

Product Summary

BV_{DSS}	R_{DSON} 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)
- An automotive-compliant part is available under separate datasheet ([DMWSH120H90SCT7Q](#))

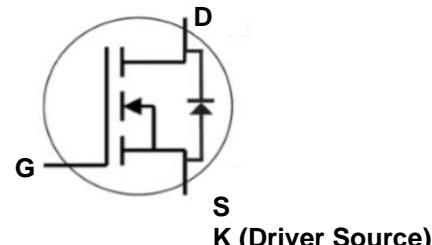
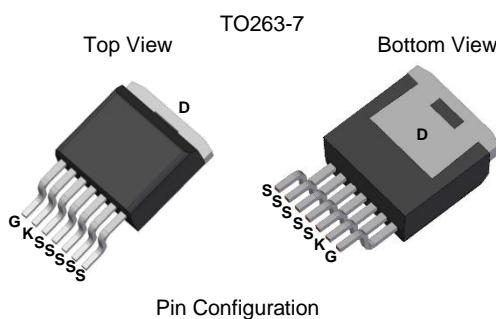
Description and Applications

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)



Internal Schematic

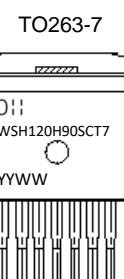
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMWSH120H90SCT7	TO263-7	50	Tube
DMWSH120H90SCT7-13	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



DII = 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	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	38.2 27.0	A
$T_C = +25^\circ\text{C}$			
$T_C = +100^\circ\text{C}$			
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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	197	W
$T_C = +100^\circ\text{C}$		99	
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	58.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case (Note 5)		0.76	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	1200	—	—	V	$V_{GS} = 0\text{V}, I_D = 100\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	50	μA	$V_{DS} = 1200\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 200	nA	$V_{GS} = +15/-4\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.7	2.5	3.5	V	$V_{DS} = V_{GS}, I_D = 5\text{mA}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	75	90	$\text{m}\Omega$	$V_{GS} = 15\text{V}, I_D = 20\text{A}$
Diode Forward Voltage	V_{SD}	—	4.5	—	V	$V_{GS} = -4\text{V}, I_S = 10\text{A}$
Transconductance	g_{fs}	—	5.0	—	S	$V_{DS} = 20\text{V}, I_D = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1078	—	pF	$V_{GS} = 0\text{V}, V_{DS} = 1000\text{V}$ $V_{AC} = 25\text{mV}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	57	—		
Reverse Transfer Capacitance	C_{rss}	—	4.9	—		
Coss Stored Energy	E_{oss}	—	34.2	—		
Turn-On Switching Energy (Body Diode FWD)	E_{ON}	—	175	—	μJ	$V_{GS} = -4\text{V}/+15\text{V}, V_{DS} = 800\text{V}$ $R_g = 5\Omega, I_D = 20\text{A}, L = 156\mu\text{H}$
Turn-Off Switching Energy (Body Diode FWD)	E_{OFF}	—	56	—		
Gate Resistance	R_g	—	2.79	—	Ω	$V_{AC} = 100\text{mV}, f = 1\text{MHz}$
Total Gate Charge	Q_g	—	54.6	—	nC	$V_{GS} = -4\text{V}/+15\text{V}, V_{DS} = 800\text{V}$ $I_D = 20\text{A}$
Gate-Source Charge	Q_{gs}	—	16.5	—		
Gate-Drain Charge	Q_{gd}	—	22.4	—		
Turn-On Delay Time	$t_{D(ON)}$	—	9.1	—	ns	$V_{GS} = -4\text{V}/+15\text{V}, V_{DS} = 800\text{V}$ $R_g = 5\Omega, I_D = 20\text{A}$ 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	$V_{GS} = -4\text{V}, V_{DS} = 800\text{V}$ $I_F = 20\text{A}, di/dt = 3600\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	108	—		
Body Diode Reverse Recovery Current	I_{RRM}	—	18.8	—		

Notes:

- Device mounted on an infinite heatsink.
- Drain current limited by maximum junction temperature.
- Device mounted on FR-4 substrate PC board, 2oz. copper, with minimum recommended pad layout.
- Short duration pulse test used to minimize self-heating effect.
- Guaranteed by design. Not subject to production testing.

