

Product Summary

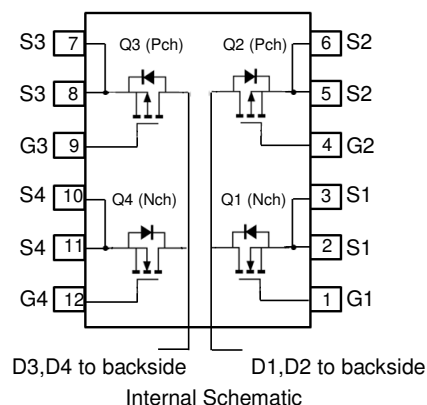
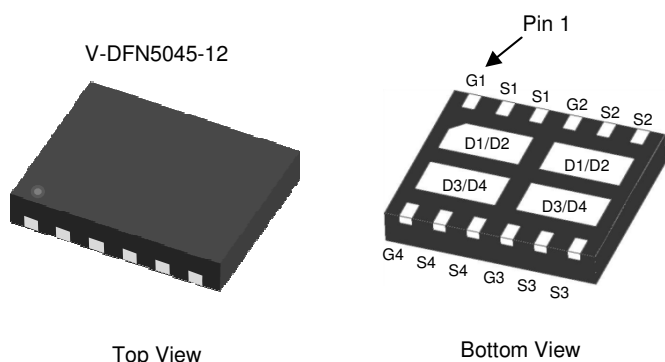
Device	V _{(BR)DSS}	R _{DS(ON)MAX}	I _D T _A = +25°C
Q1 & Q4	100V	160mΩ @ V _{GS} = 10V	2.9A
		200mΩ @ V _{GS} = 4.5V	2.6A
Q2 & Q3	-100V	250mΩ @ V _{GS} = -10V	-2.3A
		300mΩ @ V _{GS} = -4.5V	-2.1A

Description

This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

Applications

- High-Efficiency Bridge Rectifiers

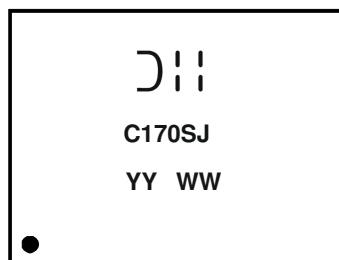


Ordering Information (Note 4)

Part Number	Case	Tape Width	Packaging
DMHC10H170SFJ-13	V-DFN5045-12	12mm	3,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



DII = Manufacturer's Marking
 C170SJ = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 14 = 2014)
 WW = Week Code (01 to 53)

Maximum Ratings Q1 & Q4 N-Channel (@T_A = +25 °C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	100	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = 10V	Steady State	T _C = +25 °C	I _D	9.3	A
		T _A = +25 °C		2.9	
Maximum Body Diode Forward Current (Note 5)			I _S	2.5	A
Pulsed Drain Current (10μs pulse, Duty Cycle = 1%)			I _{DM}	10.1	A

Maximum Ratings Q2 & Q3 P-Channel (@T_A = +25 °C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-100	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = -10V	Steady State	T _C = +25 °C	I _D	-7.4	A
		T _A = +25 °C		-2.3	
Maximum Body Diode Forward Current (Note 5)			I _S	-2.4	A
Pulsed Drain Current (10μs pulse, Duty Cycle = 1%)			I _{DM}	-9.1	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	20	W
	T _A = +25 °C		2.1	
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	60	°C/W
Thermal Resistance, Junction to Case (Note 5)		R _{θJC}	6	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Note: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1 inch square copper pad layout.

