

# PSZ10065H

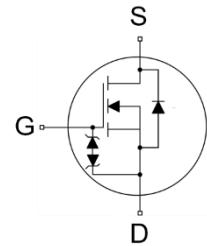
650V 10A 350mΩ Si Super junction MOSFET with Zener diode



## Features

### Si Super junction MOSFET

- Rated to 650V at 10Amps @ $T_J = 25^\circ\text{C}$
- Max  $R_{DS(on)} = 350 \text{ m}\Omega$
- Typ  $R_{DS(on)} = 330 \text{ m}\Omega$
- Gate Charge(Typ.  $Q_g=20 \text{ nC}$ )
- Improved dv/dt Capability
- 100% Avalanche Tested
- Excellent ESD robustness >2kV (HBM)



PKG type : TO-220F

## Description

PSZ10065H is PowerCubeSemi's second generation of high voltage Super Junction MOSFET that is utilizing charge balance technology for outstanding low on-resistance and lower gate charge performance. This advanced technology is tailored to minimize conduction loss, provide superior switching performance, and withstand extreme dv/dt rate and higher avalanche energy. Consequently, the combination of Super Junction MOSFET is suitable for various AC/DC power conversion for system miniaturization and higher efficiency

## Absolute Maximum Ratings

Symbol	Parameter	Test Condition	Value	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$ , $I_D=1\text{mA}$	650	V
$I_D$	Drain Current	$T_c=25^\circ\text{C}$	10	A
$I_{DM}$	Pulsed Drain Current	Pulse width limited by junction temperature	30	A
$V_{GS}$	Gate-Source Voltage		$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy	-	72	mJ
$P_d$	Power Dissipation	-	89.2	W
$T_J$	Operating Junction Temperature		150	$^\circ\text{C}$
$T_{stg}$	Storage Temperature		-55 to 150	$^\circ\text{C}$



## Package Marking and Ordering Information

Device Marking	Device	Package	Packing Method	Tape width	Quantity
PSZ10065H	PSZ10065	TO-220F	Tube	-	50 unit

## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
$BV_{DSS}$	Drain-source breakdown voltage	$V_{GS} = 0V, I_D = 1mA, T_J = 25^\circ C$	650	-	-	V
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 650V, V_{GS} = 0V$	-	-	10	$\mu A$
$I_{GSS}$	Gate-source leakage current	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	$\pm 5$	$\mu A$
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 1mA$	3.5	-	4.5	V
$R_{DS(ON)}$	Static drain-source on state resistance	$V_{GS} = 10V, I_D = 5A$	-	330	350	$m\Omega$
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 380 V, I_D = 5A, V_{GS} = 10 V, R_G = 4.7\Omega$	-	16	-	ns
$T_r$	Turn-on rise time		-	8	-	
$t_{d(off)}$	Turn-off delay time		-	48	-	
$T_f$	Turn-off fall time		-	12	-	



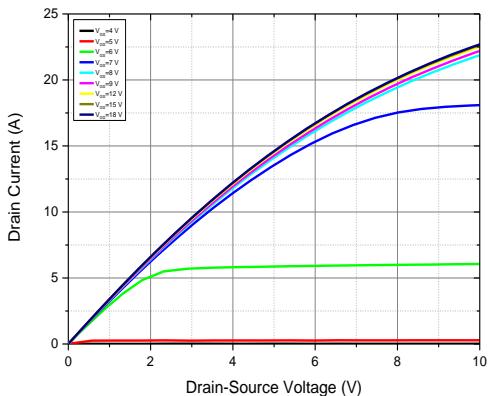
## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		1.4	-	°C/W
$R_g$	Gate resistance	$V_{GS} = 0V, f = 1MHz$	6.5	-	Ω
$C_{iss}$	Input capacitance	$V_{DS} = 380V, V_{GS} = 0V, f = 200kHz$	840	-	pF
$C_{oss}$	Output capacitance		21	-	
$C_{rss}$	Reverse transfer capacitance		1.5	-	
$Q_{g(tot)}$	Total gate charge at 10V	$V_{DS} = 380V, I_D = 5A$ $V_{GS(on)} = 10V, V_{GS(off)} = 0V$	20	-	nC
$Q_{gs}$	Gate to source gate charge		3.6	-	
$Q_{gd}$	Gate to drain "Miller" charge		9	-	