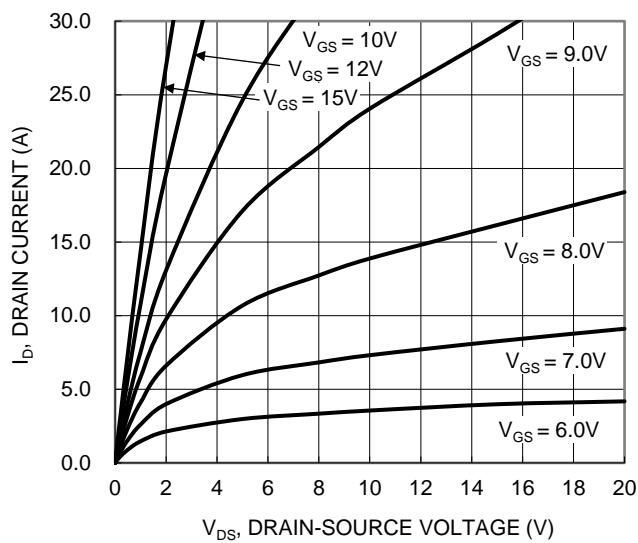


Figure 1. Typical Output Characteristic

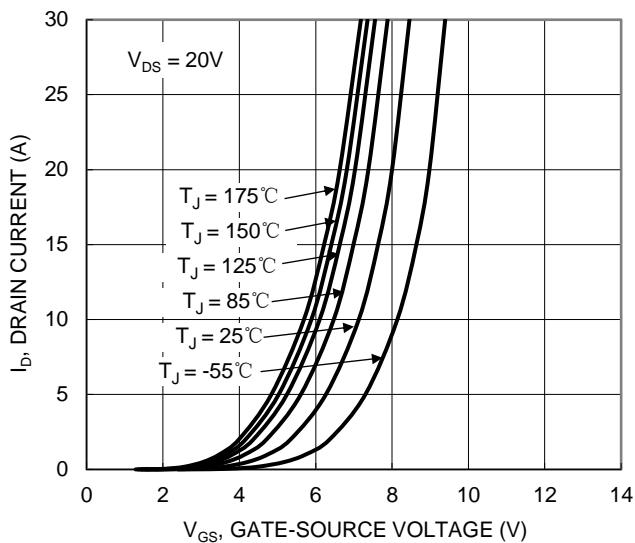


Figure 2. Typical Transfer Characteristic

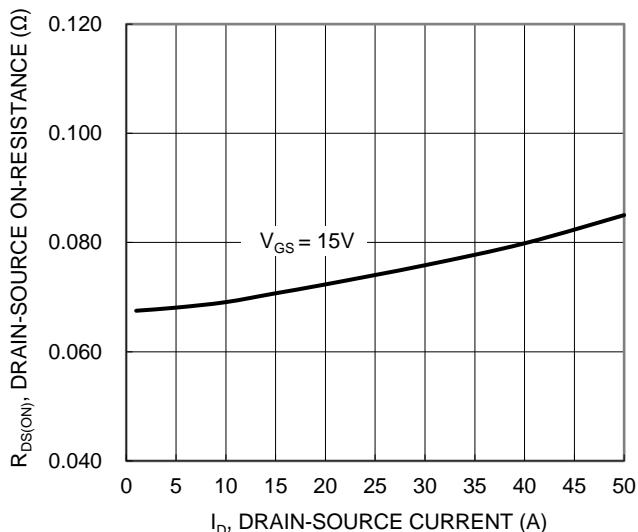


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

