JX3S0060R065T3

Silicon Carbide Power MOSFET

N-Channel Enhancement Mode

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness
- Halogen Free, RoHS Compliant

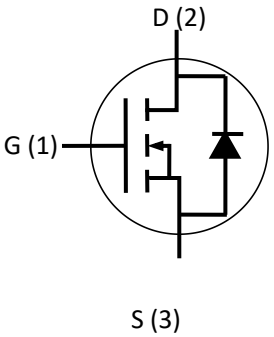
Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives
- Pulsed Power applications

Package



Part Number	Package
JX3S0060R065T3	TO-263-3

Maximum Ratings (T_c = 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain - Source Voltage	650	V	V_{GS}=0V,I_D=100μA	
V_{GSmax}	Gate - Source Voltage	-10/+25	V	Absolute maximum values	
V_{GSop}	Gate - Source Voltage	-5/+20	V	Recommended operational values	
I_D	Continuous Drain Current	30 22	A	V_{GS}=20V, T_C=25°C V_{GS}=20V, T_C=100°C	
I_{DM}	Pulse Drain Current	65	A	Pulse width limited by T_{jmax}	
P_D	Power Dissipation	171	W	T_C=25°C, T_J=150°C	Fig. 10
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +150	°C		

Electrical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	650			V	V_{GS}=0V,I_D=100μA	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.40	4.0	V	V_{GS}= V_{DS}, I_{DS}=5mA,T_C=25°C	Fig. 6
			1.8			V_{GS}= V_{DS}, I_{DS}=5mA,T_C=150°C	
I_{DSS}	Zero Gate Voltage Drain Current		2	100	μA	V_{DS}= 650V, V_{GS}=0V	
I_{GSS}	Gate-Source Leakage Current		50	200	nA	V_{GS}=20V, V_{DS}= 0V	
$R_{DS(on)}$	Drain-Source on-state Resistance		60	80	mΩ	V_{GS}=20V, I_D=20A, T_C=25°C	Fig. 4
			95			V_{GS}=20V, I_D=20A, T_C=175°C	
g_{fs}	Transconductance		4.7		S	V_{GS} = 20 V, I_D = 20A, T_J = 25 °C	Fig. 5
			5.9			V_{GS} = 20 V, I_D = 20A,T_J = 175 °C	
Ciss	Input Capacitance		1700		pF	V_{GS}=0V, V_{DS}=1000 V, f=1MHz V_{AC}=25 mV	Fig. 8
Coss	Output Capacitance		172				
Crss	Reverse Transfer Capacitance		77				
E_{ON}	Turn-OnSwitching Energy		140		μJ	V_{DS}=400V, V_{GS}=-5/20V,I_D= 10A, $R_{G(ext)}$ = 5Ω, L= 142 μH	
E_{OFF}	Turn-Off Switching Energy		32				
$t_{d(on)}$	Turn-On Delay Time		15		ns	V_{DD}=400V, V_{GS}=-0/20 V I_D = 10A, $R_{G(ext)}$ = 5 Ω , R_L=40Ω , Timing relative to VDS	
t_r	Rise Time		45				
$t_{d(off)}$	Turn-Off Delay Time		13				
t_f	Fall Time		10				
$R_{G(int)}$	Internal Gate Resistance		2.0		Ω	f=1 MHz, V_{AC}=25mV	
Q_{gs}	Gate to Source Charge		18		nC	V_{DD}=400V, V_{GS}=-0/20 V I_D = 10A	Fig. 9
Q_{gd}	Gate to Drain Charge		19				
Q_g	Total Gate Charge		65				

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	3.5		V	V_{GS} =-5V, I_{SD} = 10 A, T_J = 25 °C	Fig. 7
		3.3		V	V_{GS} =-5V, I_{SD} = 10 A, T_J = 175 °C	
I_S	Continuous Diode Forward Current	20		A	T_C = 25°C	
t_{rr}	Reverse Recovery time	37		ns	V_{GS} =-5V, I_{SD} = 20 A, V_R=400V, dif/dt=1000A/μs;	
Q_{rr}	Reverse Recovery Charge	198		nC		
I_{rrm}	Peak Reverse Recovery Current	12		A		

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.73	℃/W		Fig. 11
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	35			