Electrical Characteristics Q1 & Q4 N-Channel (@T_A = +25 °C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	100	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 80V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	2.0	3.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	111	160	mΩ	V _{GS} = 10V, I _D = 5A
		—	121	200		V _{GS} = 4.5V, I _D = 5A
Diode Forward Voltage	V _{SD}	—	0.9	1.0	V	V _{GS} = 0V, I _S = 10A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	1,167	—	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	36	—		
Reverse Transfer Capacitance	C _{rss}	—	25	—		
Gate Resistance	R _G	—	1.3	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	4.9	—	nC	V _{DS} = 80V, I _D = 12.8A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	9.7	—		
Gate-Source Charge	Q _{gs}	—	2.0	—		
Gate-Drain Charge	Q _{gd}	—	2.0	—		
Turn-On Delay Time	t _{D(ON)}	—	10.5	—	ns	V _{DD} = 50V, R _G = 25Ω, I _D = 12.8A
Turn-On Rise Time	t _R	—	11.1	—		
Turn-Off Delay Time	t _{D(OFF)}	—	42.6	—		
Turn-Off Fall Time	t _F	—	12.8	—		
Body Diode Reverse Recovery Time	t _{RR}	—	30.3	—	ns	V _{GS} = 0V, I _S = 12.8A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	35.2	—	nC	V _{GS} = 0V, I _S = 12.8A, dI/dt = 100A/μs

Electrical Characteristics Q2 & Q3 P-Channel (@T_A = +25 °C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	-100	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = -80V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(TH)}	-1.0	-1.6	-3.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	191	250	mΩ	V _{GS} = -10V, I _D = -5A
		—	213	300		V _{GS} = -4.5V, I _D = -5A
Diode Forward Voltage	V _{SD}	—	-0.9	-1.2	V	V _{GS} = 0V, I _S = -5A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	1,239	—	pF	V _{DS} = -25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	42	—		
Reverse Transfer Capacitance	C _{rss}	—	28	—		
Gate Resistance	R _G	—	13	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	8.4	—	nC	V _{DS} = -60V, I _D = -5A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	17.5	—		
Gate-Source Charge	Q _{gs}	—	2.8	—		
Gate-Drain Charge	Q _{gd}	—	3.2	—		
Turn-On Delay Time	t _{D(ON)}	—	9.1	—	ns	V _{DD} = -50V, R _G = 9.1Ω, I _D = -5A
Turn-On Rise Time	t _R	—	14.9	—		
Turn-Off Delay Time	t _{D(OFF)}	—	57.4	—		
Turn-Off Fall Time	t _F	—	34.4	—		
Body Diode Reverse Recovery Time	t _{RR}	—	25.2	—	ns	V _{GS} = 0V, I _S = -5A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	24.5	—	nC	V _{GS} = 0V, I _S = -5A, dI/dt = 100A/μs

