

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C
1200V	37mΩ @ V _{GS} = 18V	75A

Description and Applications

This SiC MOSFET is designed to minimize the on-state resistance yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

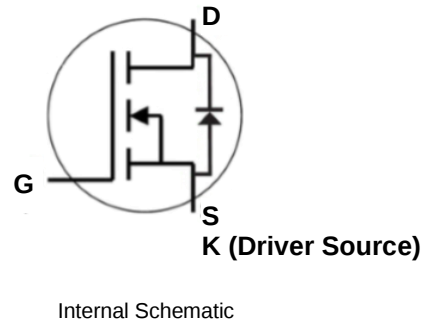
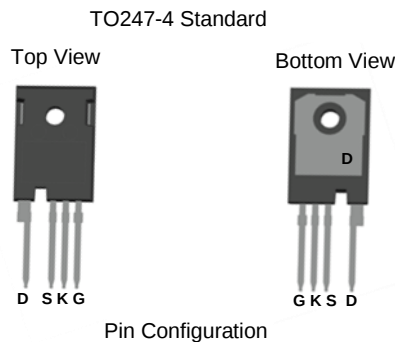
- EV high-power DC-DC converters
- EV charging systems
- AC-DC traction inverters
- Solar inverters
- Automotive motor drivers

Features and Benefits

- Low On-Resistance
 - High BV_{DSS} Rating for Power Application
 - Low Input Capacitance
 - **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
 - **Halogen and Antimony Free. "Green" Device (Note 3)**
 - For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.
- <https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: TO247-4
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 6.6 grams (Approximate)

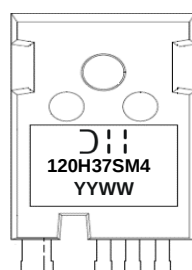


Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMWSH120H37SM4	TO247-4 Standard	30 Pieces	Tube

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



 = Manufacturer's Marking
 120H37SM4 = Product Type Marking Code
 YYWW or YYWW = Date Code Marking
 YY or YY = Last Two Digits of Year (ex: 24 = 2024)
 WW or WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	1200	V
Gate-Source Voltage		V _{GS}	-10/+22	V
Gate-Source Voltage (Recommended Operating Values)		V _{GS}	-5/+18	V
Gate-Source Transient Voltage, t _P < 1μs, t ≤ 10 Hours over Lifetime		V _{GS}	-11/+25	V
Continuous Drain Current (Notes 5, 6)	T _C = +25°C	I _D	75	A
	T _C = +100°C		53	
Continuous Diode Forward Current (Note 5)		I _S	66	A
Pulsed Source Current (Pulse Width t _P Limited by T _{J Max}) (Note 5)		I _{SM}	168	A
Pulsed Drain Current (Pulse Width t _P Limited by T _{J Max}) (Note 5)		I _{DM}	168	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _C = +25°C	P _D	315	W
	T _C = +100°C		157	
Thermal Resistance, Junction to Ambient (Note 7)		R _{θJA}	29.5	°C/W
Thermal Resistance, Junction to Case (Note 5)		R _{θJC}	0.47	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

Notes:

5. Device mounted on an infinite heatsink.
6. Drain current limited by maximum junction temperature.
7. Device mounted on FR-4 substrate PC board, 2oz. copper, with minimum recommended pad layout.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	1200	—	—	V	V _{GS} = 0, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	10	μA	V _{DS} = 1200V, V _{GS} = 0
Gate-Source Leakage	I _{GSS}	—	—	±250	nA	V _{GS} = -10/+22V, V _{DS} = 0
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	2.04	2.5	4.4	V	V _{DS} = V _{GS} , I _D = 15mA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	28.5	37	mΩ	V _{GS} = 18V, I _D = 30A
Static Drain-Source On-Resistance	R _{DS(ON)}	—	35	—	mΩ	V _{GS} = 15V, I _D = 30A
Diode Forward Voltage	V _{SD}	—	4.0	—	V	V _{GS} = -5V, I _S = 30A
Transconductance	g _{fs}	—	12	—	S	V _{DS} = 10V, I _D = 30A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	2320	—	pF	V _{GS} = 0, V _{DS} = 800V V _{AC} = 25mV, f = 1MHz
Output Capacitance	C _{oss}	—	112	—		
Reverse Transfer Capacitance	C _{rss}	—	6.4	—		
Effective Output Capacitance (Energy Related)	C _{O(ER)}	—	145	—		
Effective Output Capacitance (Time Related)	C _{O(TR)}	—	216	—		
C _{oss} Stored Energy	E _{OSS}	—	45	—	μJ	V _{GS} = -5V/+18V, V _{DS} = 800V R _g = 5Ω, I _D = 30A, L = 157μH
Turn-On Switching Energy (Body Diode Forward)	E _{ON}	—	259	—	μJ	
Turn-Off Switching Energy (Body Diode Forward)	E _{OFF}	—	145	—		
Gate Resistance	R _g	—	1.3	—	Ω	V _{AC} = 100mV, f = 1MHz
Total Gate Charge	Q _g	—	135	—	nC	V _{GS} = -5V/+18V, V _{DS} = 800V I _D = 30A
Gate-Source Charge	Q _{gs}	—	46.4	—		
Gate-Drain Charge	Q _{gd}	—	36.7	—		
Turn-On Delay Time	t _{D(ON)}	—	15.0	—	ns	V _{GS} = -5V/+18V, V _{DD} = 800V R _g = 5Ω, I _D = 30A Inductive Load
Turn-On Rise Time	t _r	—	24.6	—		
Turn-Off Delay Time	t _{D(OFF)}	—	34.5	—		
Turn-Off Fall Time	t _f	—	9.6	—		
Body Diode Reverse-Recovery Time	t _{RR}	—	24.6	—	ns	V _{GS} = -5V, V _{DS} = 800V I _D = 30A, di/dt = 1000A/μs
Body Diode Reverse-Recovery Charge	Q _{RR}	—	181	—	nC	
Body Diode Reverse-Recovery Current	I _{RRM}	—	13.5	—	A	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