Typical Performance

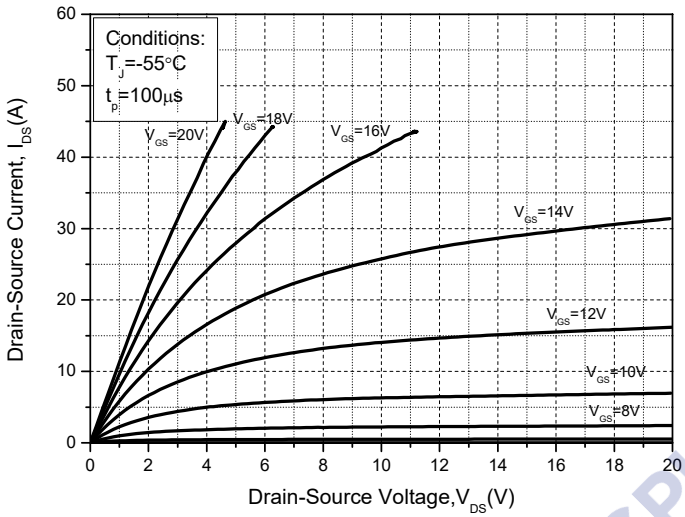


Figure 1. Output Characteristics T_J = -40 °C

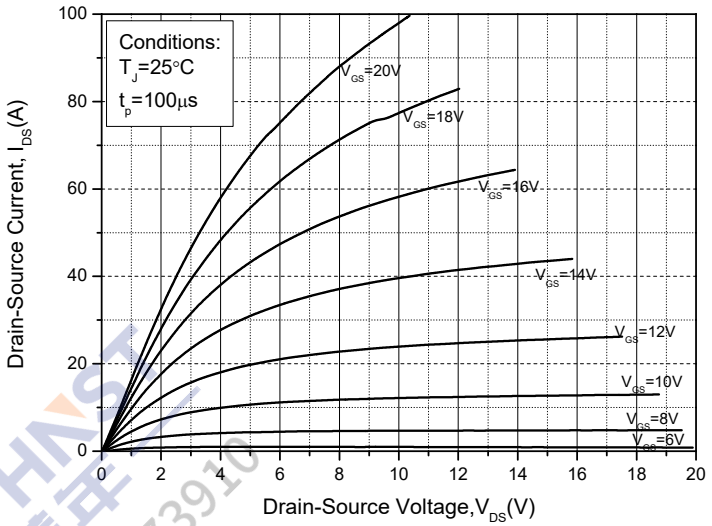


Figure 2. Output Characteristics T_J = 25 °C

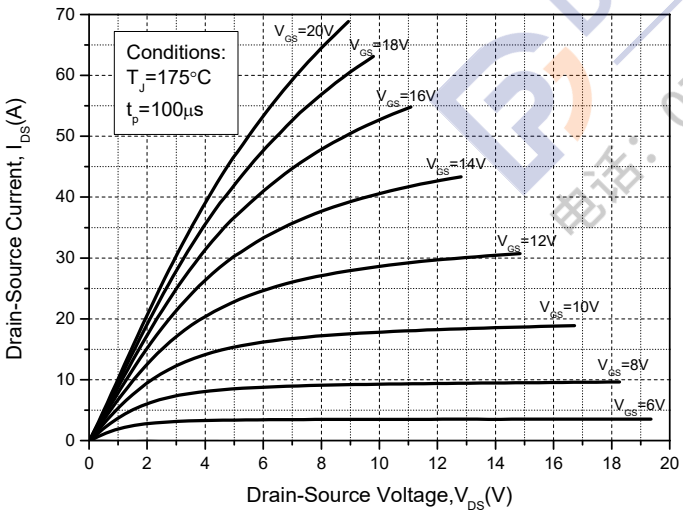


Figure 3. Output Characteristics T_J =175 °C

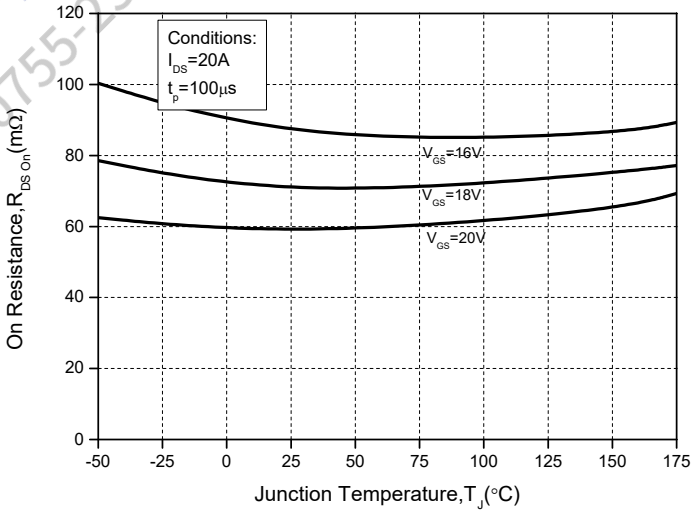


Figure 4. On-Resistance For Various Gate Voltage

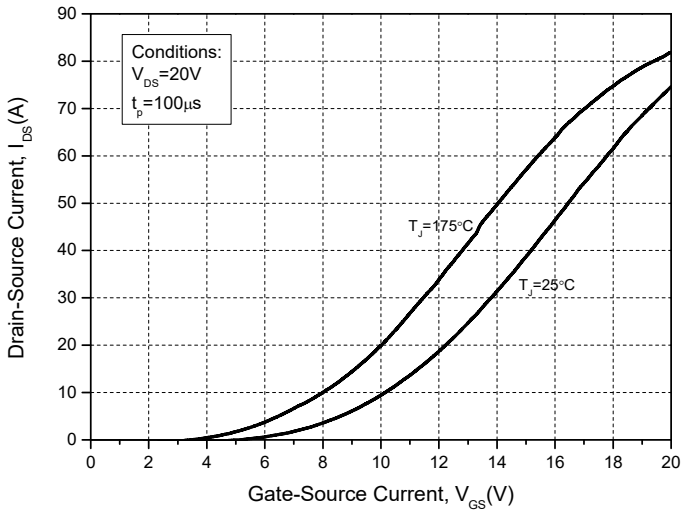


Figure 5. Transfer Characteristic