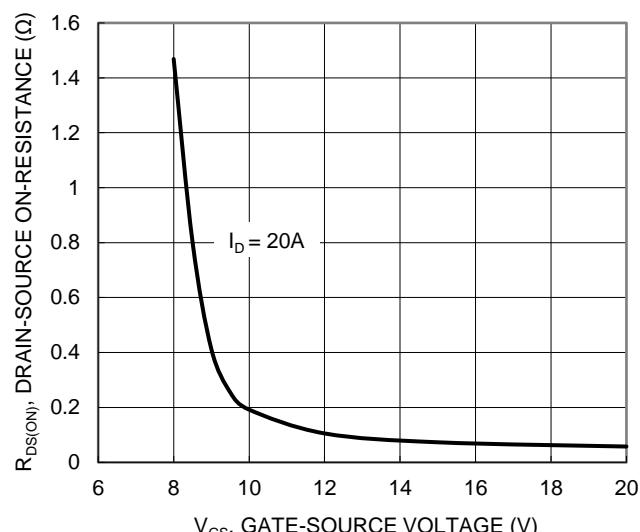


Figure 4. Typical Transfer Characteristic

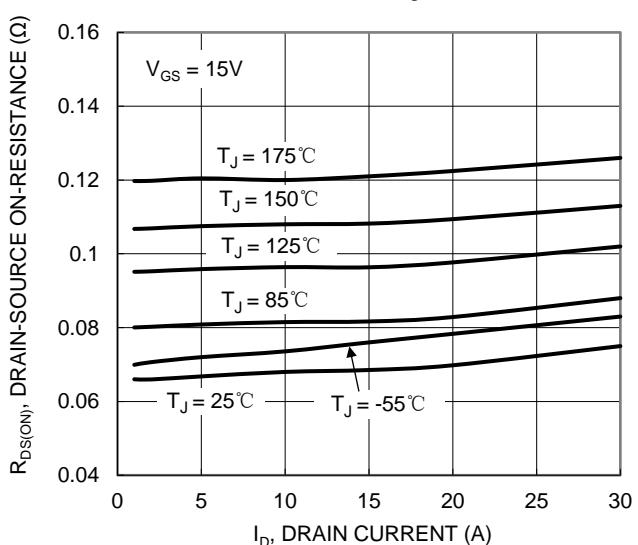


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

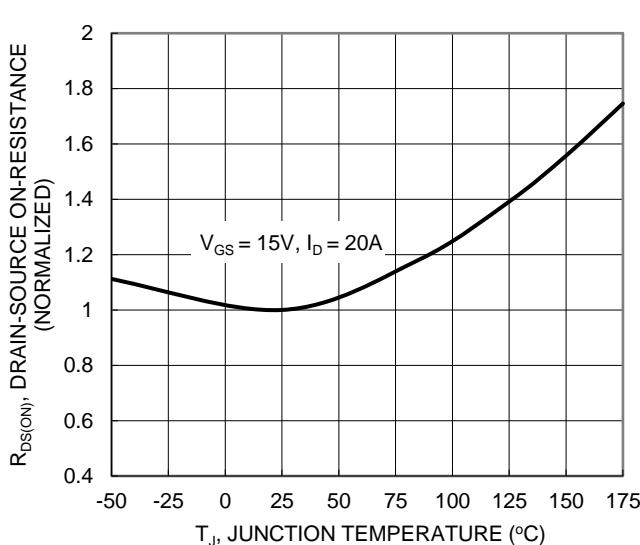


