

## SC030N65H7

### 55 Amps,650 Volts N-Channel Sic Power MOSFET

#### Features

- 55A,650V, $R_{DS(ON)MAX}=50m\Omega @V_{GS}=18V/25A$
- High Blocking Voltage with low On-Resistance
- High Speed Switching with Low Capacitance
- Fast Intrinsic Diode with Low Reverse Recovery(Qrr)

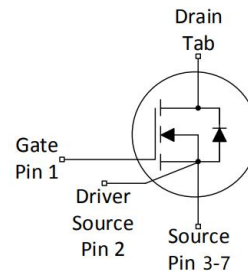
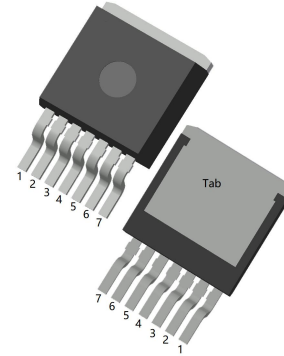
#### Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequencytance
- Easy to Parallel and Simple to Drive
- Enable Totem-Pole PFC Topologies

#### Applications

- Solar Inverters
- Server Power Supplies
- Solar PV Inverters
- UPS
- DC/DC Converters

#### TO-263-7H



#### Absolute Maximum Ratings( $T_c=25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Value	UNIT	Test Conditions
Drain-Source Voltage	$V_{DSmax}$	650	V	$V_{GS}=0V, I_{DS}=100\mu A$
Gate-Source Voltage(dynamic)	$V_{GSmax}$	-8/+22		Absolute maximum values
Gate-Source Voltage (static)	$V_{GSop}$	-4/+18		Recommended operational values
Continuous Drain Current	$I_D$	55	A	$V_{GS}=18V, T_c=25^\circ C$
		39		$V_{GS}=18V, T_c=100^\circ C$
Pulsed Drain Current	$I_{D(pulse)}$	197	A	Pulse width $t_p$ limited by $T_{Jmax}$
Power Dissipation	$P_D$	187	W	$T_c=25^\circ C, T_J=175^\circ C$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-40 to +175	$^\circ C$	

#### Thermal Characteristics

Parameter	Symbol	SC030N65H7	Units
Typical Junction-to-Case	$R_{thJC}$	0.8	$^\circ C/W$

<b>Electrical Characteristics</b> ( $T_c=25^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=100\mu A$	650	—	—	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	—	1	50	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=22V, V_{DS}=0V$	—	10	250	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=10mA$	1.8	2.6	4.3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=18V, I_D=25A$	—	30	50	m $\Omega$
		$V_{GS}=18V, I_D=25A, T_J=175^\circ\text{C}$	—	42	—	
Input Capacitance	$C_{iss}$	$V_{DS}=400V, V_{GS}=0V,$ $f=1.0MHz, V_{AC}=25mV$	—	2000	—	pF
Output Capacitance	$C_{oss}$		—	180	—	pF
Reverse Transfer Capacitance	$C_{rss}$		—	19	—	pF
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=400V, V_{GS}=-4V/18V,$ $I_D=25A, R_g=2.5\Omega, R_L=16\Omega$	—	14	—	ns
Turn-On Rise Time	$t_r$		—	15	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	28	—	ns
Turn-Off Fall Time	$t_f$		—	8	—	ns
Turn-On Switching Energy	$E_{ON}$	$V_{DS}=400V, V_{GS}=-4V/18V$	—	50	—	$\mu J$
Turn-Off Switching Energy	$E_{OFF}$	$I_D=50A, R_g=2.5\Omega, L=100\mu H$	—	65	—	$\mu J$
Internal Gate Resistance	$R_G$	$f=1MHz, V_{AC}=25mV$	—	2.5	—	$\Omega$
Total Gate Charge	$Q_g$	$V_{DS}=400V, I_D=25A,$ $V_{GS}=-4V/18V$	—	110	—	nC
Gate-Source Charge	$Q_{gs}$		—	30	—	
Gate-Drain Charge	$Q_{gd}$		—	32	—	
<b>Reverse Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=-4V, I_{SD}=12.5A$	—	4.2	—	V
		$V_{GS}=-4V, I_{SD}=12.5A, T_J=175^\circ\text{C}$	—	3.8	—	
Continuous Diode Forward Current	$I_S$	$V_{GS}=-4V, T_C=25^\circ\text{C}$	—	—	45	A
Reverse Recover Time	$t_{rr}$	$V_R=400V, I_{SD}=25A$	—	25	—	ns
Reverse Recovery Charge	$Q_{rr}$		—	100	—	nc
Peak Reverse Recovery Current	$I_{rrm}$		—	5	—	A