For Various Junction Temperatures

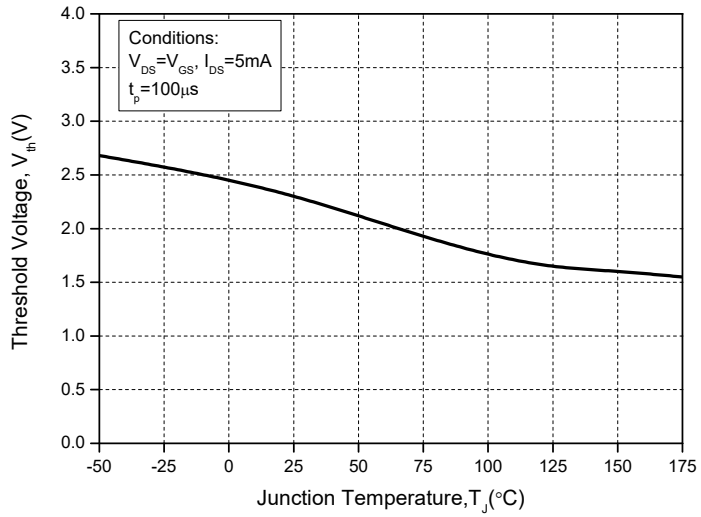


Figure 6. Threshold Voltage vs. Temperature

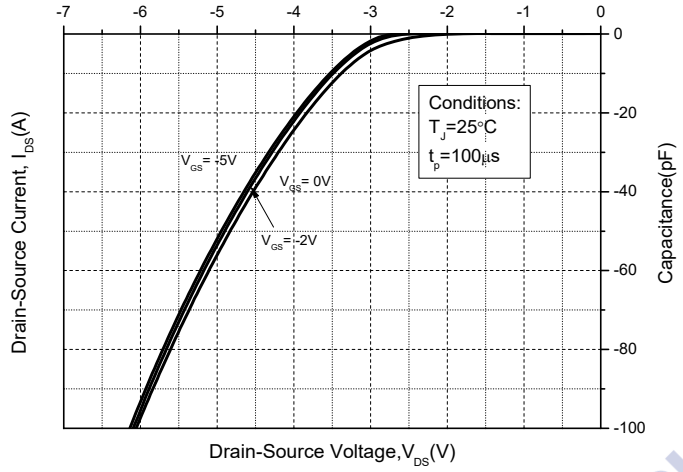


Figure 7.Body Diode Characteristics

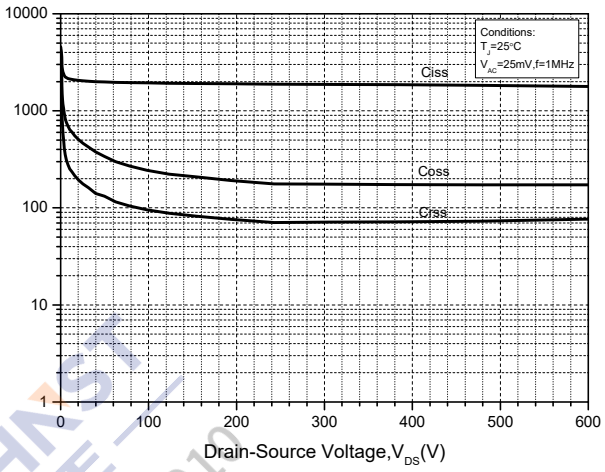


Figure 8. Capacitances vs. Drain-Source Voltage

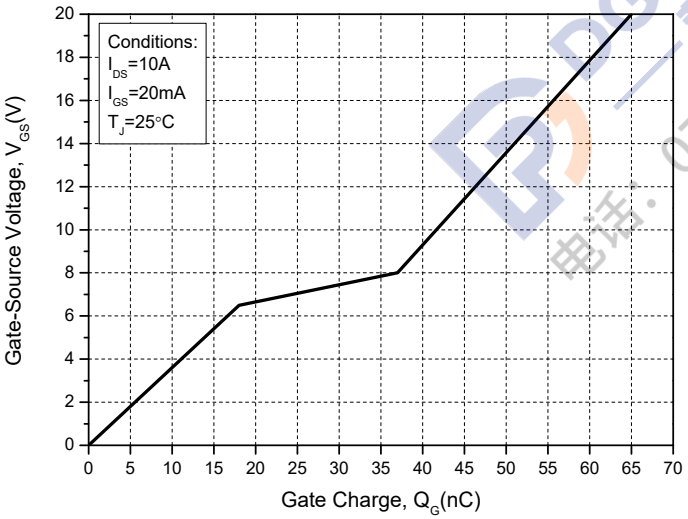


Figure 9.Gate Charge Characteristics

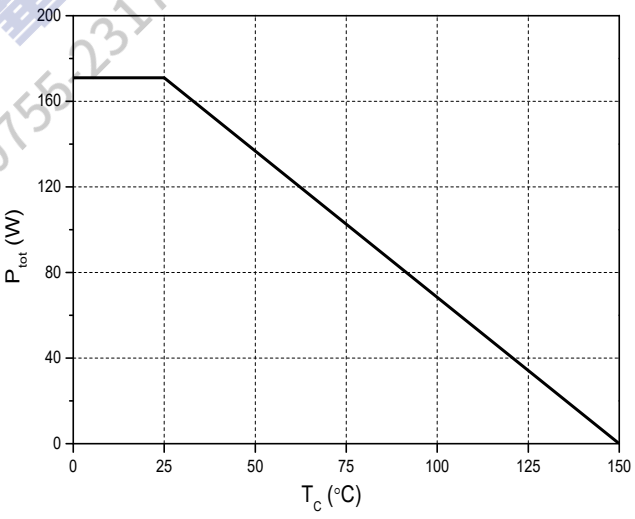


Figure 10. Power Dissipation Derating

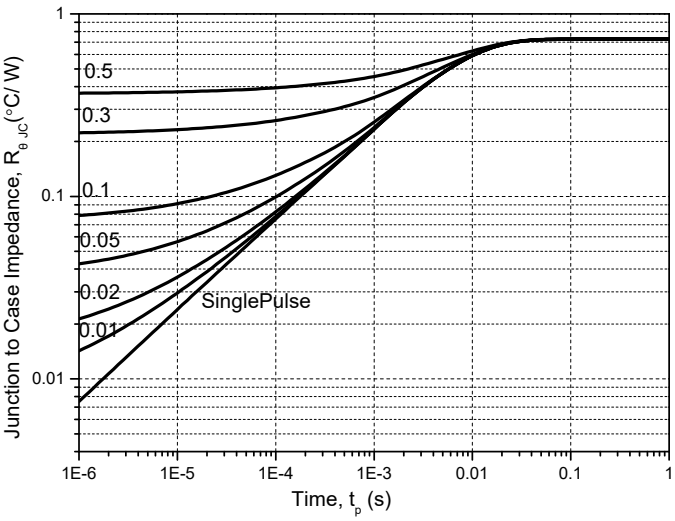
