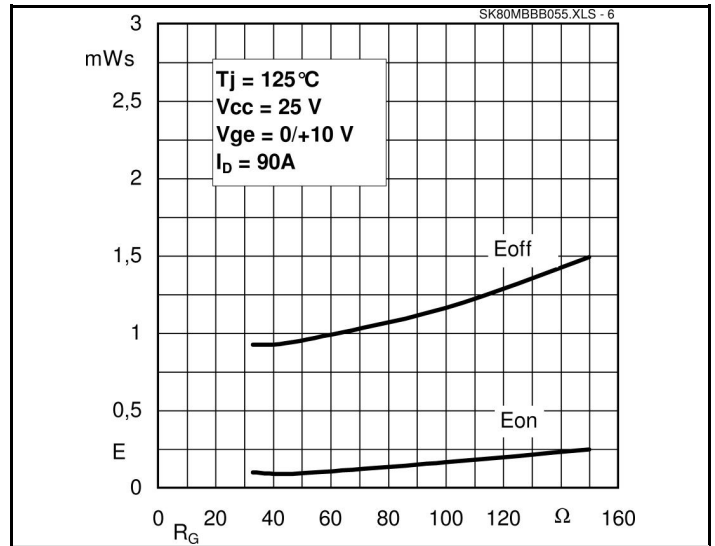


Fig. 6 Typ. Turn-on/off energy=f(Rg)

