ADVANCE INFORMATION SiC JFET ASJD1200R085

micross components

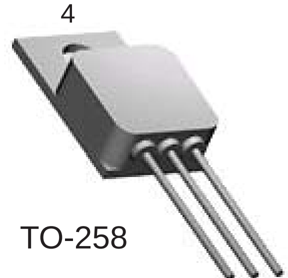
Normally-ON Trench Silicon Carbide Power JFET

Product Summary		
BV_{DS}	1200	V
$RDS_{(ON)max}$	0.085	Ω
$E_{TS,typ}$	TBD	µJ

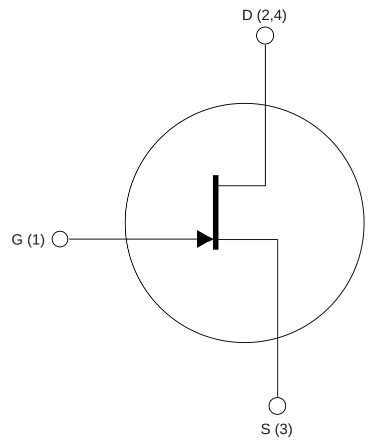
FEATURES:

SemiSouth Die Inside

- Hermetic TO-258 Packaging
- 200°C Maximum Operating Temperature (260°C Contact Factory)
- Available Screening:
  - MIL-PRF-19500 Equivalent
  - Space Level
  - MIL-STD-750 Methods & Conditions
- Inherent Radiation Tolerance >100K TID
- Positive Temperature Coefficient for Ease of Paralleling
- Extremely Fast Switching with No “Tail” Current at 150°C
- 1200 Volt Drain-Source Blocking Voltage
- $RDS_{(on)max}$ of 0.085 Ω
- Voltage Controlled
- Low Gate Charge
- Low Intrinsic Capacitance



TO-258



Internal Schematic

Non-isolated tab version shown. For isolated tab version, tab (4) is No Connect.

APPLICATIONS:

- Satellite Solar Inverters
- Mil Spec Power Supplies
  - Switch Mode
  - Uninterrupted
- Jet Engine Electronics
- Down-hole Electronics (Motor / Compressor Control)

MAXIMUM RATINGS

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current	$I_{D, Tj=100}$	T_j = 100 °C	52	A
	$I_{D, Tj=150}$	T_j = 150 °C	43	
Pulsed Drain Current [(1)]	I_{DM}	T_c = 25 °C	75	A
Short Circuit Withstand Time	t_{SC}	V_{DD} < 800 V, T_C < 125 °C	50	µS
Power Dissipation	P_D	T_c = 25 °C	114	W
Gate-Source Voltage	V_{GS}	AC[(2)]	-15 to +15	V
Operating and Storage Temperature	T_j, $T_{j,stg}$		-55 to +200*	°C
Lead Temperature for Soldering	T_{sold}	1/8" from case < 10 s	260	°C

(1) Limited by pulse width

(2) Rg_{EXT} =1 ohm, t_p < 200ns, see Figure 5 for static conditions

*Consult factory for 260°C

THERMAL CHARACTERISTICS

Parameter	Symbol	Value		Unit
		Typ	Max	
Thermal Resistance, junction-to-case	$R_{th,JC}$	-	TBD	°C / W
Thermal Resistance, junction-to-ambient	$R_{th,JA}$	-	TBD	