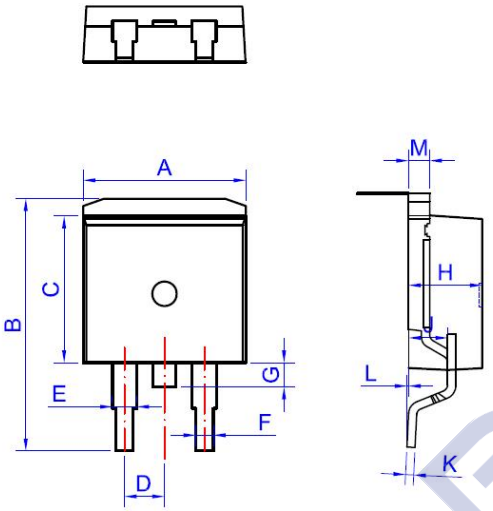


Figure 11. Transient Thermal Impendance

Package Dimensions: TO-263-3



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.90		10.20	0.390		0.402
B	14.70		15.80	0.579		0.622
C	9.4		9.6	0.37		0.378
D		2.54			0.100	
E	1.20		1.40	0.047		0.055
F	0.75		0.85	0.029		0.033
G			1.75			0.069
H	4.40		4.70	0.173		0.185
J	2.30		2.70	0.091		0.106
K	0.38		0.55	0.015		0.022
L	0	0.10	0.25	0	0.004	0.010
M	1.25		1.35	0.049		0.053