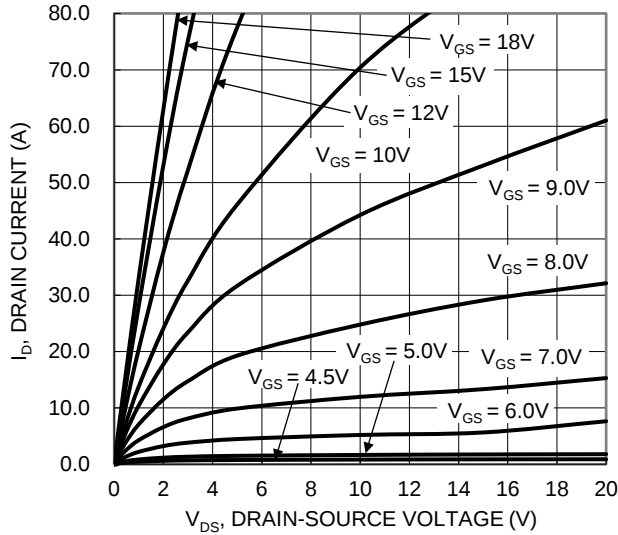


Figure 1. Typical Output Characteristic

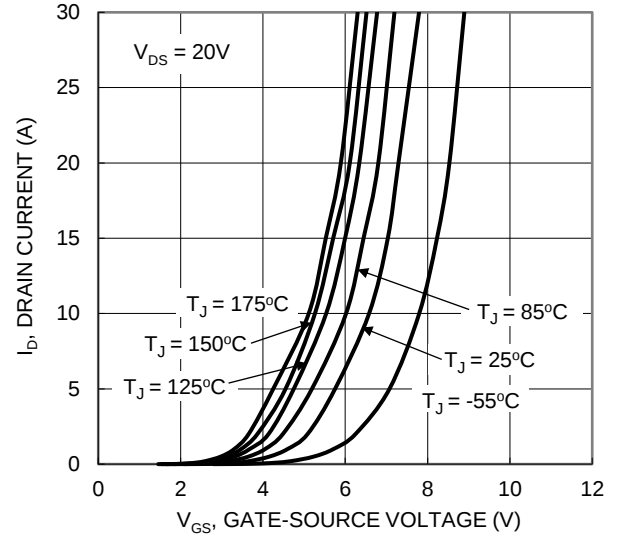


Figure 2. Typical Transfer Characteristic

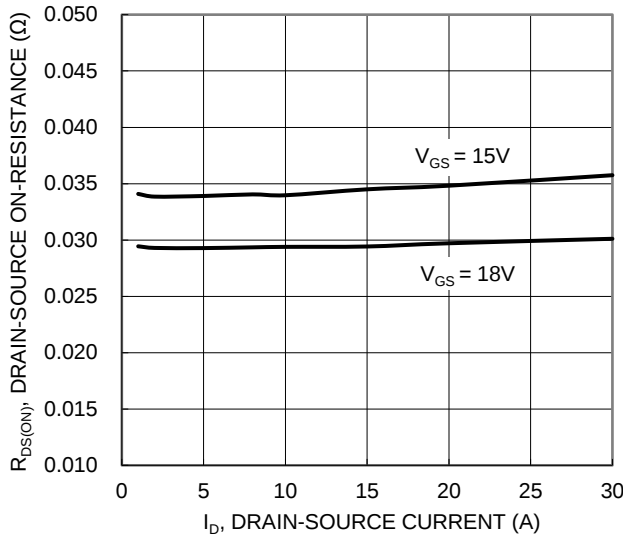


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

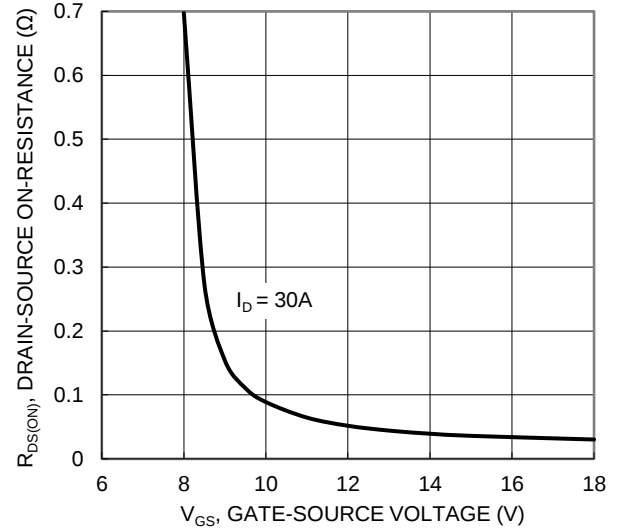