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ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Off Characteristics						
Drain-Source Blocking Voltage	BV_{DS}	V_{GS} = -15 V, I_D = 600 µA	1200	-	-	V
Total Drain Leakage Current	I_{DSS}	V_{DS} = 1200 V, V_{GS} = -15 V, Tj = 25°C	-	1	10	µA
		V_{DS} = 1200 V, V_{GS} = -15 V, Tj = 150°C	-	10	200	
Total Gate Reverse Leakage	I_{GSS}	V_{GS} = -15 V, V_{DS} = 0V	-	-0.1	-0.3	mA
		V_{GS} = -15 V, V_{DS} = 1200V	-	-0.1	-	
On Characteristics						
Drain-Source On-resistance	$R_{DS(on)}$	I_D = 43 A, V_{GS} = 2 V, Tj = 25 °C	-	0.075	0.085	Ω
		I_D = 43 A, V_{GS} = 2 V, Tj = 100 °C	-	0.14	-	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = 1 V, I_D = 34mA	-6.00	-	-4.00	V
Gate Forward Current	I_{GFWD}	V_{GS} = 2 V	-	220	-	mA
Gate Resistance	R_G	f = 1 MHz, drain-source shorted	-	8	-	Ω
	$R_{G(on)}$	V_{GS} >2.7V; See Figure 5	-	0.5	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DD} = 100 V	-	670	-	pF
Output Capacitance	C_{oss}		-	103	-	
Reverse Transfer Capacitance	C_{rss}		-	97	-	
Effective Output Capacitance, energy related	$C_{o(er)}$	V_{DS} = 0 V to 600 V, V_{GS} = 0 V	-	60	-	
Switching Characteristics						
Turn-On Delay	t_{on}	V_{DS} = 600 V, I_D = 40 A, Inductive Load, T_J = 25°C Gate Driver = +15V, -15V Rg_{EXT} = 5ohm	-	TBD	-	ns
Rise Time	t_r		-	TBD	-	
Turn-Off Delay	t_{off}		-	TBD	-	
Fall Time	t_f		-	TBD	-	
Turn-On Energy	E_{on}		-	TBD	-	µJ
Turn-Off Energy	E_{off}		-	TBD	-	
Total Switching Energy	E_{ts}		-	TBD	-	
Turn-On Delay	t_{on}	V_{DS} = 600 V, I_D = 40 A, Inductive Load, T_J = 150°C Gate Driver = +15V, -15V Rg_{EXT} = 5ohm	-	TBD	-	ns
Rise Time	t_r		-	TBD	-	
Turn-Off Delay	t_{off}		-	TBD	-	
Fall Time	t_f		-	TBD	-	
Turn-On Energy	E_{on}		-	TBD	-	µJ
Turn-Off Energy	E_{off}		-	TBD	-	
Total Switching Energy	E_{ts}		-	TBD	-	
Total Gate Charge	Q_g	V_{DS} = 600V, I_D = 40 A, V_{GS} = + 2.5 V	-	30	-	nC
Gate-Source Charge	Q_{gs}		-	1	-	
Gate-Drain Charge	Q_{gd}		-	24	-	

Figure 1. Typical Output Characteristics
$I_D = f(V_{DS})$; $T_j = 25°C$; parameter: V_{GS}

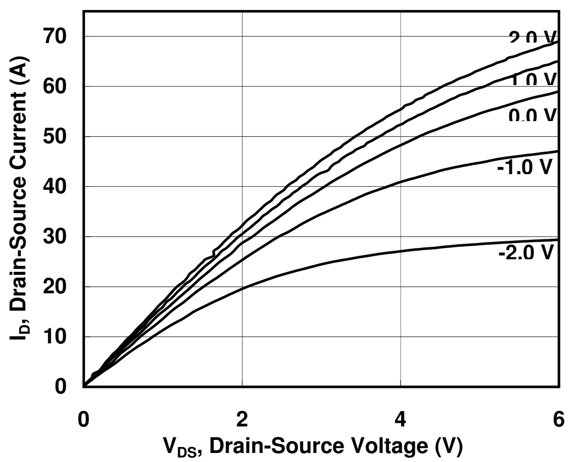


Figure 2. Typical Output Characteristics
$I_D = f(V_{DS})$; $T_j = 100°C$; parameter: V_{GS}

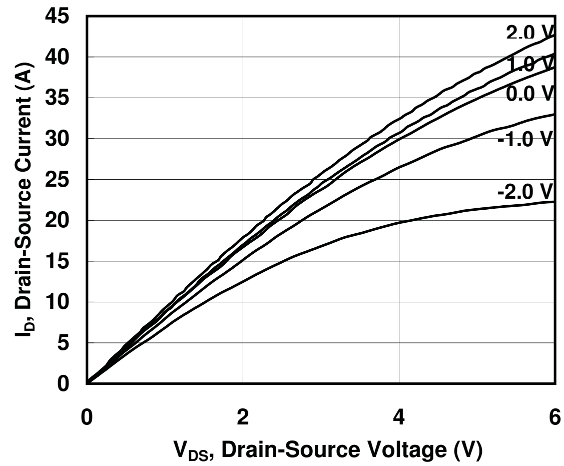


Figure 3. Typical Output Characteristics
$I_D = f(V_{DS})$; $T_j = 150°C$; parameter: V_{GS}

