

Product Summary

BV _{DSS}	R _{DS(ON)} MAX	I _D T _c = +25°C
1200V	90mΩ @ V _{GS} = 15V	38.2

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)**
- **The DMWSH120H90SCT7Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
<https://www.diodes.com/quality/product-definitions/>

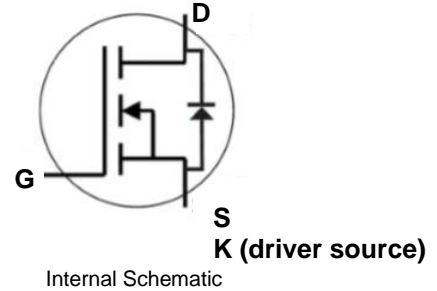
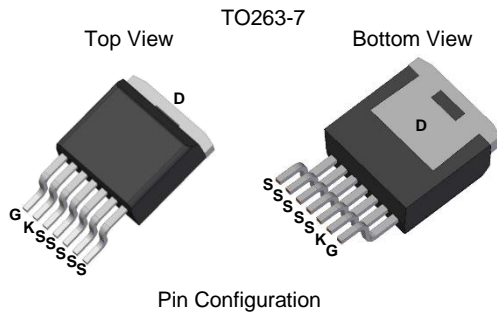
Description and Applications

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.

- Switch mode power supplies
- Motor drives
- High-voltage DC-DC converters
- Solar inverters
- EV battery chargers

Mechanical Data

- Package: TO263-7
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 1.524 grams (Approximate)

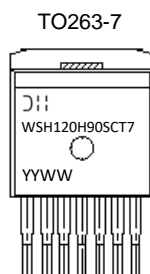


Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMWSH120H90SCT7Q	TO263-7	50	Tube
DMWSH120H90SCT7Q-13	TO263-7	800	Tape & Reel

- 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
 WSH120H90SCT7 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 24 = 2024)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	1200	V
Gate-Source Voltage (Dynamic)	V _{GSS}	+19/-8	V
Gate-Source Voltage (Static)	V _{GSS}	+15/-4	V
Continuous Drain Current (Notes 5 & 6)	I _D	T _C = +25°C	38.2
		T _C = +100°C	27.0
Continuous Diode Forward Current (Note 5)	I _S	34	A
Pulsed Source Current (Pulse Width t _P Limited by T _{J Max}) (Note 5)	I _{SM}	97	A
Pulsed Drain Current (Pulse Width t _P Limited by T _{J Max}) (Note 5)	I _{DM}	97	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	T _C = +25°C	197
		T _C = +100°C	99
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	58.5	°C/W
Thermal Resistance, Junction to Case (Note 5)	R _{θJC}	0.76	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

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 _{DS}	1200	—	—	V	V _{GS} = 0V, I _D = 100μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	50	μA	V _{DS} = 1200V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±200	nA	V _{GS} = +15/-4V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.7	2.5	3.5	V	V _{DS} = V _{GS} , I _D = 5mA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	75	90	mΩ	V _{GS} = 15V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	4.5	—	V	V _{GS} = -4V, I _S = 10A
Transconductance	g _{fs}	—	5.0	—	S	V _{DS} = 20V, I _D = 20A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	1078	—	pF	V _{GS} = 0V, V _{DS} = 1000V V _{AC} = 25mV, f = 1MHz
Output Capacitance	C _{oss}	—	57	—		
Reverse Transfer Capacitance	C _{riss}	—	4.9	—		
Coss Stored Energy	E _{oss}	—	34.2	—	μJ	
Turn-On Switching Energy (Body Diode FWD)	E _{ON}	—	175	—	μJ	V _{GS} = -4V/+15V, V _{DS} = 800V R _g = 5Ω, I _D = 20A, L = 156μH
Turn-Off Switching Energy (Body Diode FWD)	E _{OFF}	—	56	—		
Gate Resistance	R _g	—	2.79	—	Ω	V _{AC} = 100mV, f = 1MHz
Total Gate Charge	Q _g	—	54.6	—	nC	V _{GS} = -4V/+15V, V _{DS} = 800V I _D = 20A
Gate-Source Charge	Q _{gs}	—	16.5	—		
Gate-Drain Charge	Q _{gd}	—	22.4	—		
Turn-On Delay Time	t _{D(ON)}	—	9.1	—	ns	V _{GS} = -4V/+15V, V _{DS} = 800V R _g = 5Ω, I _D = 20A Inductive Load
Turn-On Rise Time	t _R	—	18.8	—		
Turn-Off Delay Time	t _{D(OFF)}	—	17.2	—		
Turn-Off Fall Time	t _F	—	8.5	—		
Body Diode Reverse Recovery Time	t _{RR}	—	11.5	—	ns	V _{GS} = -4V, V _{DS} = 800V I _F = 20A, di/dt = 3600A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	108	—	nC	
Body Diode Reverse Recovery Current	I _{RRM}	—	18.8	—	A	