Figure 4. Typical Transfer Characteristic

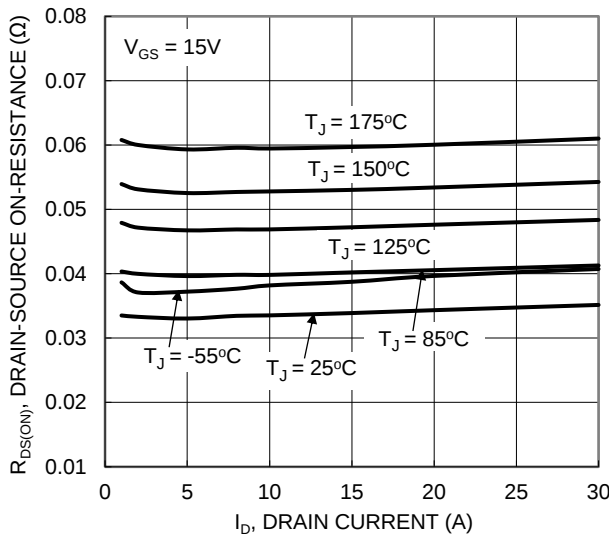


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

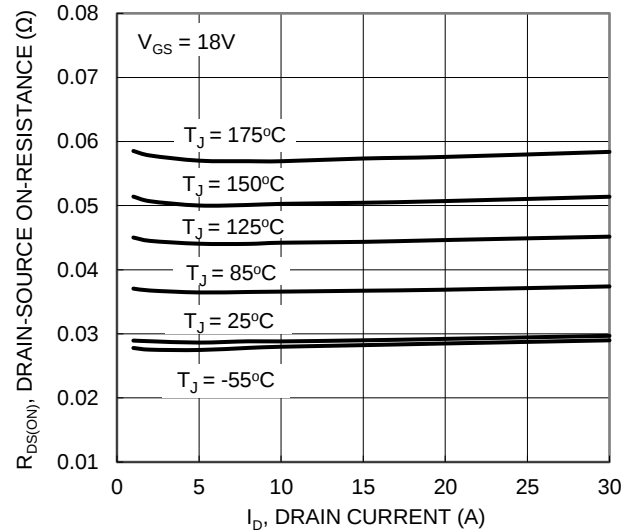


Figure 6. Typical On-Resistance vs. Drain Current and Junction Temperature

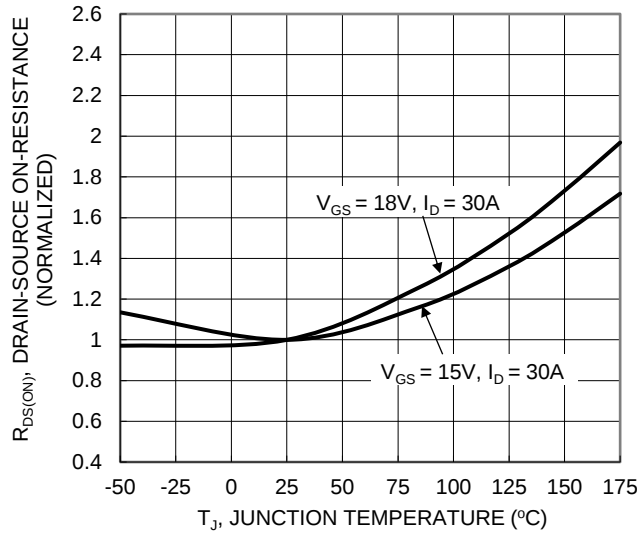


Figure 7. On-Resistance Variation with Junction Temperature