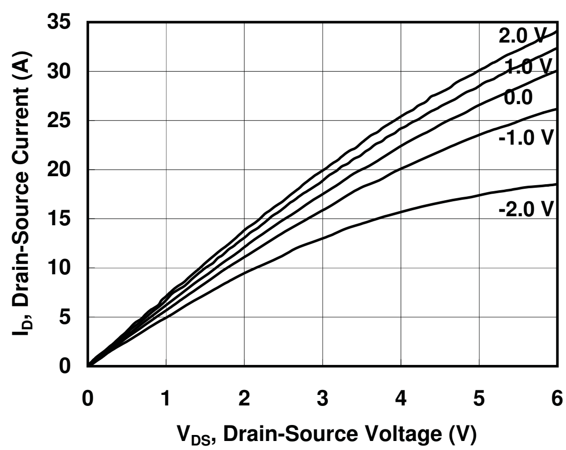


Figure 4. Typical Transfer Characteristics
$I_D = f(V_{GS})$; $V_{DS} = 5V$

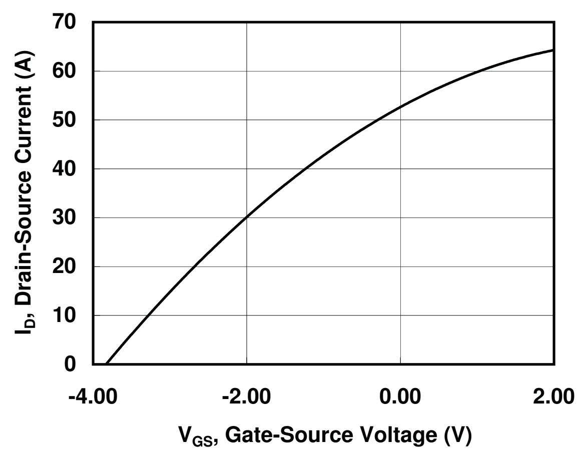


Figure 5. Gate-Source Current
$I_{GS} = f(V_{GS})$; parameter: T_j

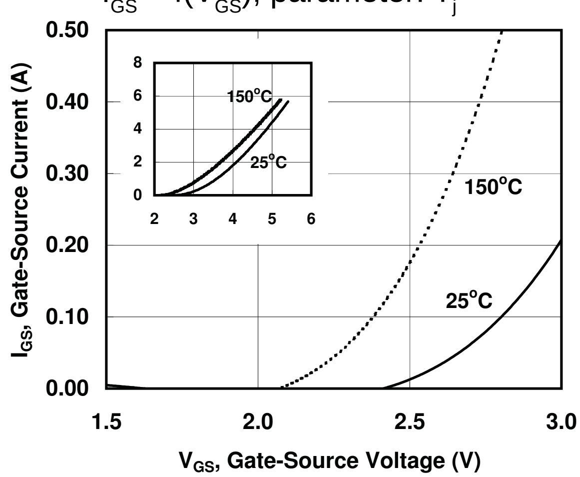


Figure 6. Drain-Source On-resistance
$R_{DS(on)} = f(I_D)$; $V_{GS} = 2.0$; parameter: T_j

