

Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- High operating junction temperature capability
- Wide bandgap SiC MOSFET technology
- Halogen free, RoHs compliant

Mechanical Data

- Case:TO-247 Package

Application

- Motor drivers
- Renewable energy
- Automotive DC/DC converters
- Switch mode power supplies

Product Summary			
V _{DS}	R _{DS(on)} (mΩ)Typ	I _D (A)	Q _g (Typ)
650V	20@ 18V 50A	92	49nc



Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source

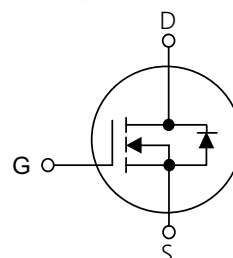


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage(Max)	V _{GS(max)}	-8/+22	V
Recommend Gate-Source Voltage	V _{GSop}	-4/+18	V
Continuous Drain Current	I _D	T _C =25°C	92
		T _C =100°C	64
Pulsed Drain Current (Note 1)	I _{DM}	257	A
Power Dissipation T _C =25°C	P _D	312	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SC20N65P	Unit
Thermal resistance Junction to Case	R _{θJC}	0.48	°C/W
Thermal resistance Junction to Ambient	R _{θJA}	40	°C/W

Table 3. Electrical Characteristics (T_J=25°C, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =100μA	650	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =650V,V _{GS} =0V	-	1	100	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =22V,V _{DS} =0V	-	10	250	nA
	Reverse		V _{GS} = -8V,V _{DS} =0V	-	-10	-250	nA
On Characteristics							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =15mA	1.9	2.6	4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =18V,I _D =50A,T _J =25°C	-	20	30	mΩ
			V _{GS} =18V,I _D =50A,T _J =175°C	-	28	-	
Gate Resisitance		R _G	f=1MHz	-	3.2	-	Ω
Dynamic Characteristics							
Input Capacitance		C _{ISS}	V _{DS} =600V,V _{GS} =0V, f=1MHz,V _{AC} =25mV	-	3180	-	pF
Output Capacitance		C _{OSS}		-	281	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	33	-	pF
Total Gate Charge		Q _G	V _{DD} =400V,I _D =40A, V _{GS} = -4/18V	-	49	-	nC
Gate-Source Charge		Q _{GS}		-	31	-	nC
Gate-Drain Charge		Q _{GD}		-	187	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 2)							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = -4V,I _S =25A	-	4.2	-	V
Continuous Diode Forward Current		I _S		-	-	92	A
Reverse Recovery Time		trr	V _{GS} = -4V, V _R =400V, I _{SD} =40A	-	26	-	ns
Recovered charge		Q _{rr}		-	58	-	nC
Peak reverse recovery current		I _{rrm}		-	3.4	-	A