Notes: 6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

Typical Characteristics - N-CHANNEL

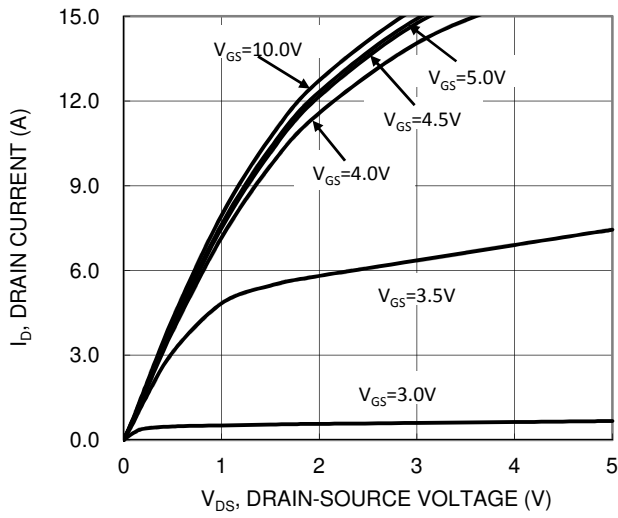


Figure 1. Typical Output Characteristic

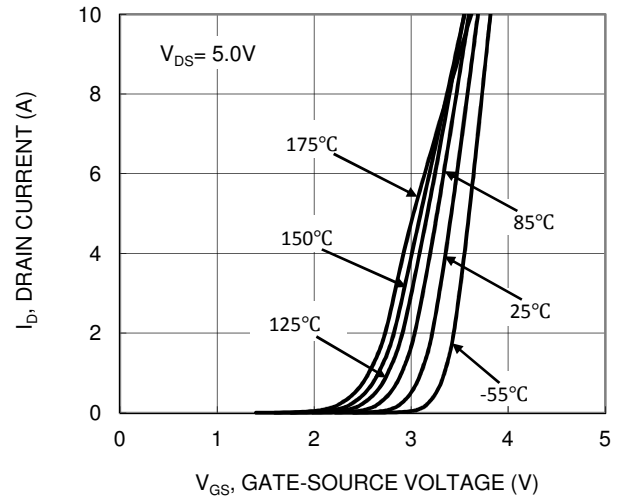


Figure 2 . Typical Transfer Characteristic

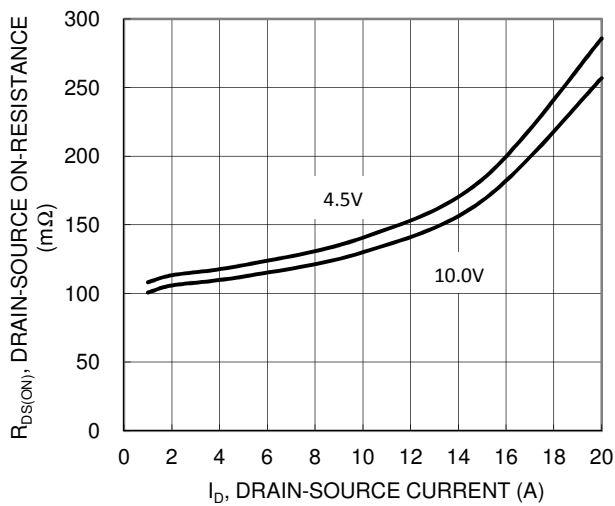