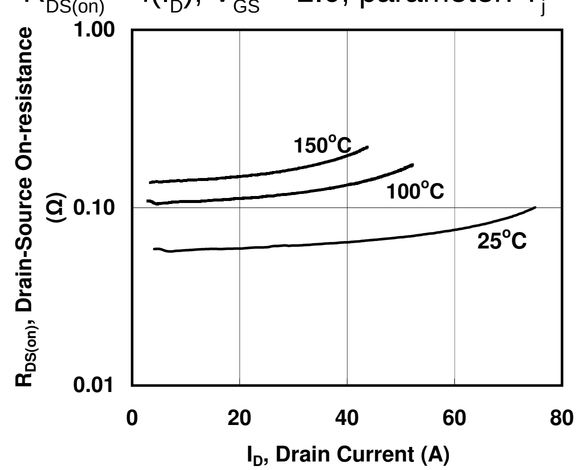


Figure 7. Drain-Source On-resistance

$R_{DS(ON)} = f(T_j)$; parameter: I_{GS}

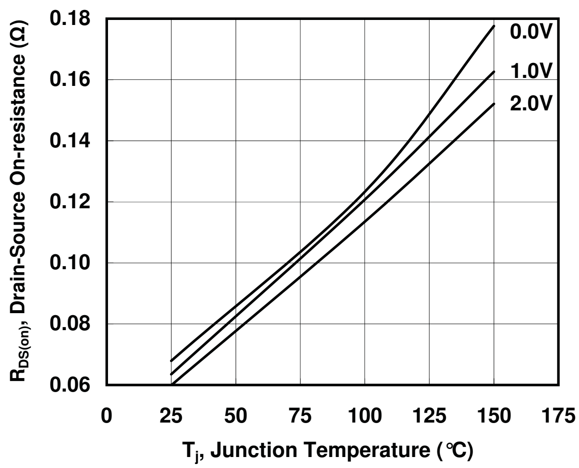


Figure 8. Drain-Source On-resistance

$R_{DS(ON)} = f(V_{GS})$; $T_j = 25^oC$

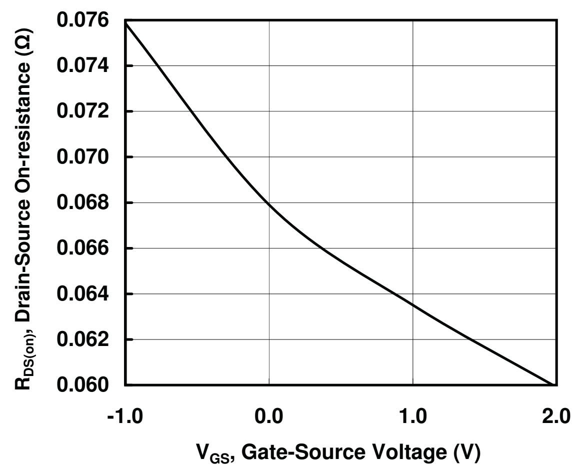


Figure 9. Typical Capacitance

$C = f(V_{DS})$; V_{GS} = 0 V; f = 1 MHz

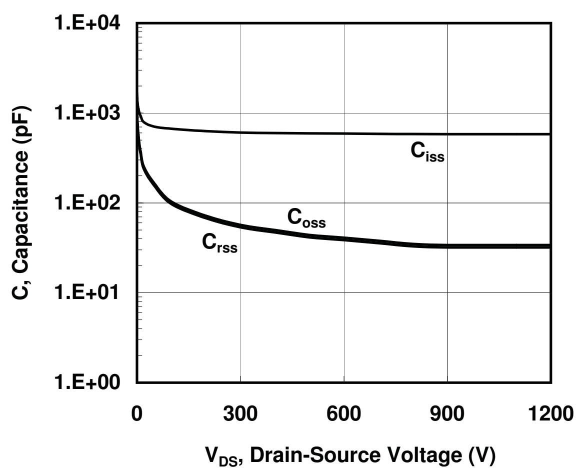


Figure 10. Gate Charge