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

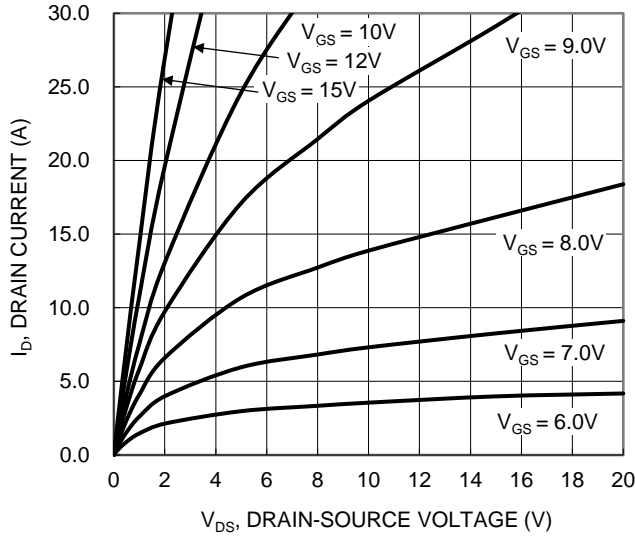


Figure 1. Typical Output Characteristic

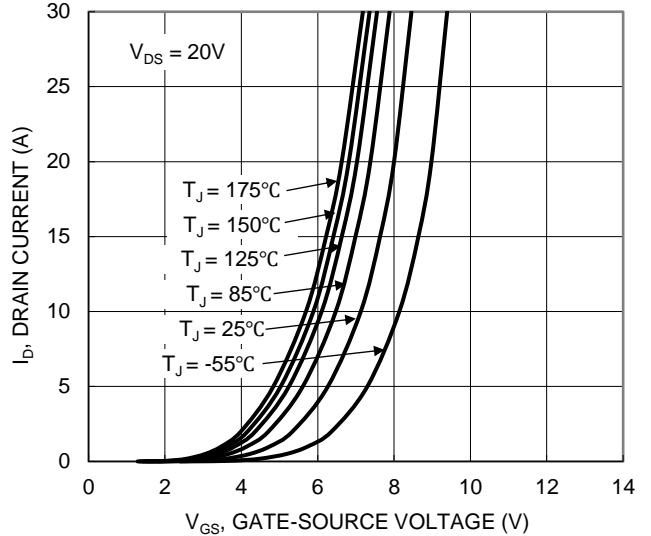


Figure 2. Typical Transfer Characteristic

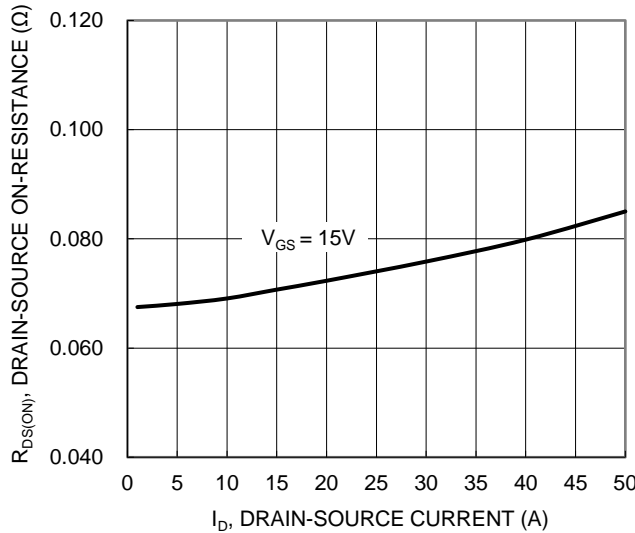