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

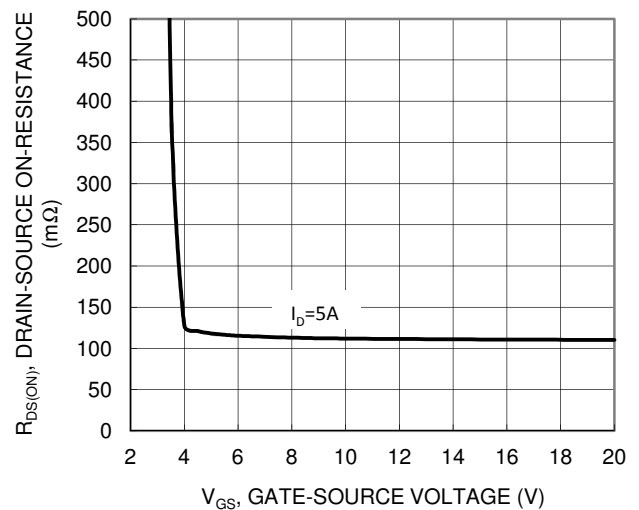


Figure 4. Typical Transfer Characteristic

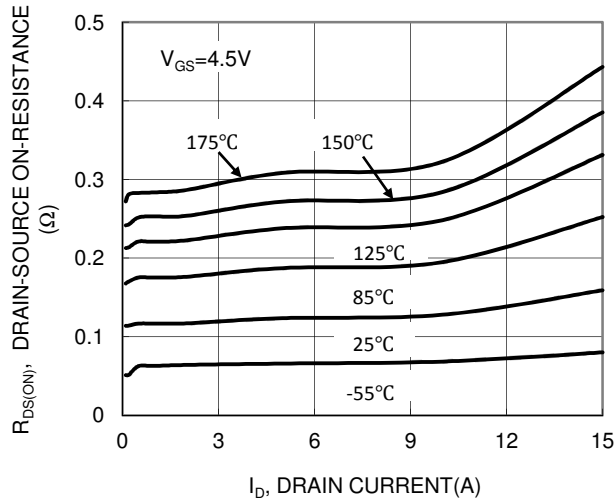


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

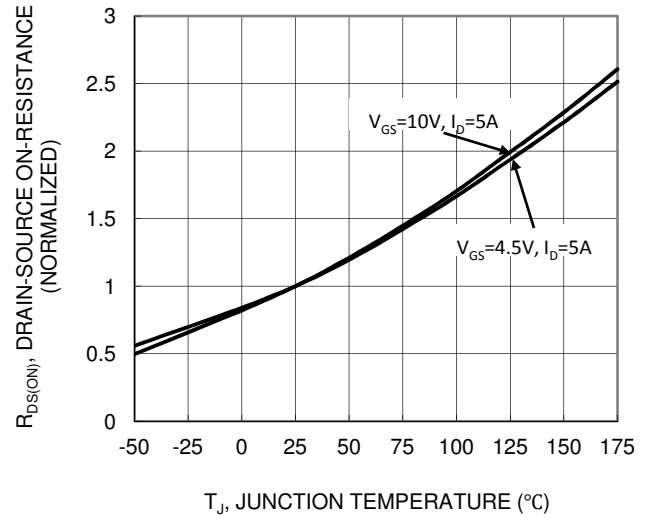


Figure 6. On-Resistance Variation with Temperature