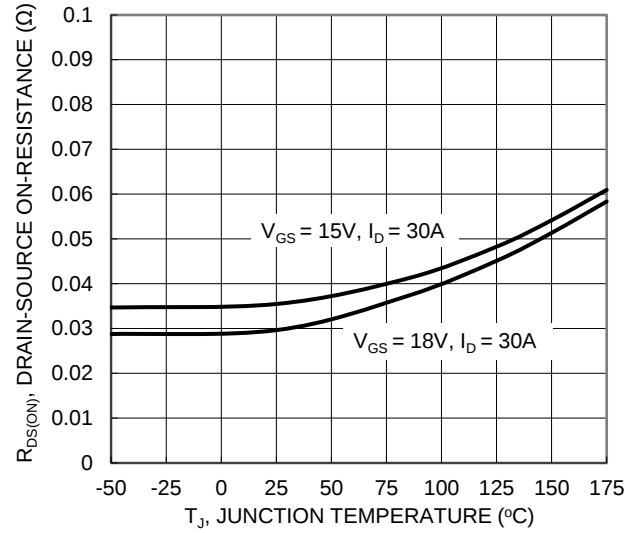


Figure 8. On-Resistance Variation with Junction Temperature

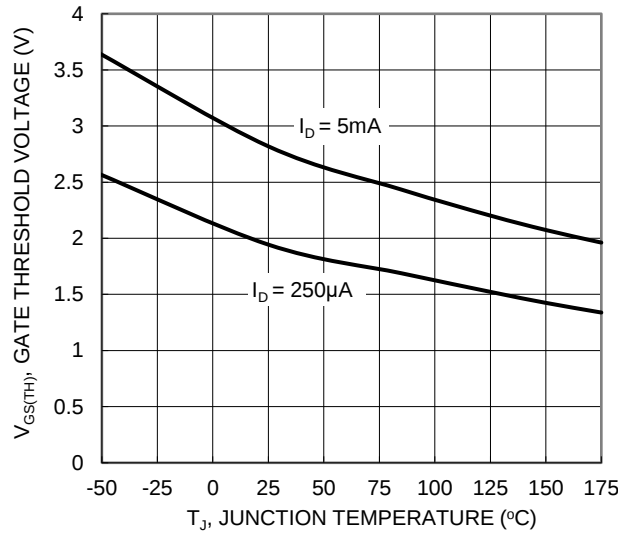


Figure 9. Gate Threshold Variation vs. Junction Temperature

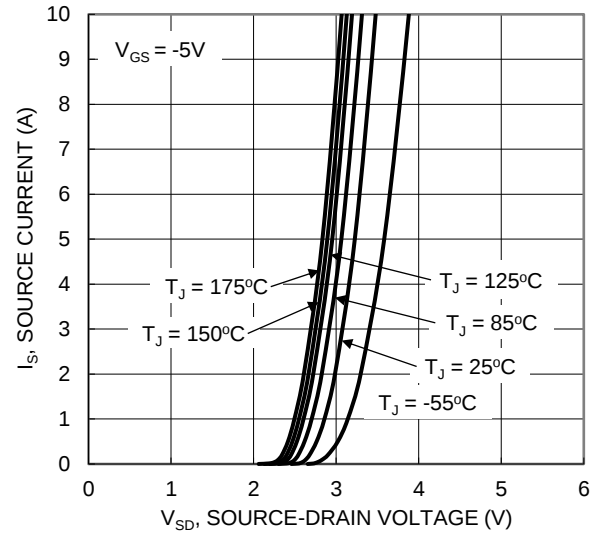


Figure 10. Diode Forward Voltage vs. Current