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

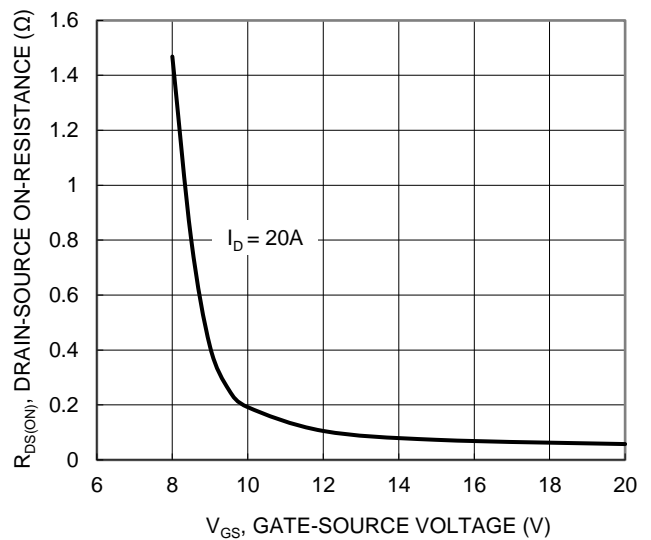


Figure 4. Typical Transfer Characteristic

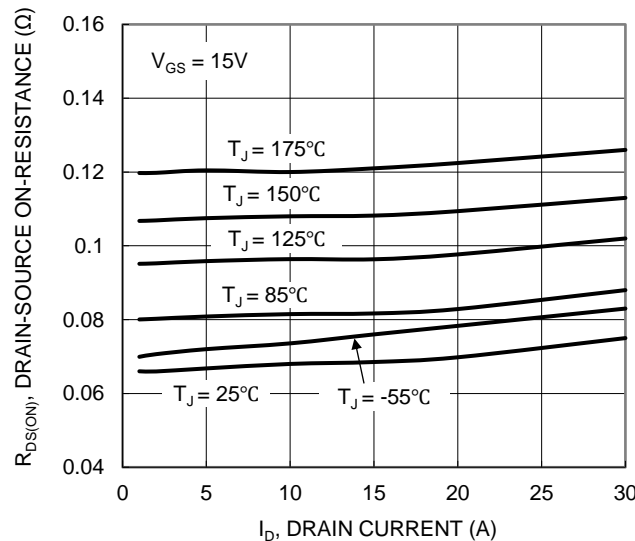


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