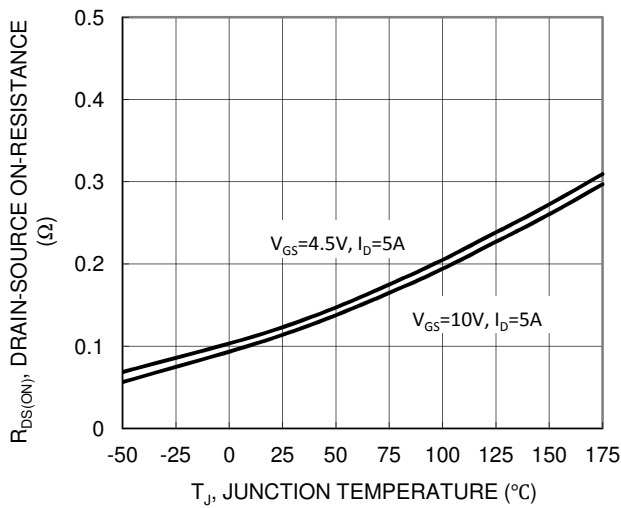


Figure 7. On-Resistance Variation with Temperature

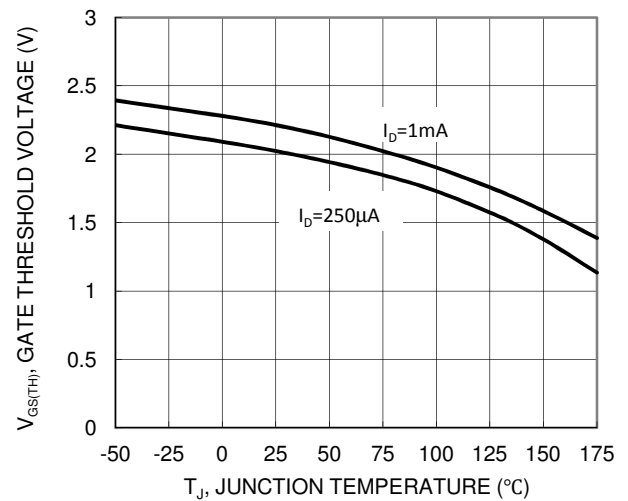


Figure 8. Gate Threshold Variation vs Ambient Temperature

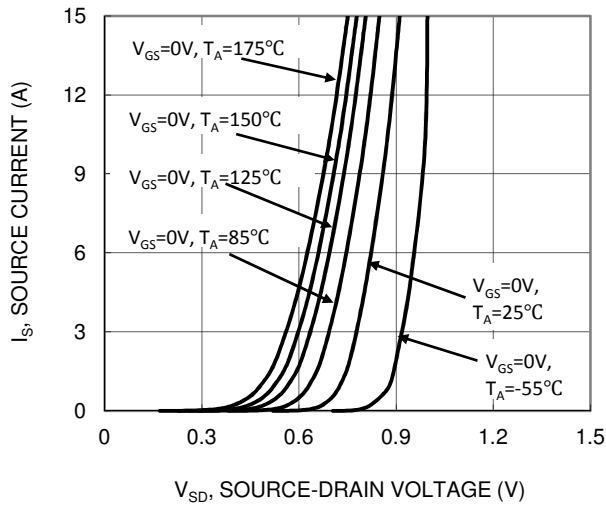


Figure 9. Diode Forward Voltage vs. Current