## RATING AND CHARACTERISTIC CURVES

Figure.1 Output Characteristics  $T_j=25^\circ\text{C}$

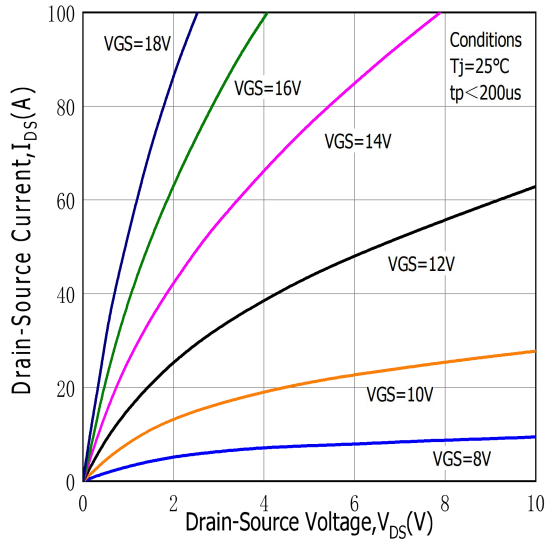


Figure.2 Output Characteristics  $T_j=175^\circ\text{C}$

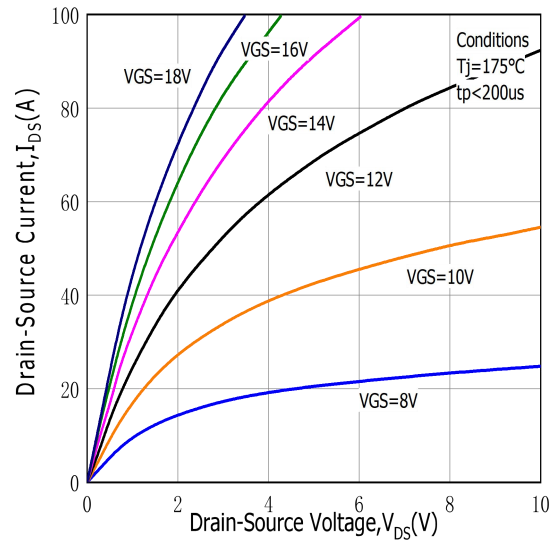


Figure.3 Normalized On-Resistance vs. Temperature

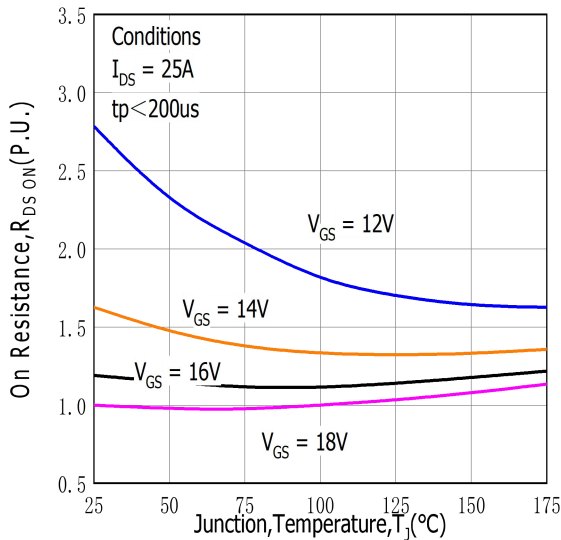


Figure.4 Body Diode Characteristic at  $25^\circ\text{C}$

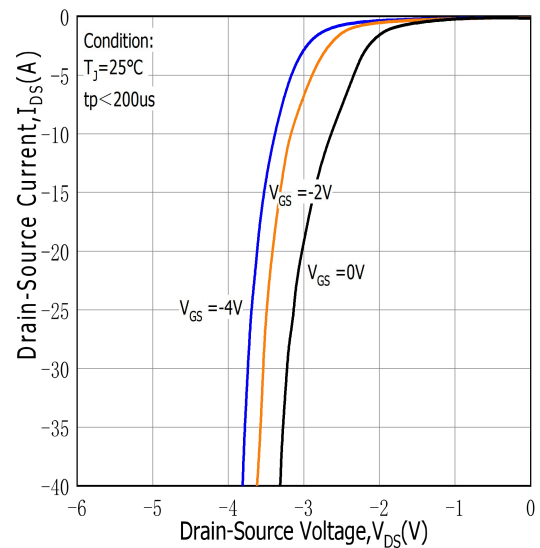