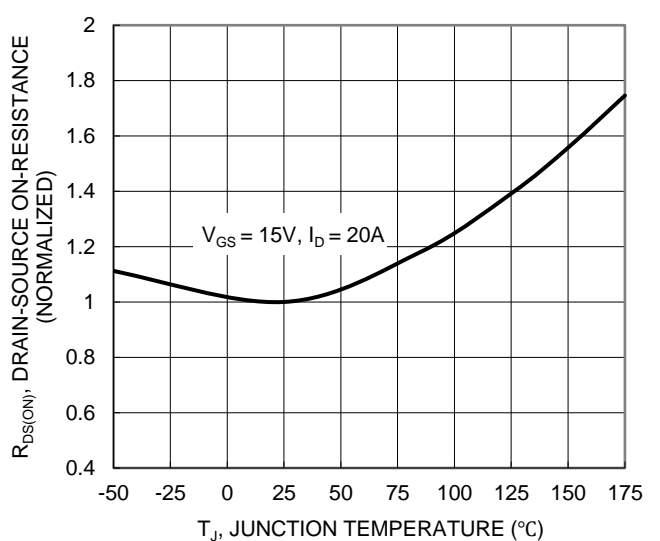


Figure 6. On-Resistance Variation with Junction Temperature

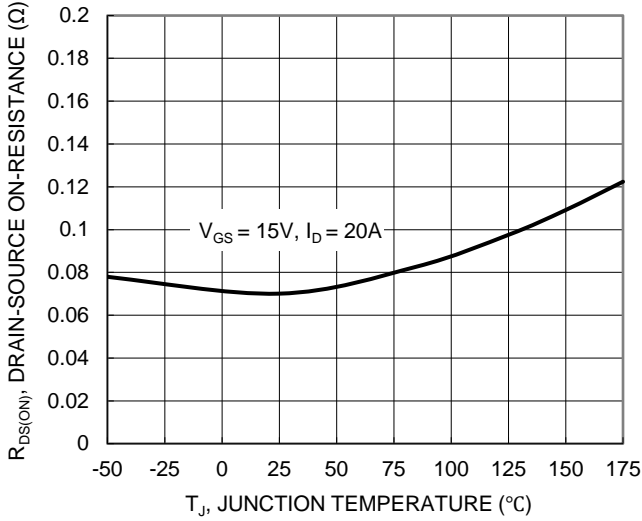


Figure 7. On-Resistance Variation with Junction Temperature

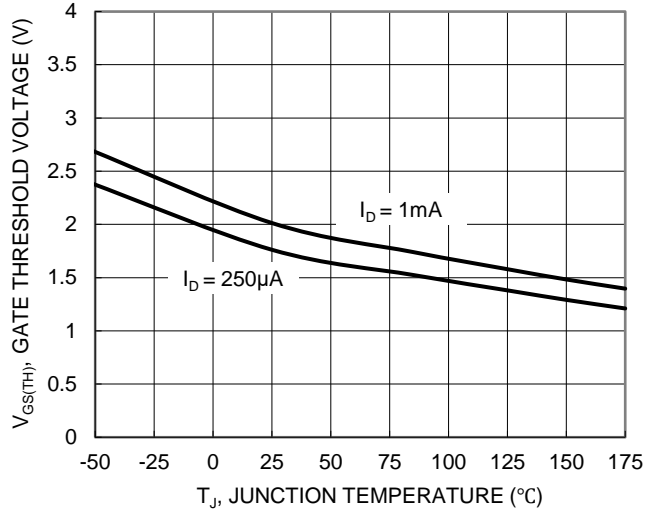