Figure 6. On-Resistance Variation with Junction Temperature

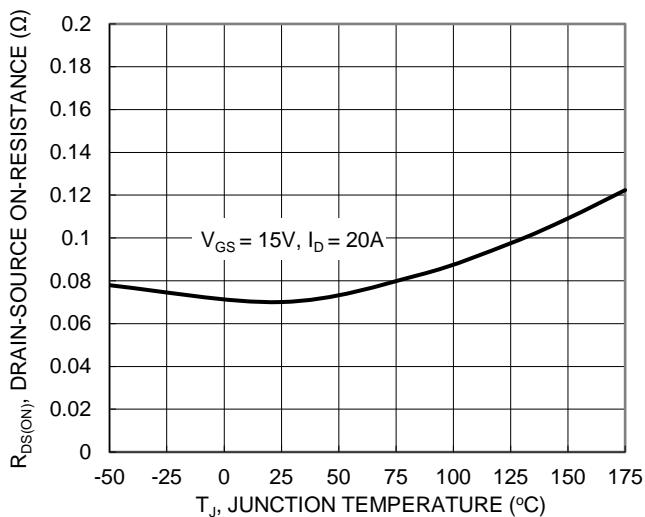


Figure 7. On-Resistance Variation with Junction Temperature

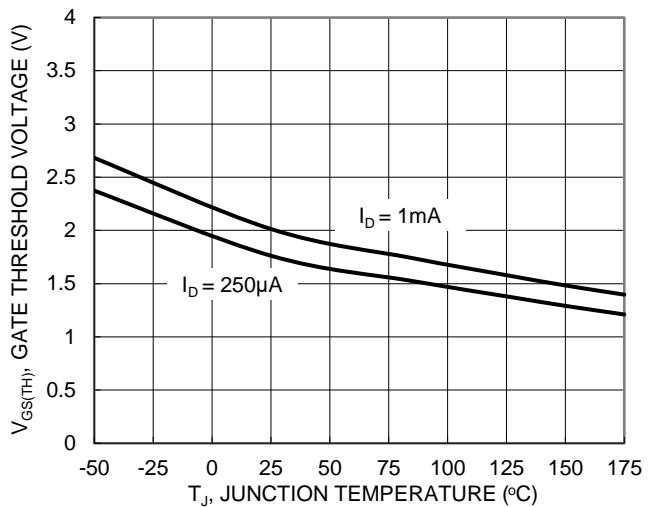


Figure 8. Gate Threshold Variation vs. Junction Temperature