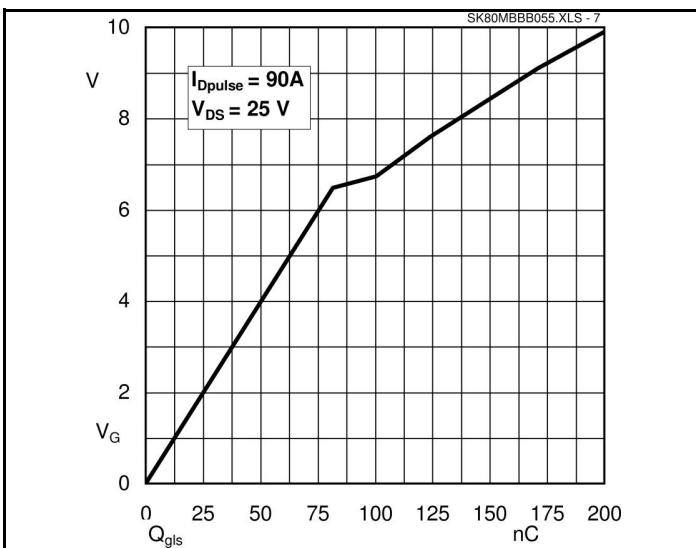


Fig. 7 Gate charge characteristic,  $I_{Dp} = 90 A$

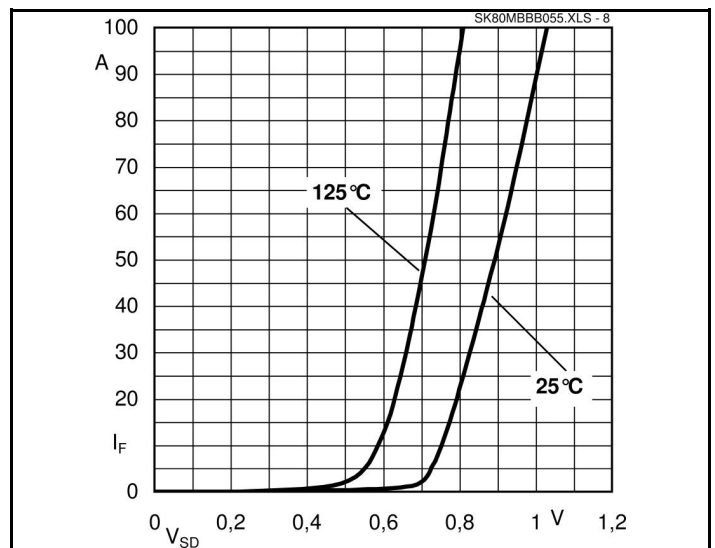
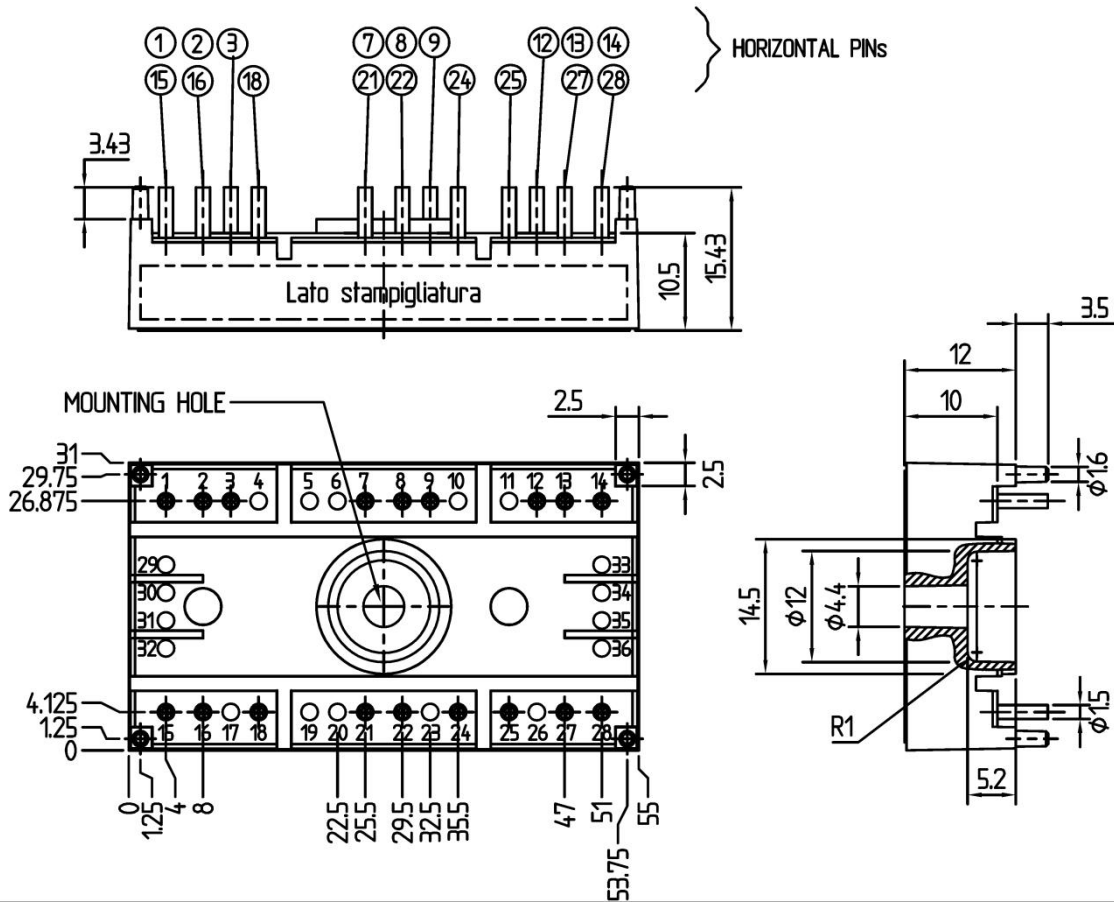
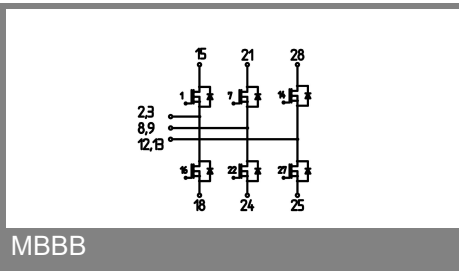


Fig. 8 Diode forward characteristic,  $t_p = 80 \mu s$



SUGGESTED HOLEDIAMETER FOR THE SOLDER PINS AND THE MOUNTING PINS IN THE PCB: 2 mm

Case T 77



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

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