Figure 8. Gate Threshold Variation vs. Junction Temperature

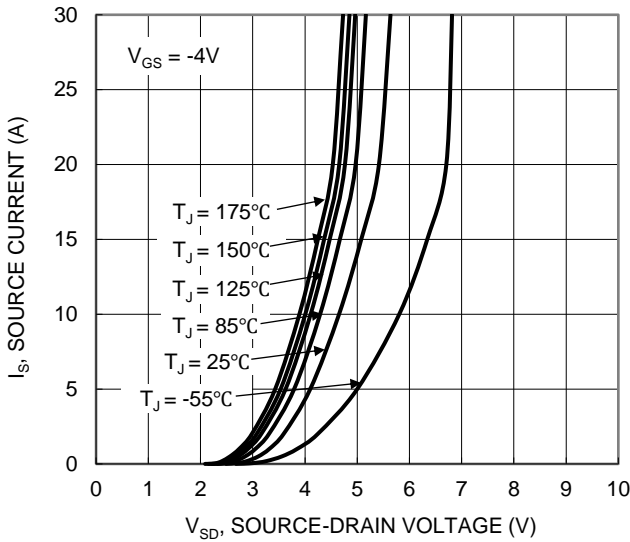


Figure 9. Diode Forward Voltage vs. Current

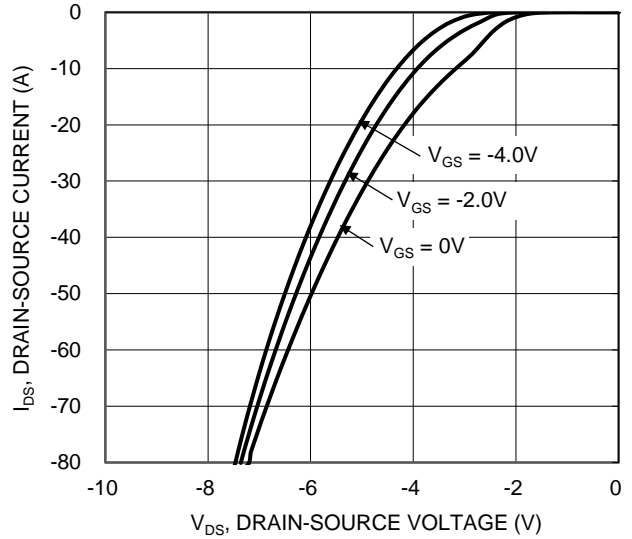


Figure 10. Body Diode Characteristic at 25°C

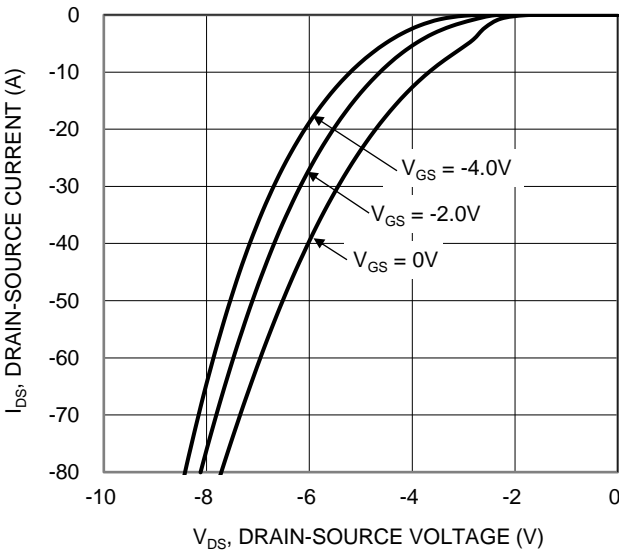