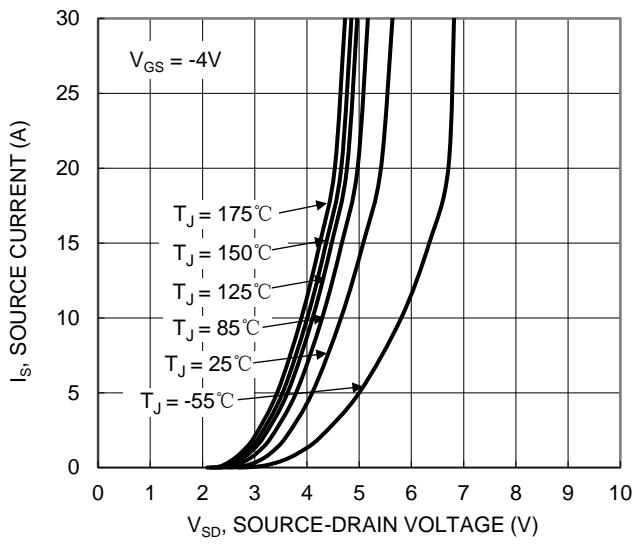


Figure 9. Diode Forward Voltage vs. Current

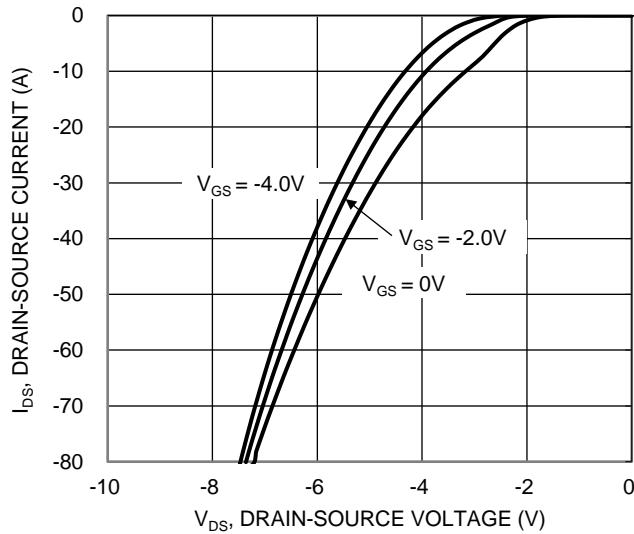


Figure 10. Body Diode Characteristic at 25°C

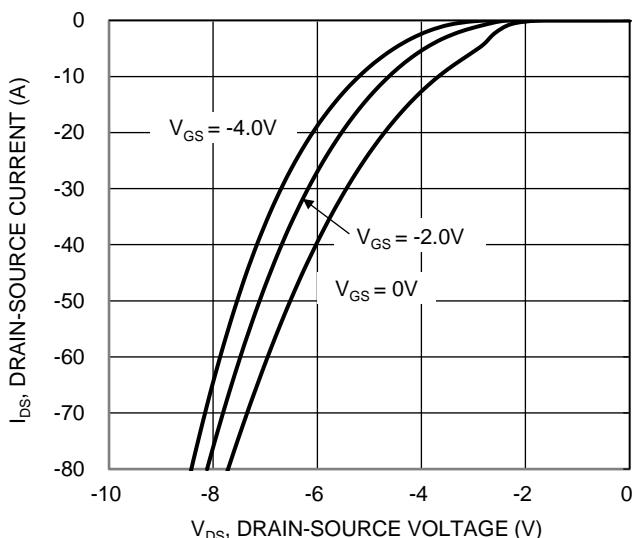