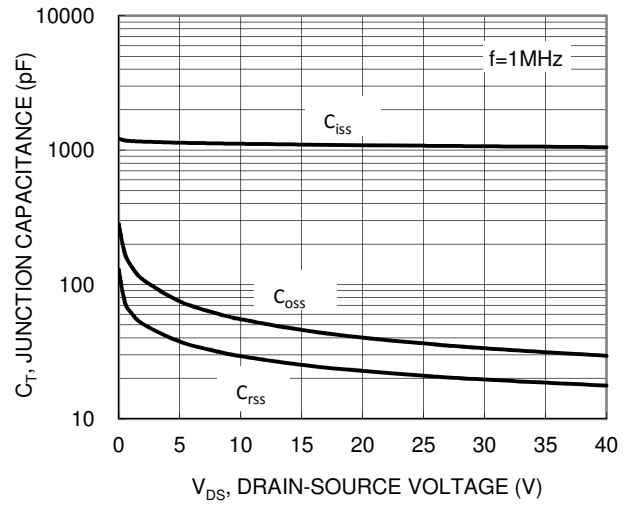


Figure 10. Typical Junction Capacitance

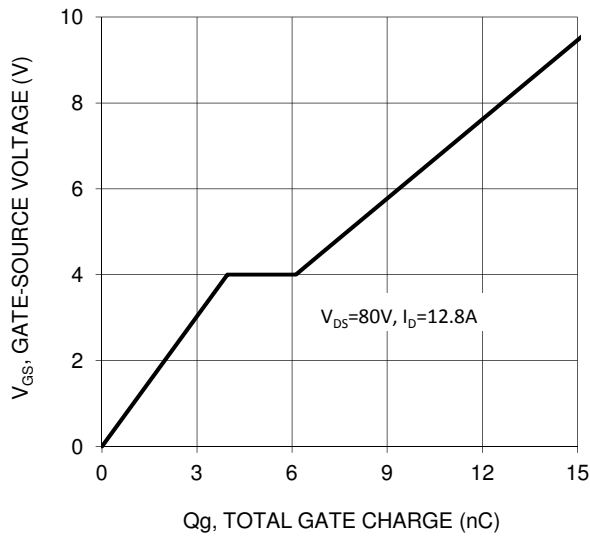


Figure 11. Gate Charge

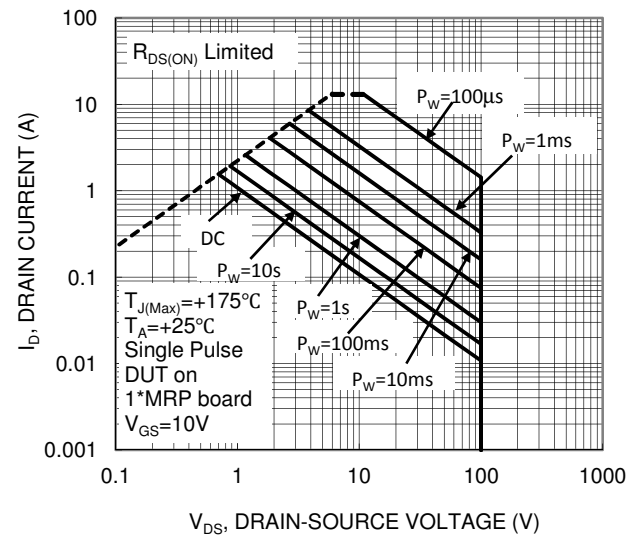


Figure 12. SOA, Safe Operation Area

Typical Characteristics - P-CHANNEL

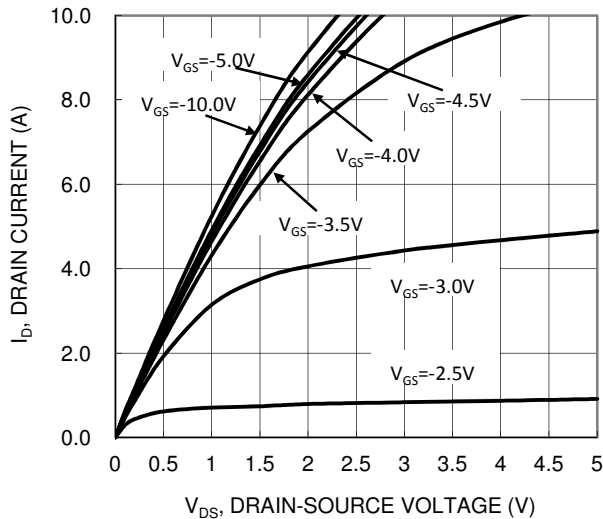