Figure 11. Body Diode Characteristic at -55°C

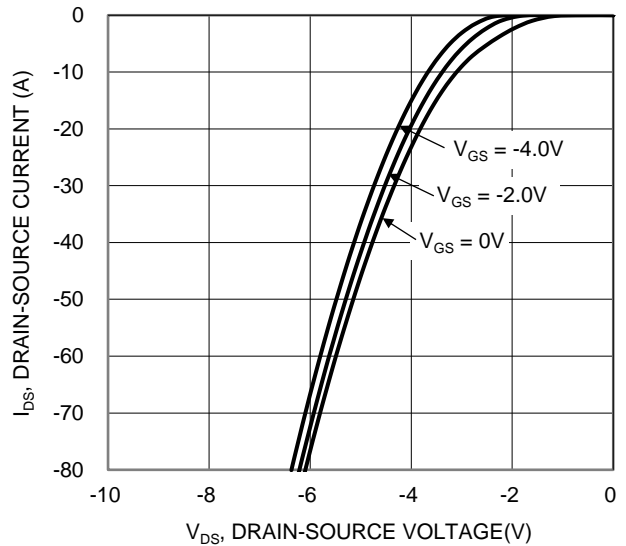
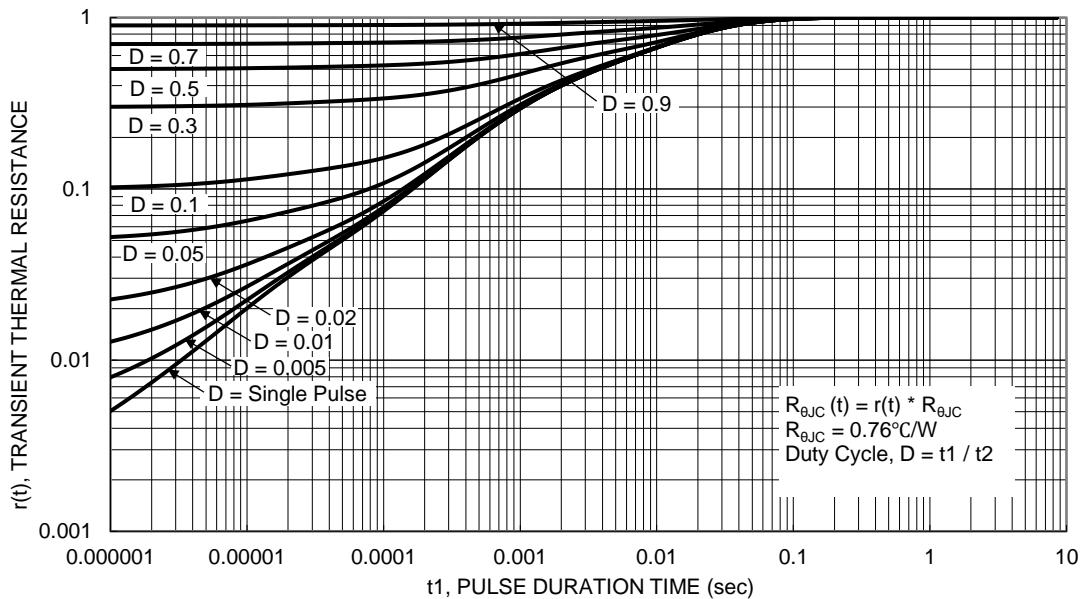
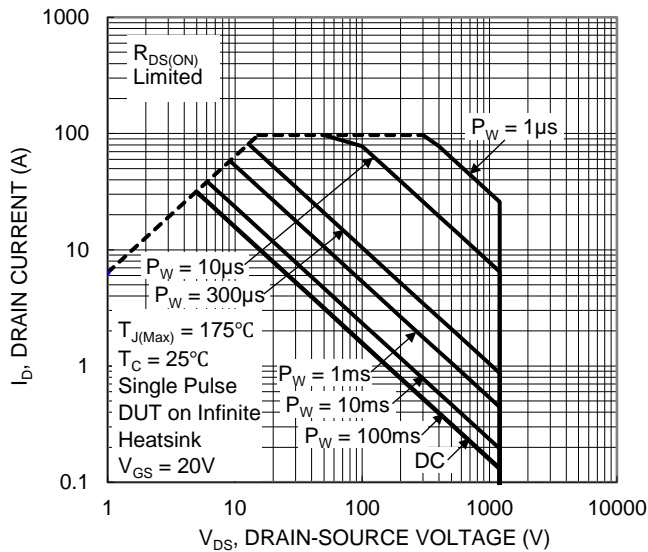
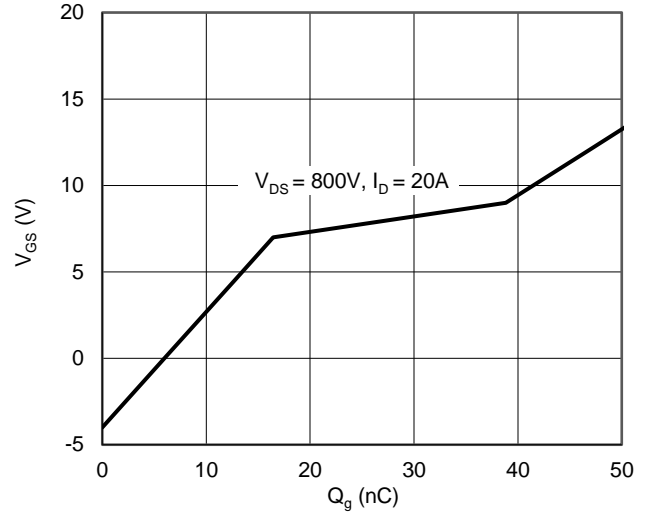
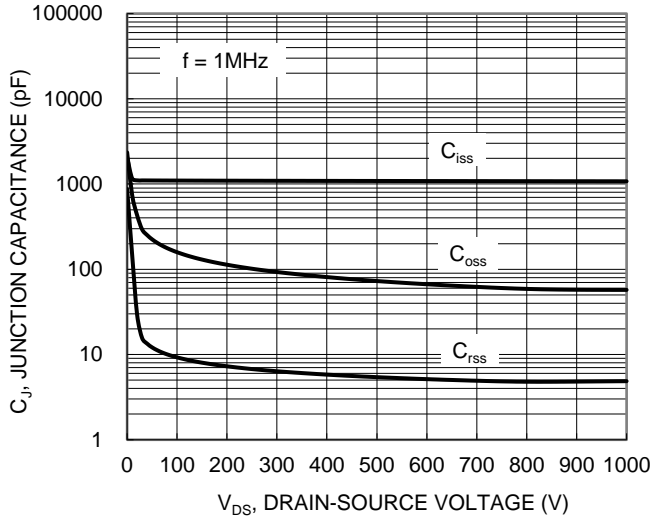