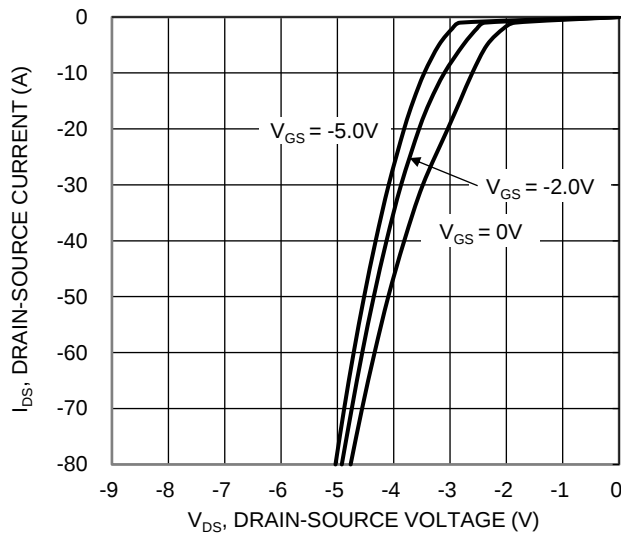


Figure 11. Body Diode Characteristic at 25°C

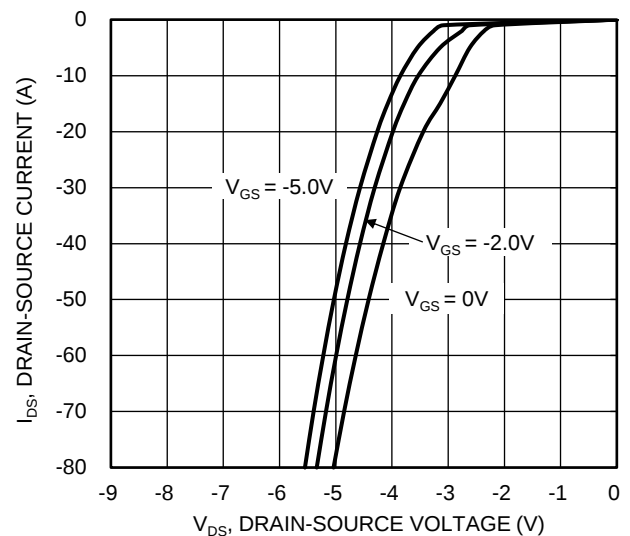
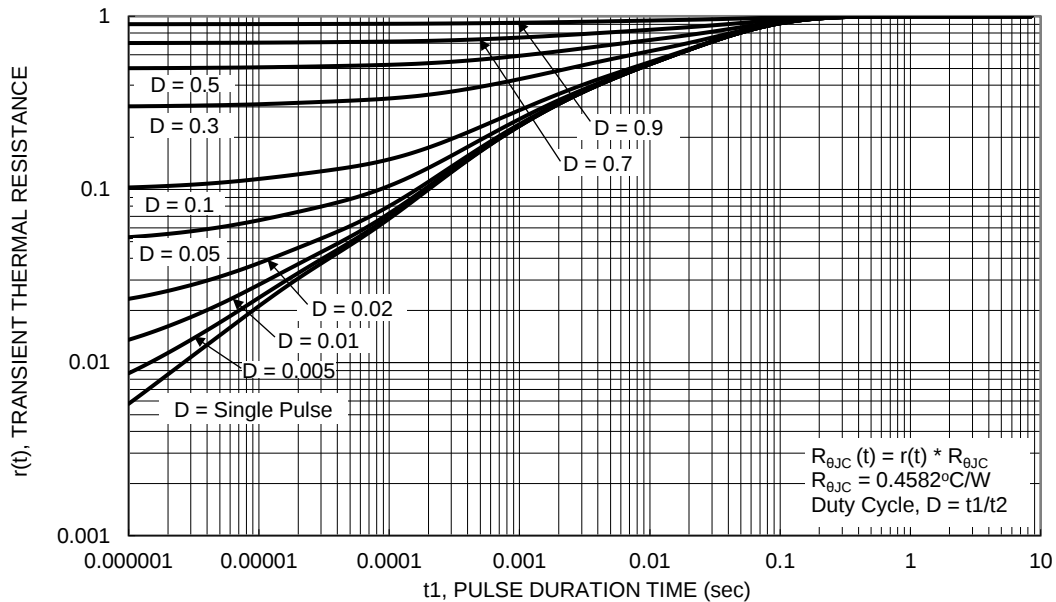
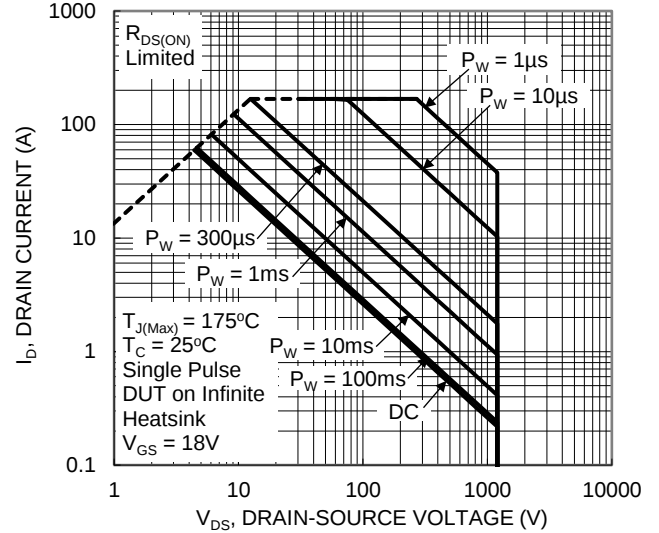
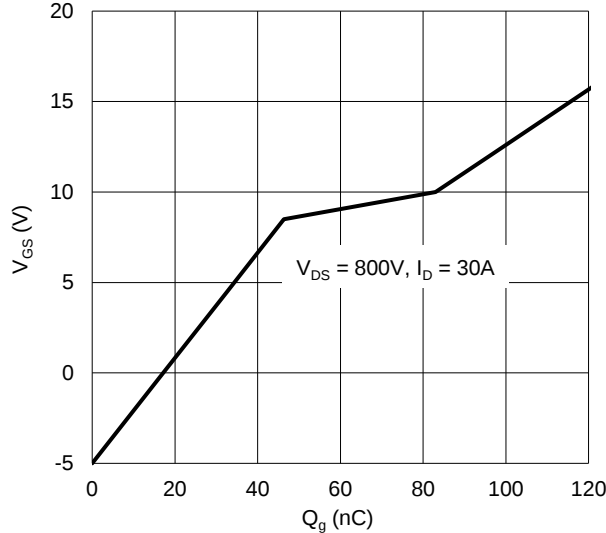
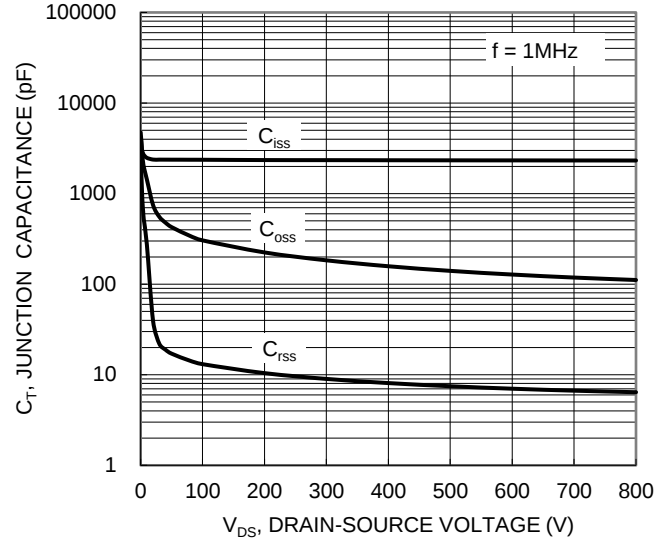
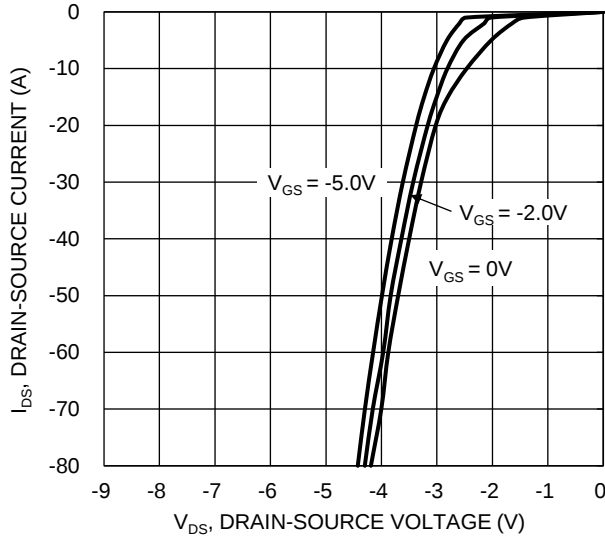