Figure 13. Typical Output Characteristic

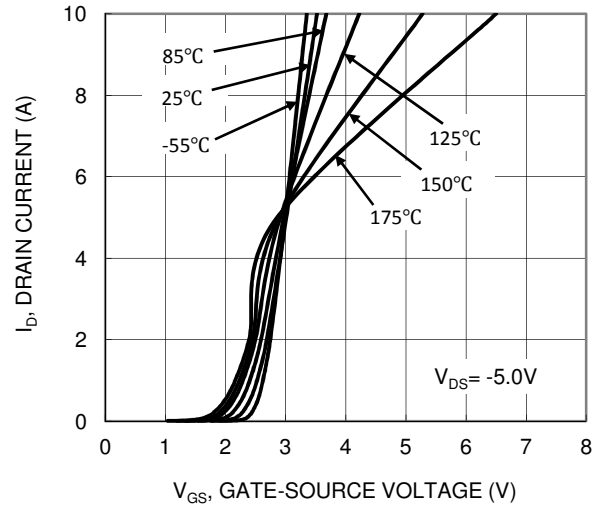


Figure 14. Typical Transfer Characteristic

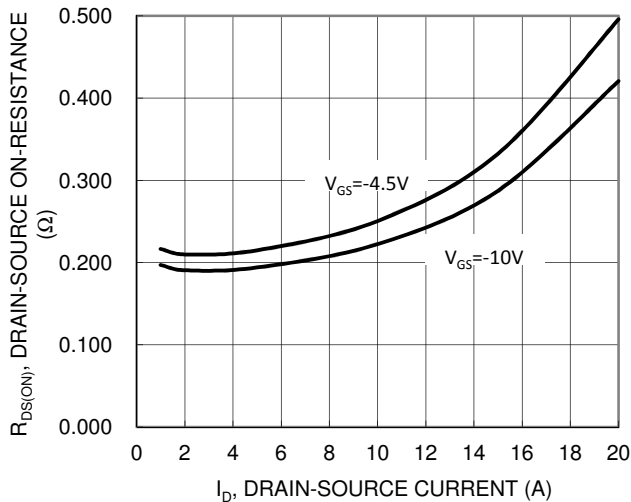


Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

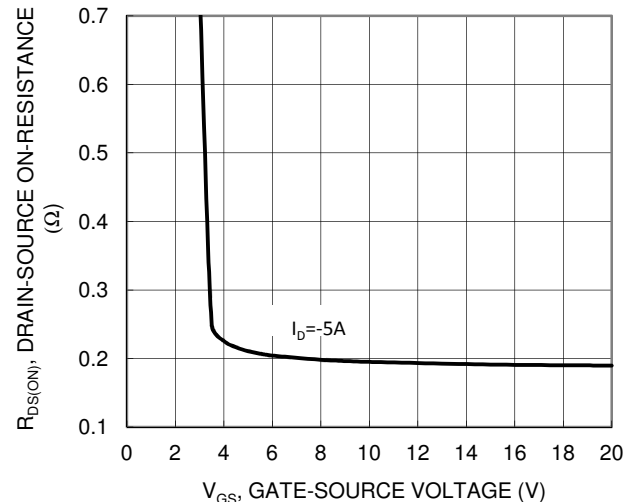


Figure 16. Typical Transfer Characteristic