Notes: 1 Repetitive Rating Pulse width limited by maximum junction temperature

2 Pulse Test: Pulse width ≤300μs, Duty cycle ≤2%

Typical Characteristics Diagrams

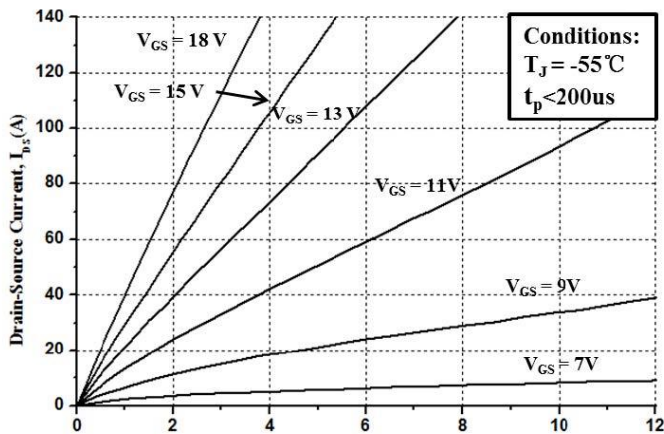


Figure 1. Output Characteristics $T_J = -55^\circ\text{C}$

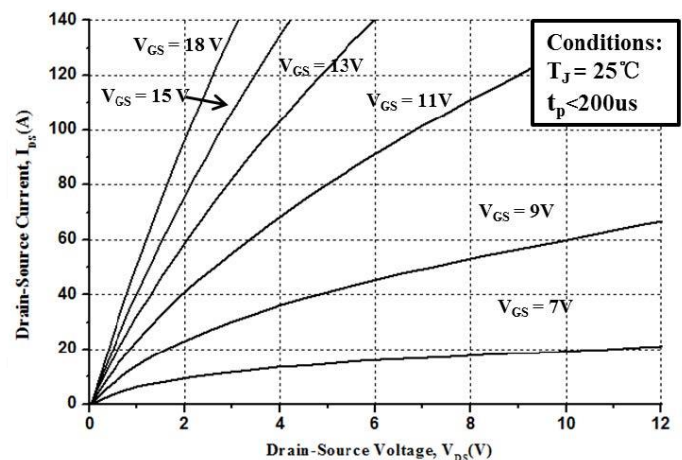


Figure 2. Output Characteristics $T_J = 25^\circ\text{C}$

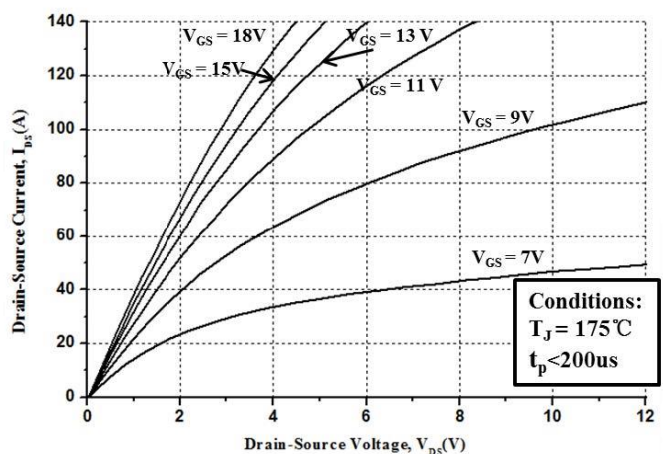


Figure 3. Output Characteristics $T_J = 175^\circ\text{C}$

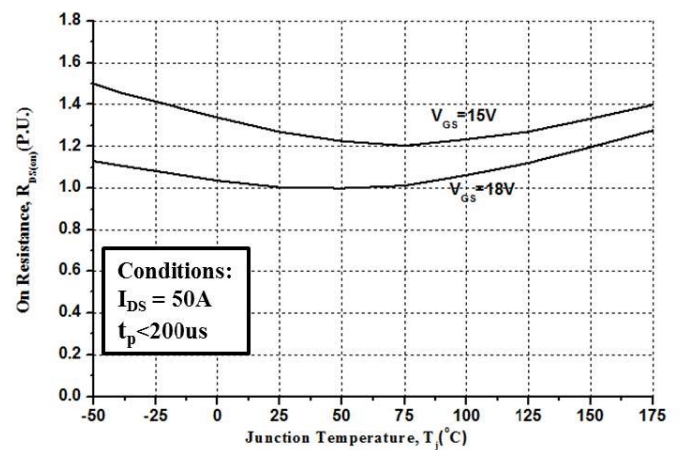


Figure 4. Normalized On-Resistance vs. Temperature