Figure.5 Body Diode Characteristic at  $175^\circ\text{C}$

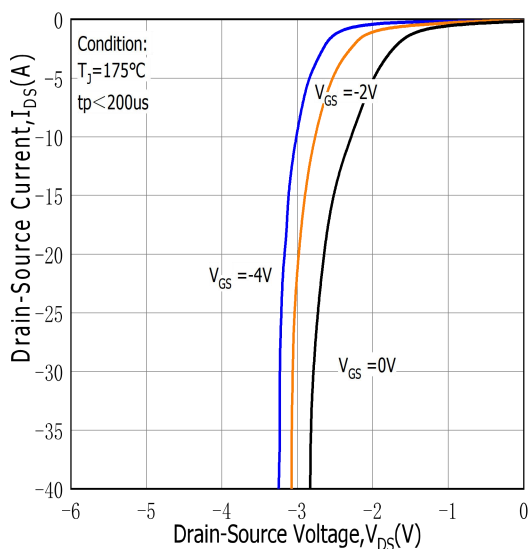


Figure.6 Threshold Voltage vs. Temperature

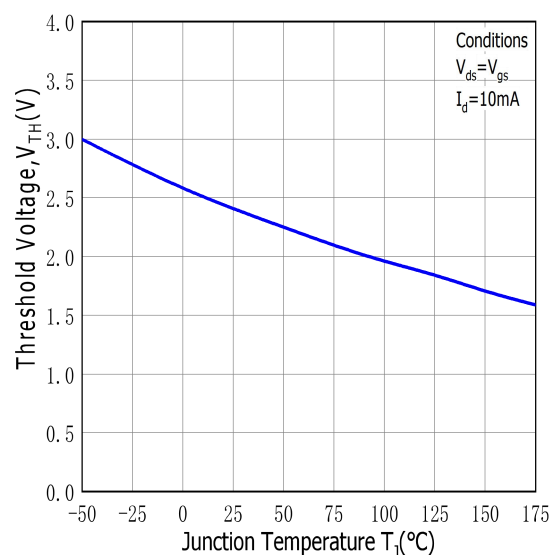


Figure.7 3rd Quadrant Characteristic at 25°C

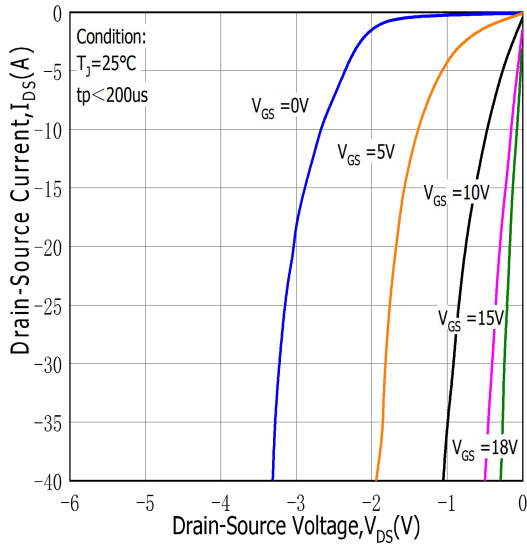


Figure.8 3rd Quadrant Characteristic at 175°C

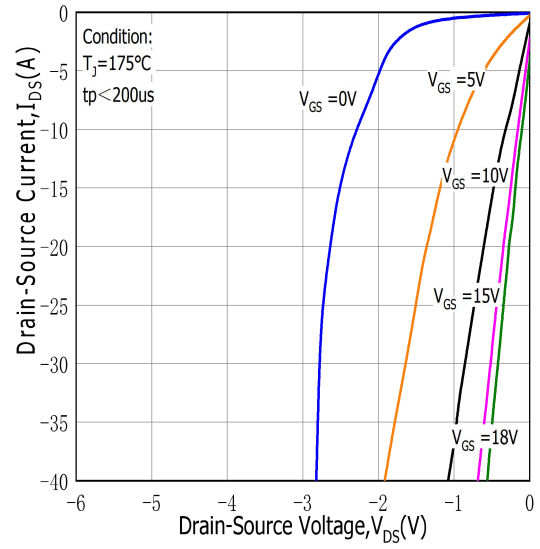


Figure.9 Capacitances vs. Drain-Source Voltage(0-200V)