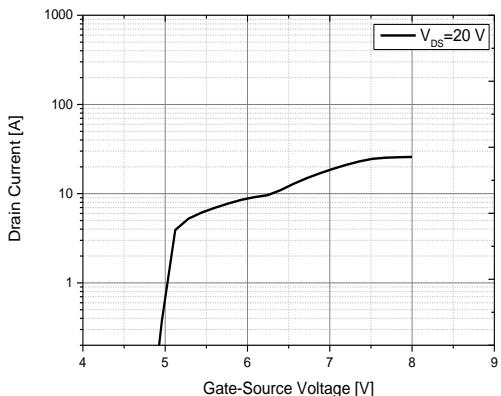
## Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$I_S$	Maximum continuous source to drain diode forward current		-	10	A
$I_{SM}$	Maximum pulsed source to drain diode forward current		-	30	A
$V_{SD}$	Source to drain diode forward voltage	$I_{SD} = 5A, V_{GS} = 0V$	-	1.2	V
$T_{rr}$	Reverse recovery time	$I_{SD} = 5A, V_{DD} = 400V, dI_F/dt = 100A/\mu s$	230	-	ns
$Q_{rr}$	Reverse recovery charge		2.6	-	μC
$I_{rrm}$	Reverse recovery current		22	-	A

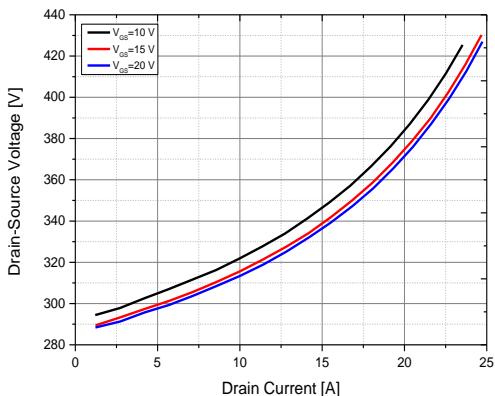
# Typical Characteristics



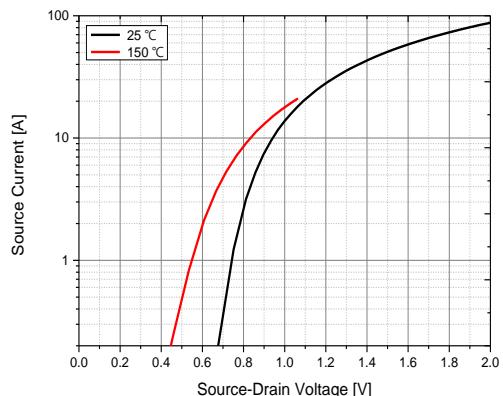
**Figure 1. On-state characteristics**



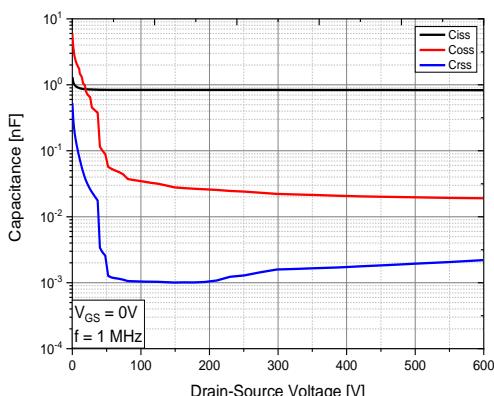
**Figure 2. Transfer Characteristics**



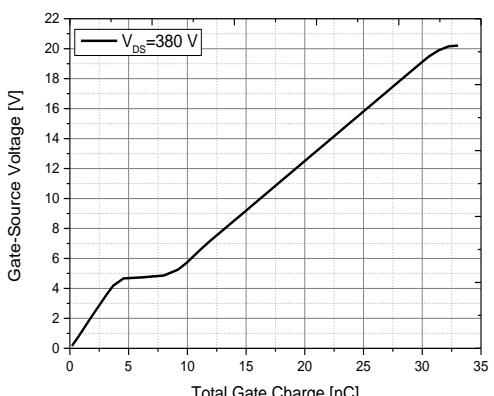
**Figure 3. On Resistance Variation vs Drain Current and Gate Voltage**