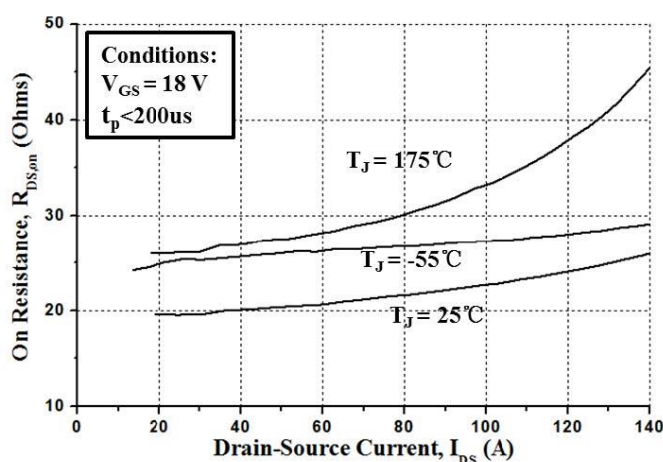


Figure 5. On-Resistance vs. Drain Current for Various Temperatures

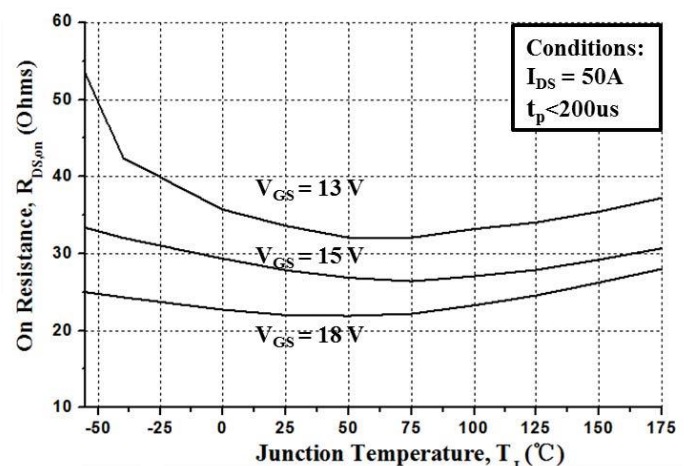


Figure 6. On-Resistance vs. Temperature for Various Gate Voltages

Typical Characteristics Diagrams

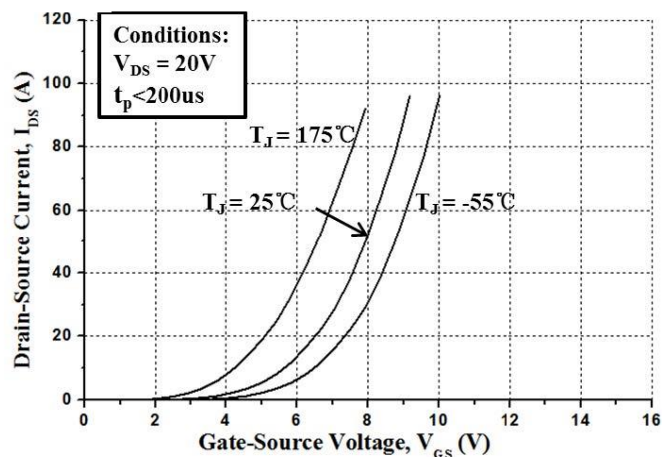


Figure 7. Transfer Characteristics for Various Junction Temperatures

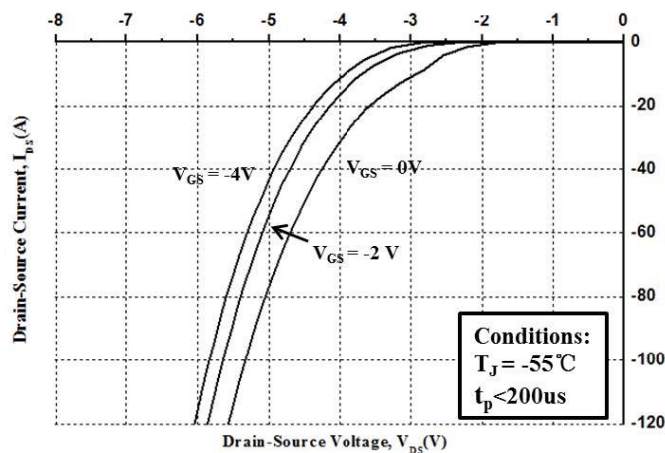


Figure 8. Body Diode Characteristics at -55 °C

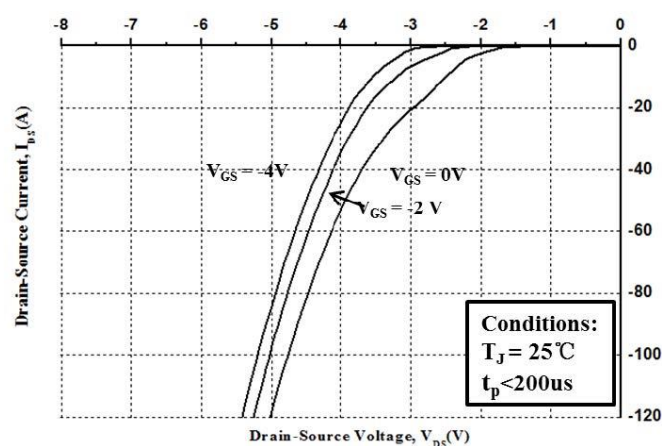


Figure 9. Body Diode Characteristics at 25 °C