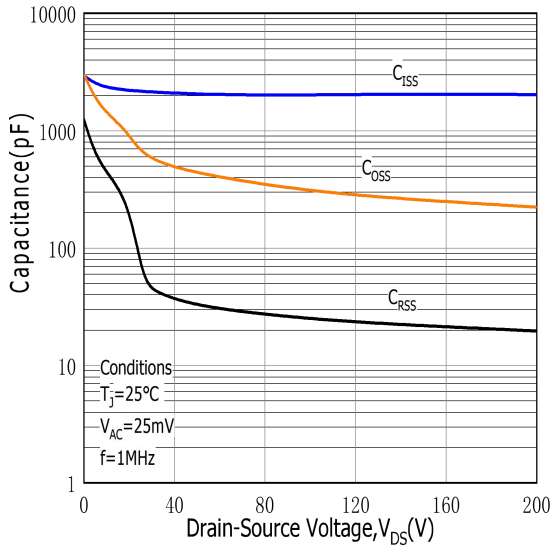
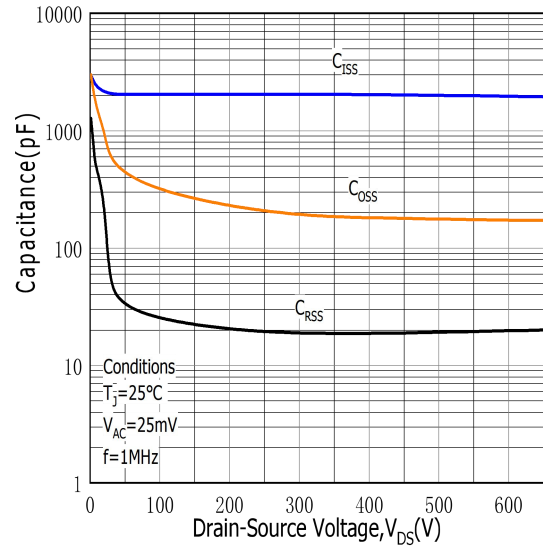
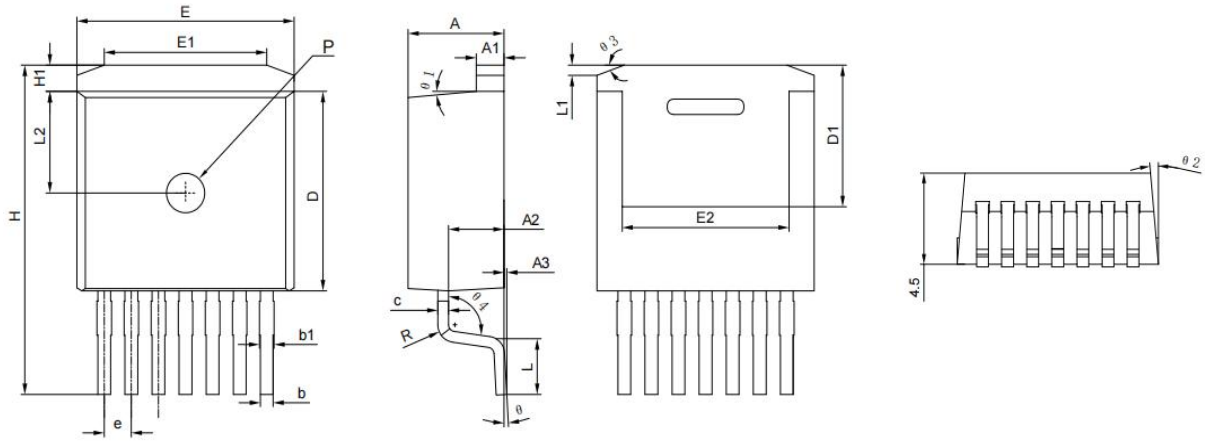


Figure.10 Capacitances vs. Drain-Source Voltage(0-1000V)



## Package Outline: TO-263-7H



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.60	0.173	0.181
A1	1.25	1.40	0.049	0.055
A2	2.45	2.70	0.096	0.106
A3	0.05	0.20	0.002	0.008
b	0.50	0.70	0.020	0.028
b1	0.60	0.85	0.024	0.033
c	0.45	0.60	0.018	0.024
D	8.88	9.28	0.350	0.365
D1	6.25	6.65	0.246	0.262
E	9.18	10.28	0.361	0.405
E1	6.67	7.47	0.263	0.294
E2	7.67	7.97	0.302	0.314
e	1.27		0.050	
H	14.80	15.20	0.583	0.598
H1	1.10	1.30	0.043	0.051
L	2.35	2.75	0.093	0.108
L1	0.37	0.77	0.015	0.030
L2	4.48	4.78	0.176	0.188
theta	0°	5°	0°	5°
theta 1	3°	7°	3°	7°
theta 2	3°	7°	3°	7°
theta 3	15°	25°	15°	25°
theta 4	93°	100°	93°	100°
R	0.75	0.85	0.030	0.033
p	1.70	1.90	0.067	0.075