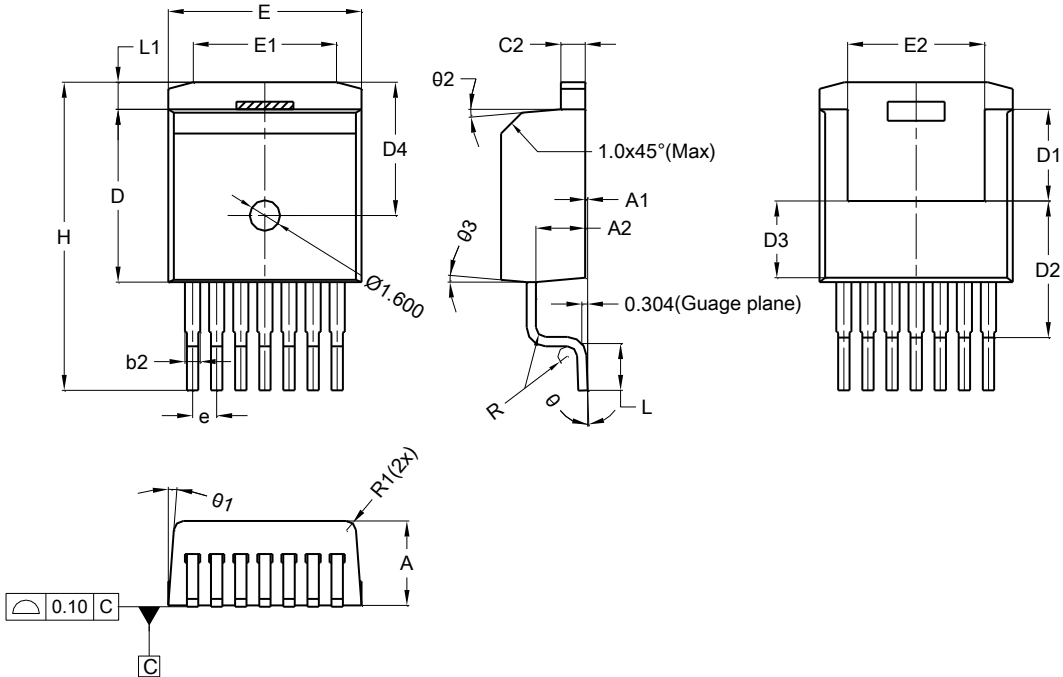
Figure 12. Body Diode Characteristic at 175°C



Package Outline Dimensions

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

TO263-7

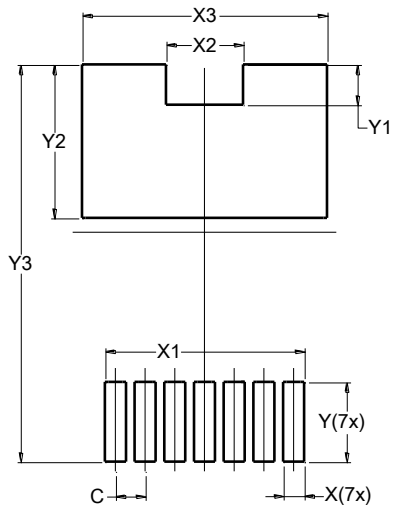


TO263-7			
Dim	Min	Max	Typ
A	4.30	4.570	4.435
A1	0.00	0.25	0.125
A2	2.595 REF		
b	0.500	0.700	0.600
b2	0.600	1.000	0.800
c	0.330	0.650	0.490
c2	1.170	1.400	1.285
D	9.025	9.125	9.075
D1	4.700	4.900	4.800
D2	7.170 REF		
D3	4.000 MIN		
D4	7.000 REF		
e	1.27 TYP		
E	10.130	10.230	10.180
E1	6.500	8.600	7.550
E2	6.778	7.665	7.223
H	15.043	17.313	16.178
L	2.324	2.700	2.512
L1	0.968	1.868	1.418
R	0.506 REF		
R1	0.500 REF		
θ	0°	8°	4°
θ_1	4.5°	5.5°	5°
θ_2	4°	6°	5°
θ_3	4°	6°	5°
All Dimensions in mm			

Suggested Pad Layout

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

TO263-7



Dimensions	Value (in mm)
C	1.270
X	0.900
X1	8.520
X2	3.300
X3	10.480
Y	3.400
Y1	1.718
Y2	6.538
Y3	16.928

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