$Q_g = f(V_{GS})$; V_{DS} = 600V; I_D = 5A, $T_j = 25^oC$

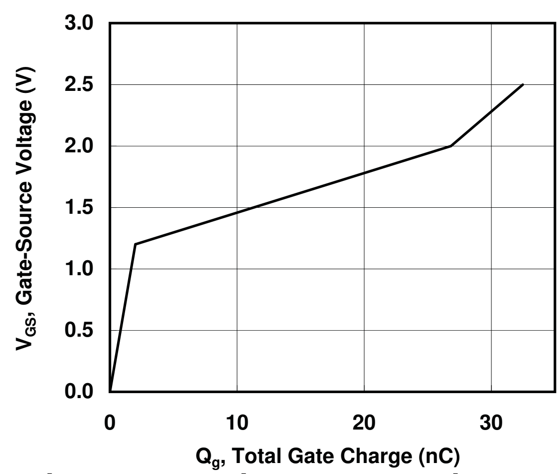


Figure 11. Gate Threshold Voltage

$V_{th} = f(T_j)$

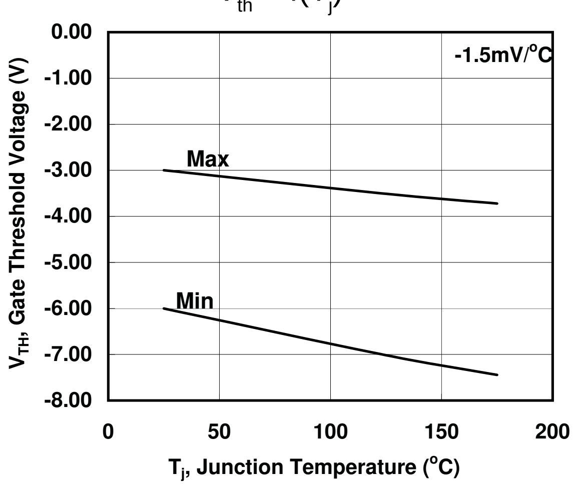


Figure 12. Drain-Source Leakage

$I_D = f(V_{DS})$; V_{GS} = 0V; parameter: T_j

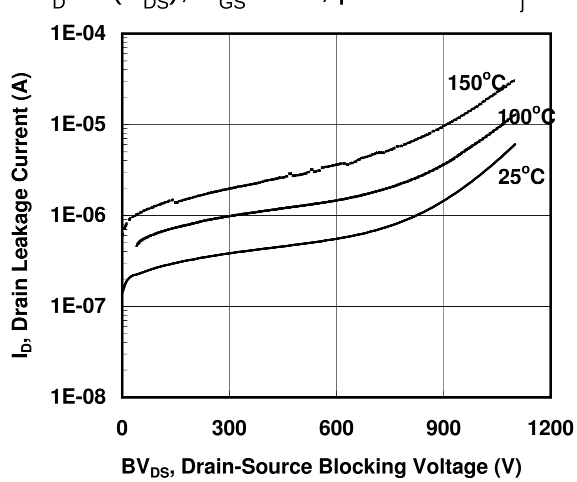
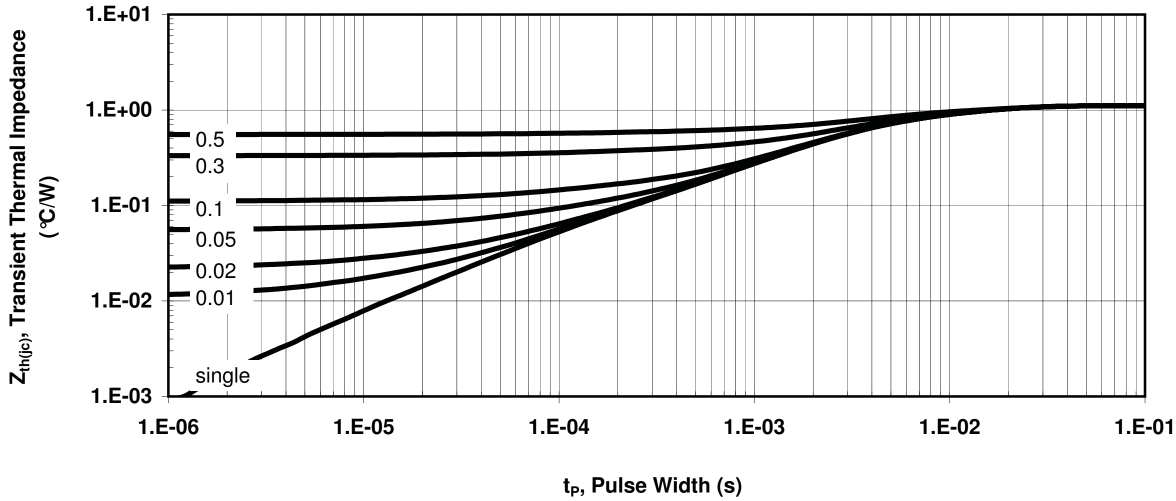
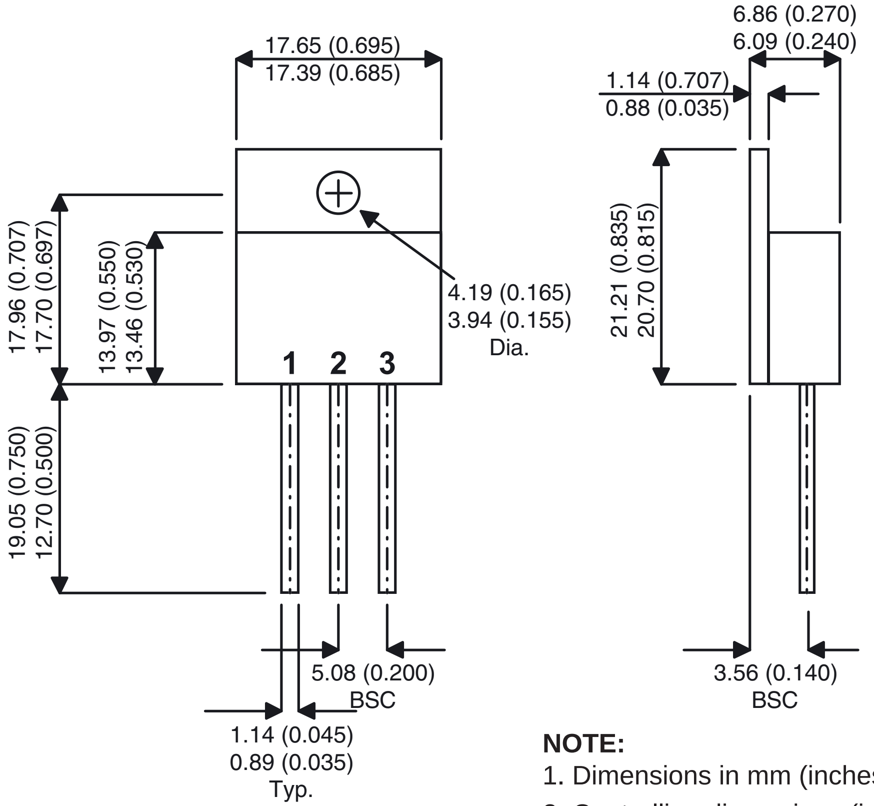