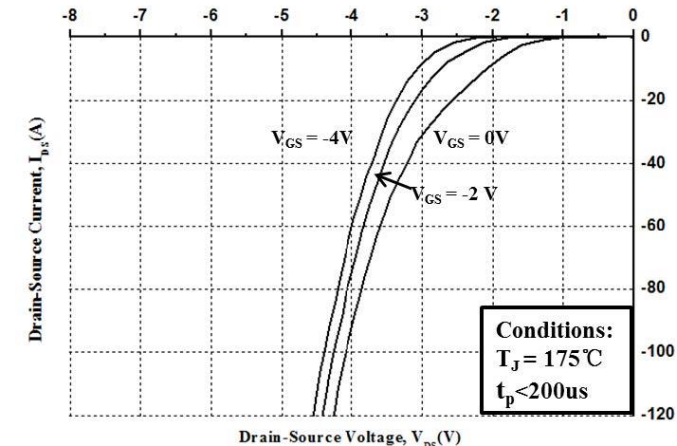


Figure 10. Body Diode Characteristics at 175 °C

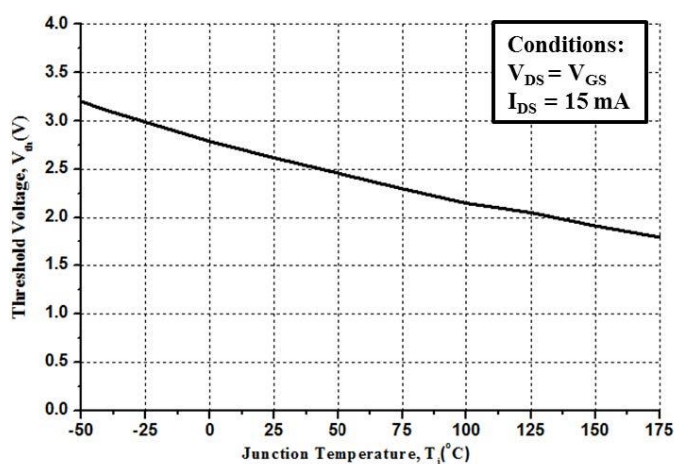


Figure 11. Threshold Voltage vs. Temperature

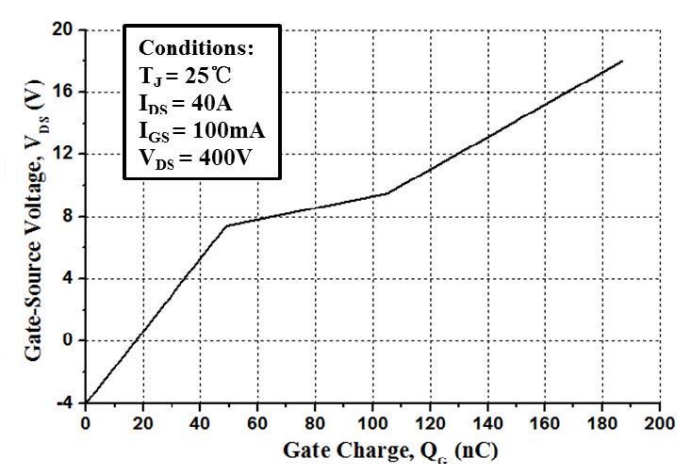


Figure 12. Gate Charge Characteristics

Typical Characteristics Diagrams

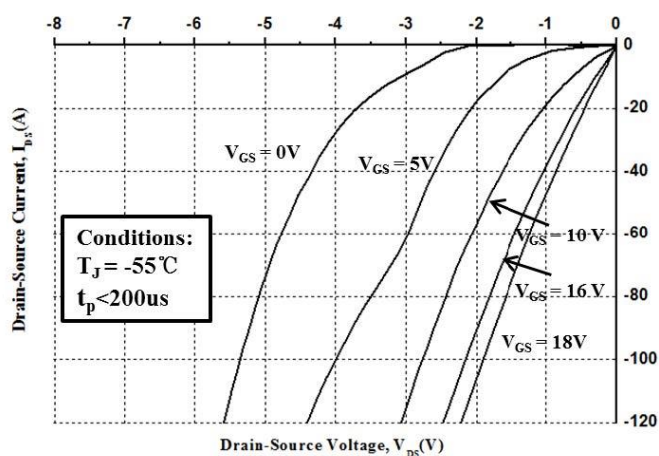


Figure 13. 3rd Quadrant Characteristics at -55 °C

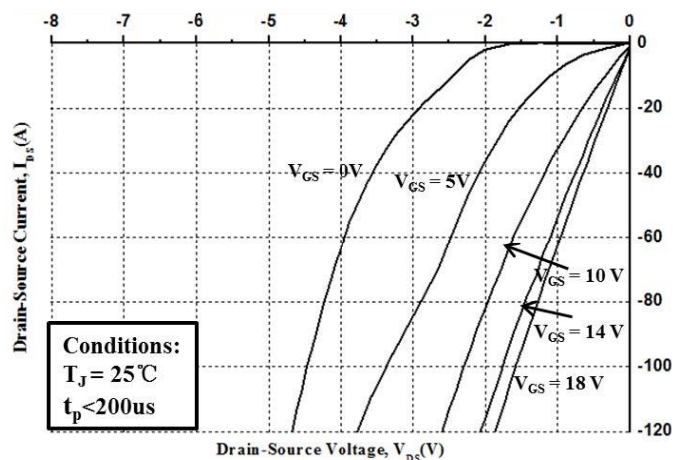


Figure 14. 3rd Quadrant Characteristics at 25 °C

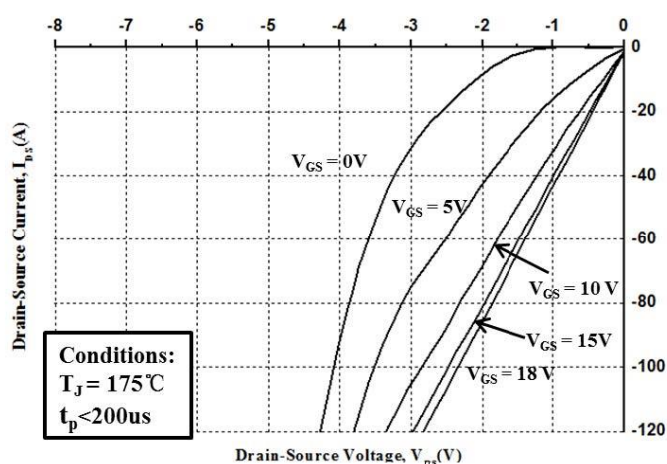