**Figure 4. Body Forward Voltage Variation vs Source Current and Temperature**

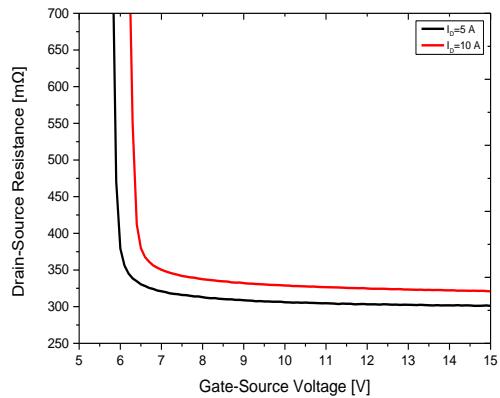


**Figure 5. Capacitance Characteristics**

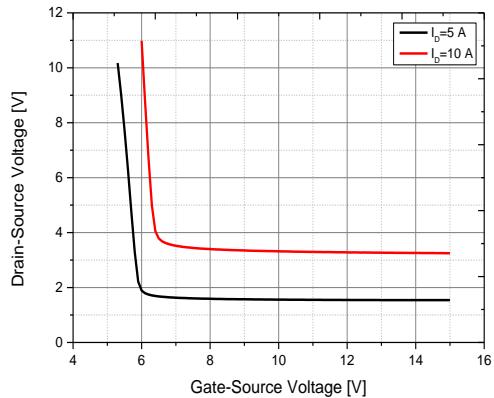


**Figure 6. Gate Charge Characteristics**

# Typical Characteristics



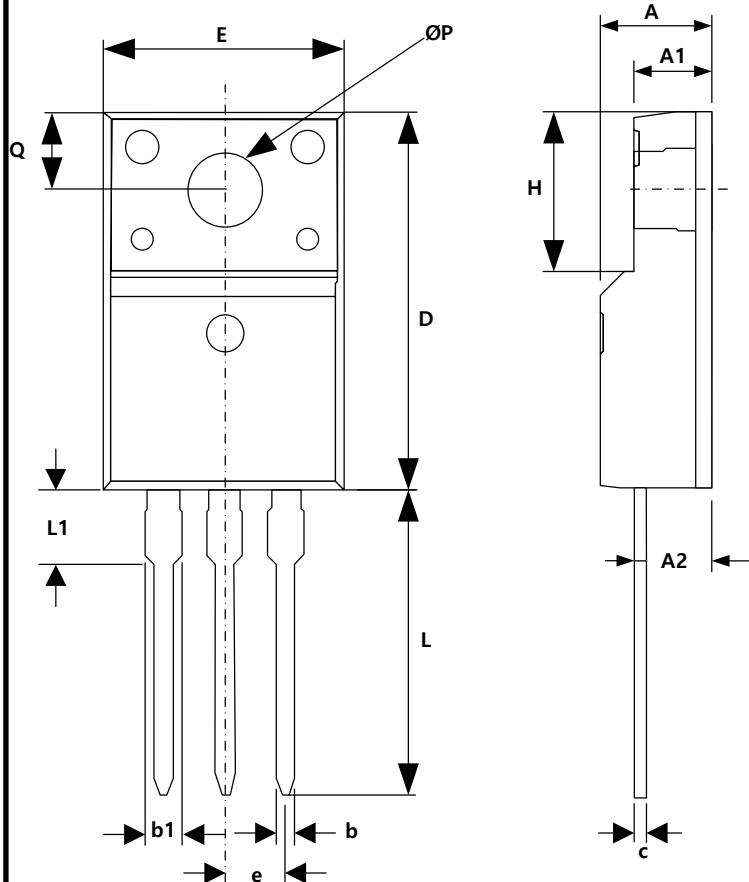
**Figure 7. Drain to Source Resistance vs Gate to Source Voltage**



**Figure 8. Drain to Source Voltage vs Gate to Source Voltage**

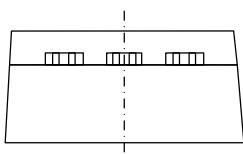


## Package Outline



[Unit : mm]

SYMBOL	DIMENSIONS		NOTES
	MIN	MAX	
A	4.50	4.90	
A1	2.34	2.74	
A2	2.56	2.96	
b	0.70	0.90	
b1	1.27	1.47	
c	0.45	0.60	
D	15.67	16.07	
E	9.96	10.36	
e	2.54 BSC		
H	6.48	6.88	
L	12.68	13.28	
L1	3.03	3.43	
ØP	3.08	3.28	
Q	3.20	3.40	



Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
M <sub>d</sub>	Mounting torque	M3 Screw 6-32 Screw	1/8.8	-	Nm/ lbf.in.