Figure 11. Body Diode Characteristic at -55°C

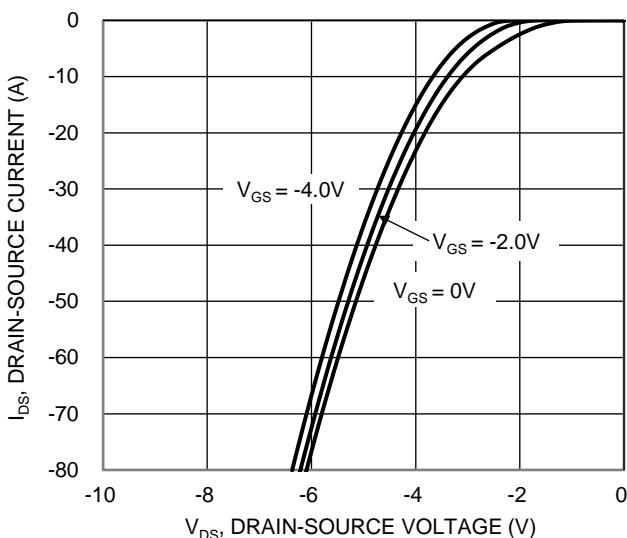
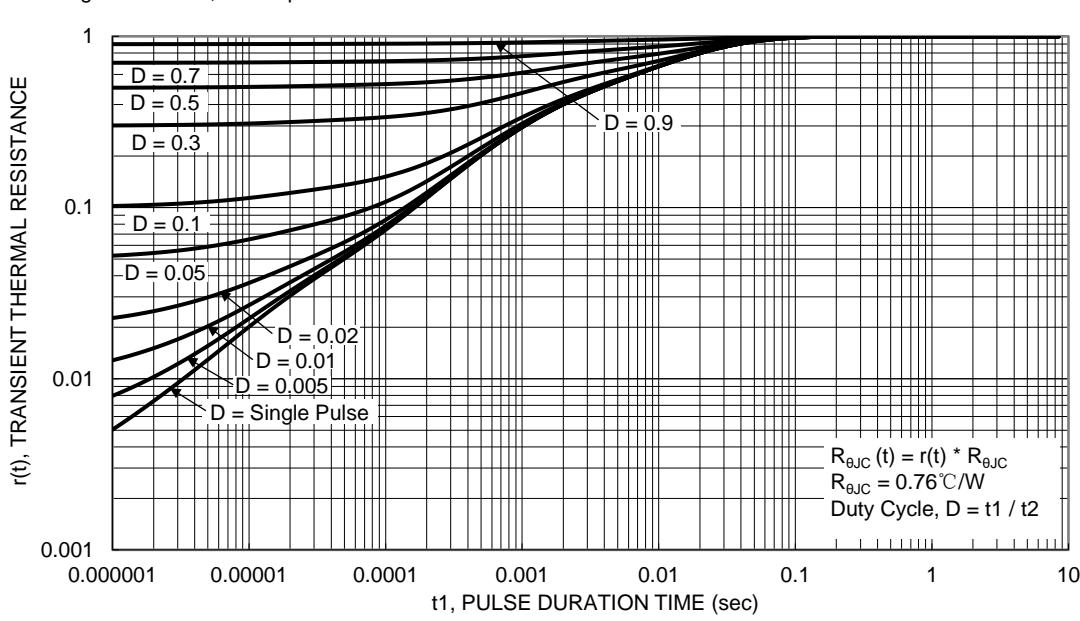
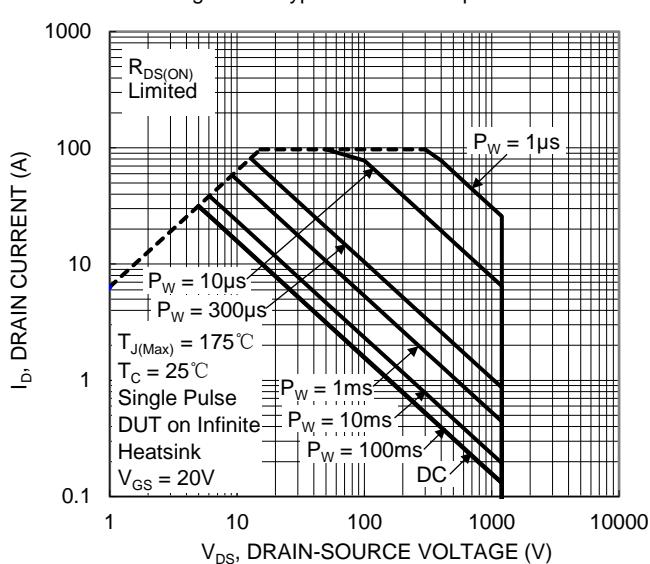
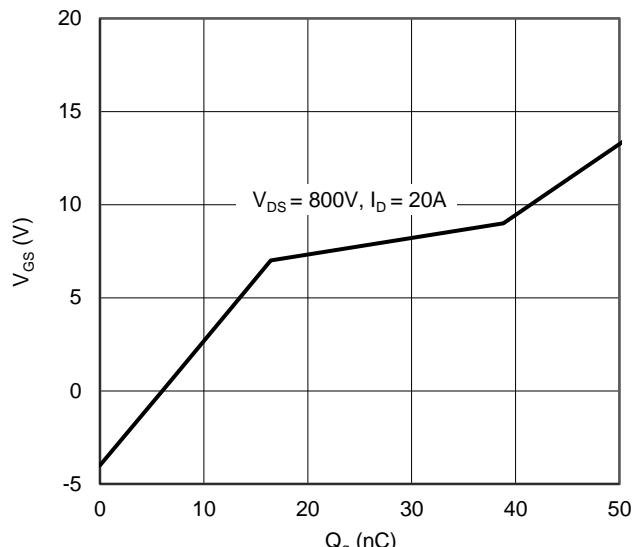
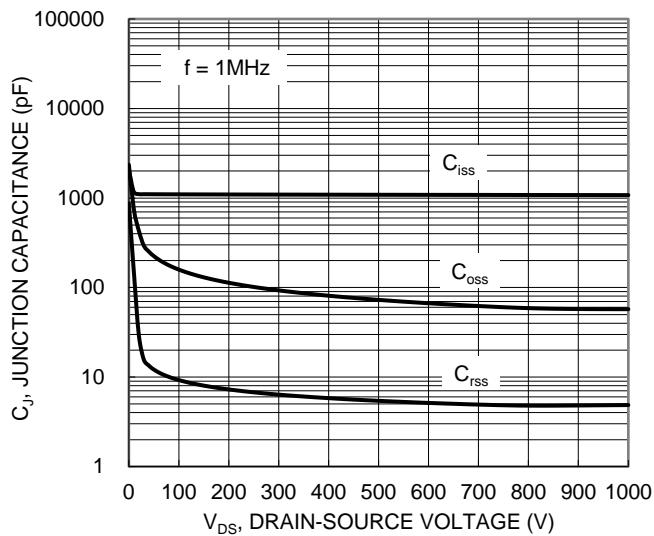