Figure 15. 3rd Quadrant Characteristics at 175 °C

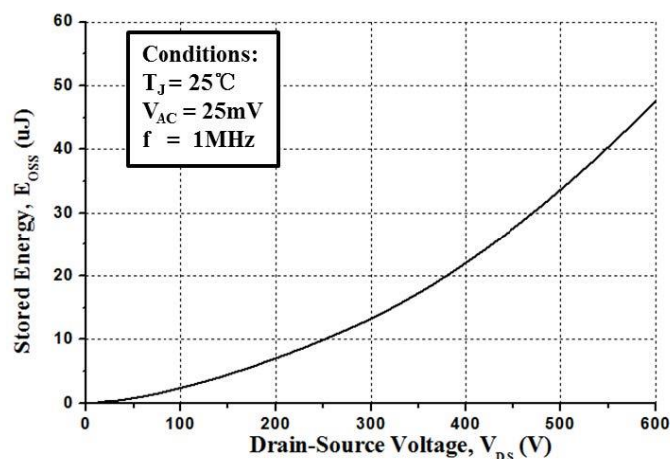


Figure 16. Output Capacitor Stored Energy

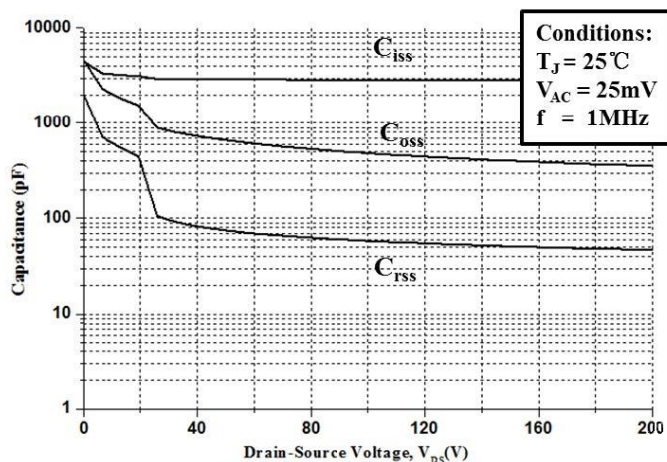


Figure 17. Capacitances vs. Drain-Source

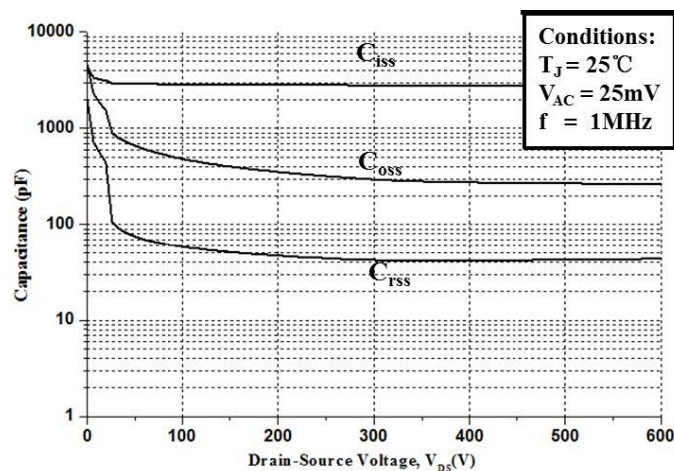
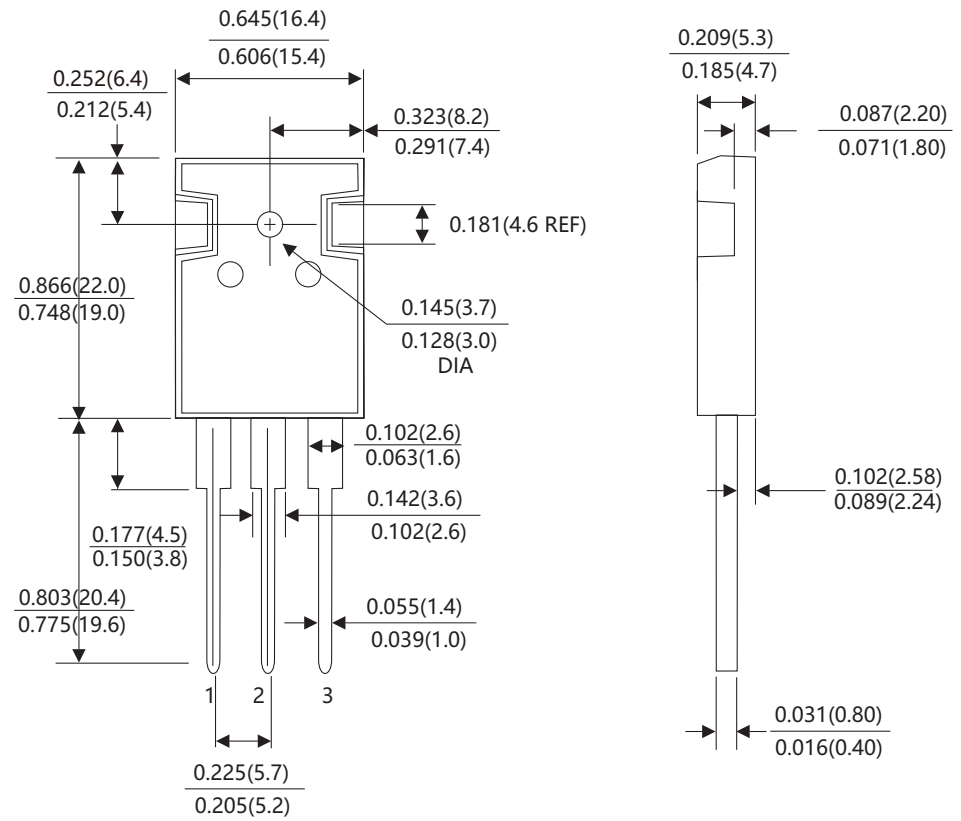
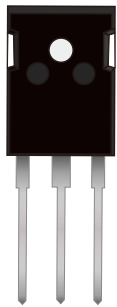


Figure 18. Capacitances vs. Drain-Source

Dimensions

TO-247 package



Friendship Reminder

■ JiNan JingHeng (hereinafter referred to as JH) reserves the right to make changes to this document and its products and specifications at anytime without notice.

■ Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

■ JH makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does JH assume any liability for application assistance or customer product design.

■ JH does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

■ No license is granted by implication or otherwise under any intellectual property rights of JH.

■ JH's products are not authorized for use as critical components in life support devices or systems without express written approval of JH.