Figure 13. Transient Thermal Impedance

$Z_{th(jc)} = f(t_P)$; parameter: Duty Ratio



MECHANICAL DRAWING



NOTE:
1. Dimensions in mm (inches)
2. Controlling dimensions (inches)

ORDERING INFORMATION

Base Part Number	Configuration	Package	Junction Temp. Range	Processing
ASJD1200R085	Blank= Non-isolated Tab	M=TO-258 -	EL	Blank
	S= Isolated Tab		EX	/V
				/S

Temp Ranges: EL= Elevated Temp. Range, -55°C to 200°C (T_J)
EX= Extreme Temp. Range, -55°C to 260°C (T_J) (consult factory)

Processing: Blank = Commercial / Standard Processing
MIL-PRF-19500 Equivalent Processing Available Per SCD
/V= JANTX MIL-PRF-19500 Equivalent (future standard offering)
/S= JANS MIL-PRF-19500 Equivalent (future standard offering)

Example Part Numbers: ASJD1200R085SM-EL
ASJD1200R085M-EX

SemiSouth has commercial plastic versions of this product available. Please refer to the SemiSouth website http://www.semisouth.com/products/products.html for datasheet specifications and ordering information. The SemiSouth part number is SJDP120R085 and is supplied in a TO-247 plastic package.

DOCUMENT TITLE
Normally-ON Trench Silicon Carbide Power JFET

Rev #	History	Release Date	Status
0.0	Initial Release	December 2010	Advance Information
0.1	Replaced TO-257 package with TO-258 package	June 2011	Advance Information