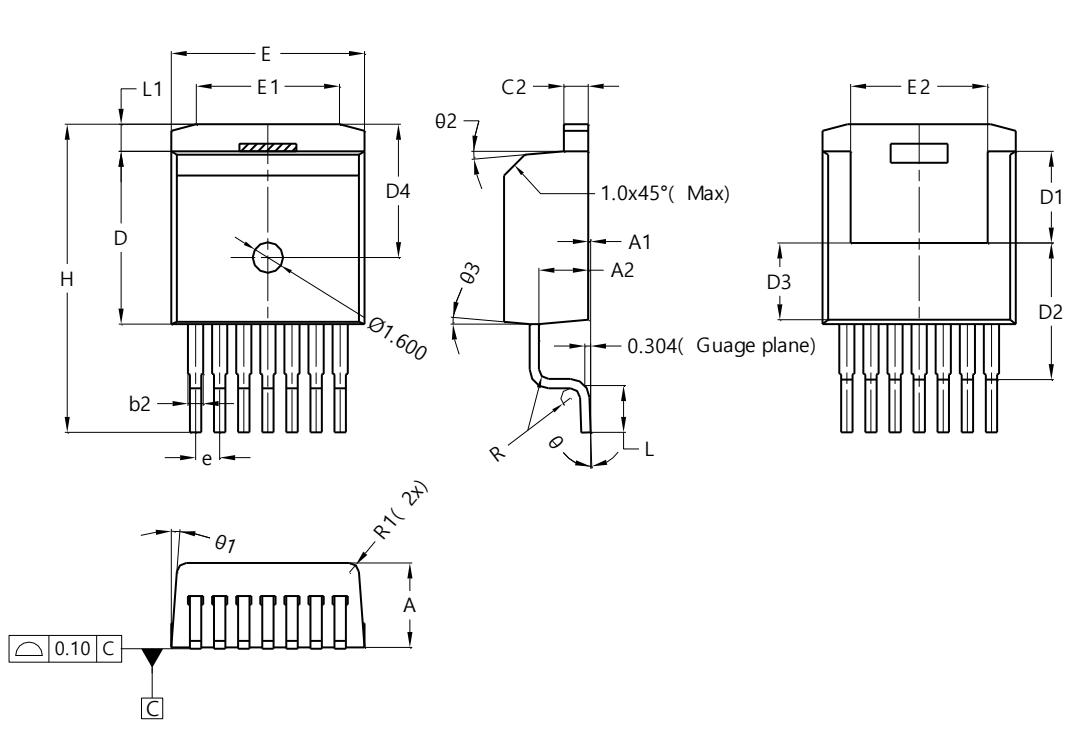
Figure 12. Body Diode Characteristic at 175°C



Package Outline Dimensions

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

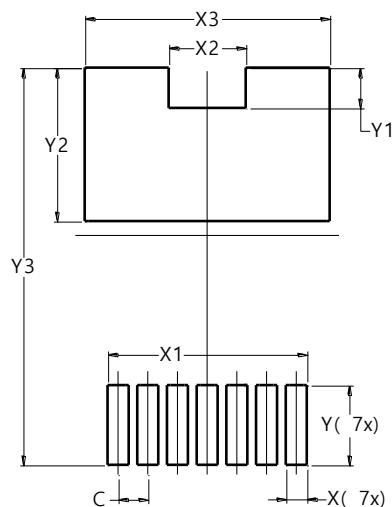
TO263-7



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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