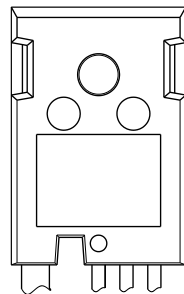
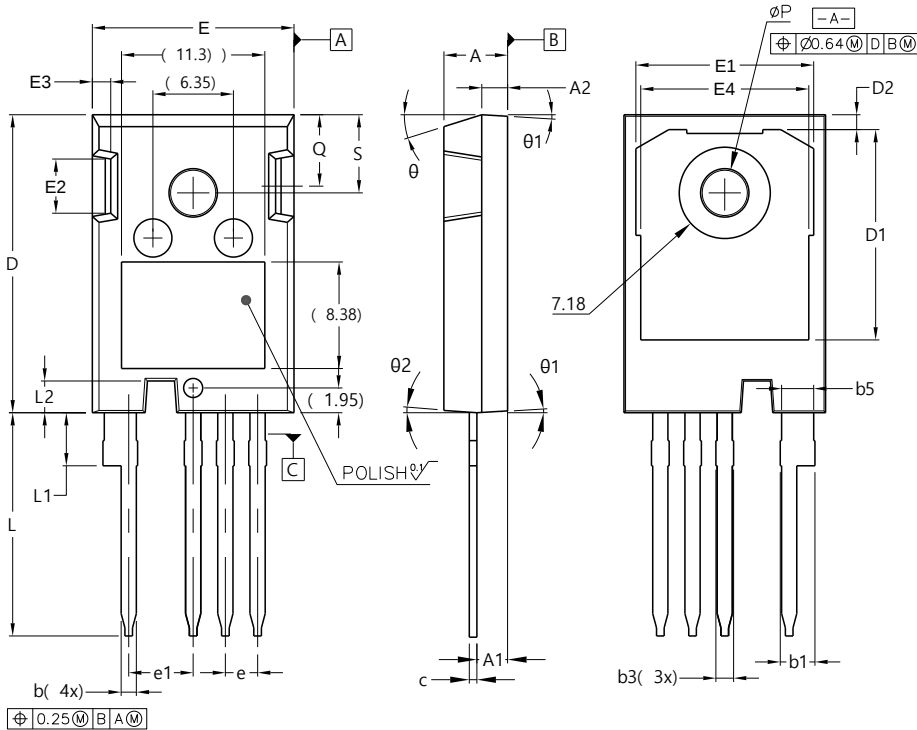
Figure 12. Body Diode Characteristic at -55°C



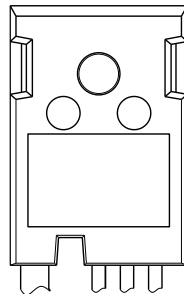
Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

TO247-4 Standard



OPTION A
(TOP VIEW)



OPTION B
(TOP VIEW)

TO247-4 Standard		
Dim	Min	Max
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b	1.07	1.33
b1	2.39	2.94
b3	1.07	1.60
b5	2.39	2.69
c	0.55	0.68
D	23.30	23.60
D1	16.25	17.65
D2	0.95	1.25
E	15.75	16.30
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	2.54 BSC	
e1	5.08 BSC	
L	17.31	17.82
L1	3.97	4.37
L2	2.35	2.65
ØP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
θ	17.5°- 20° REF	
θ1	3.5°- 5° REF	
θ2	4°- 5° REF	
All Dimensions in mm		

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