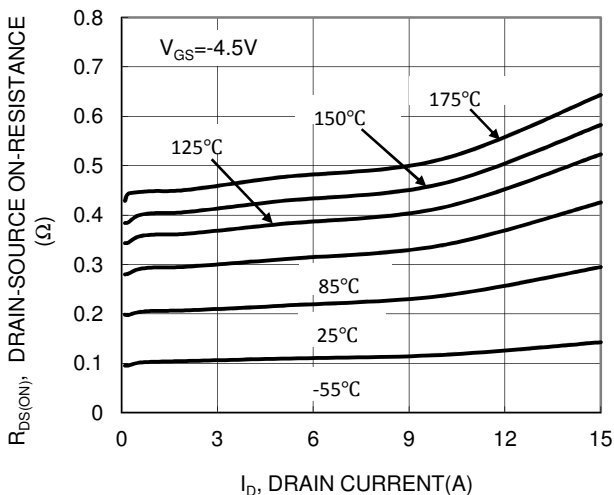


Figure 17. Typical On-Resistance vs Drain Current and Temperature

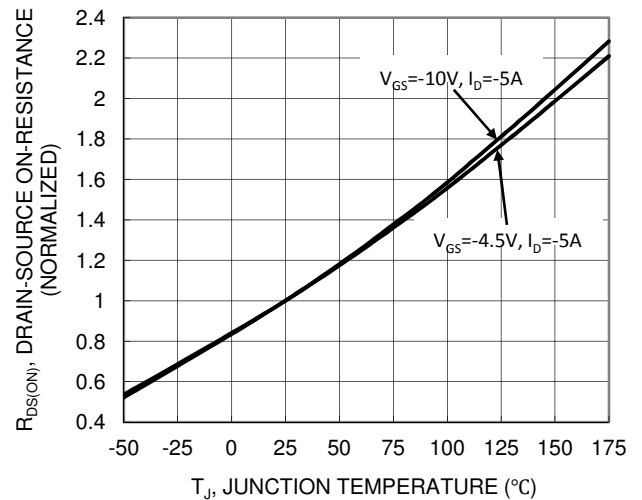
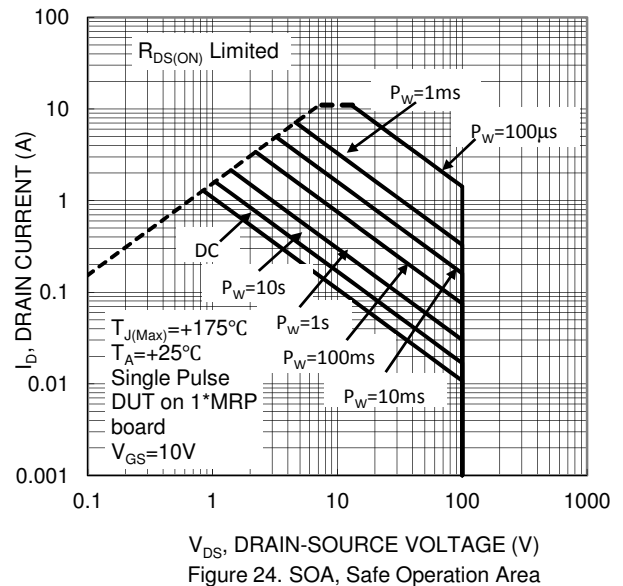
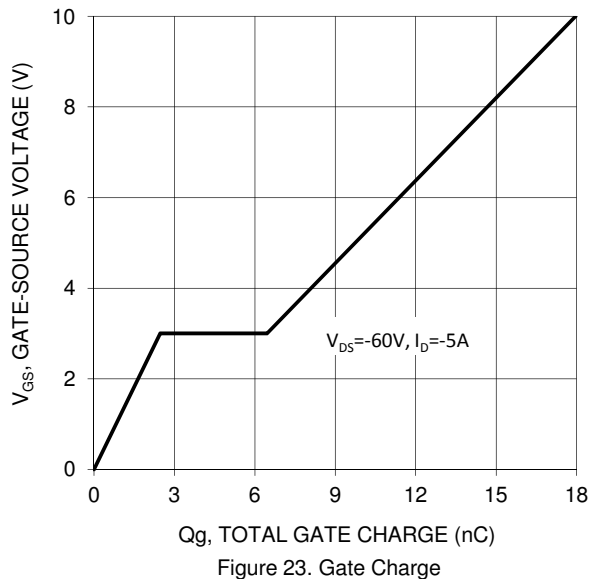
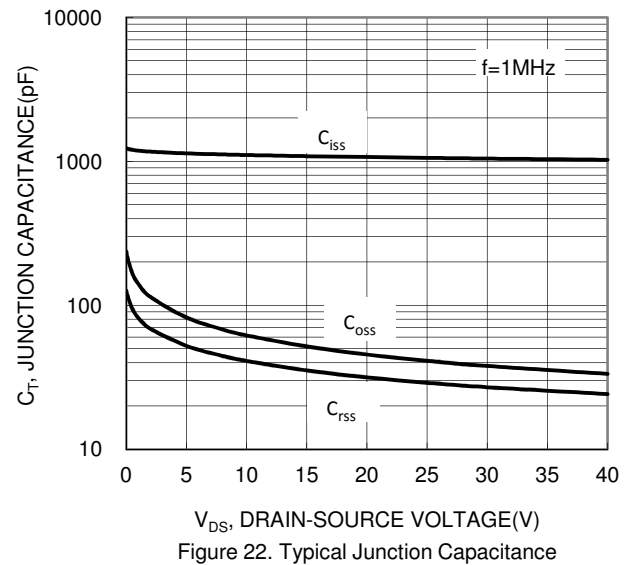
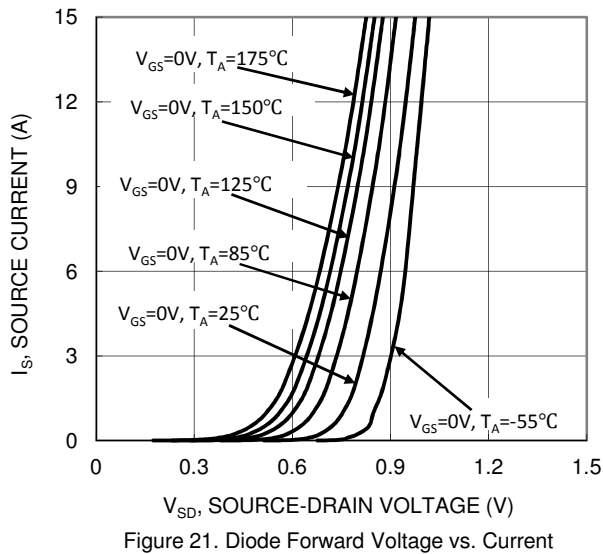
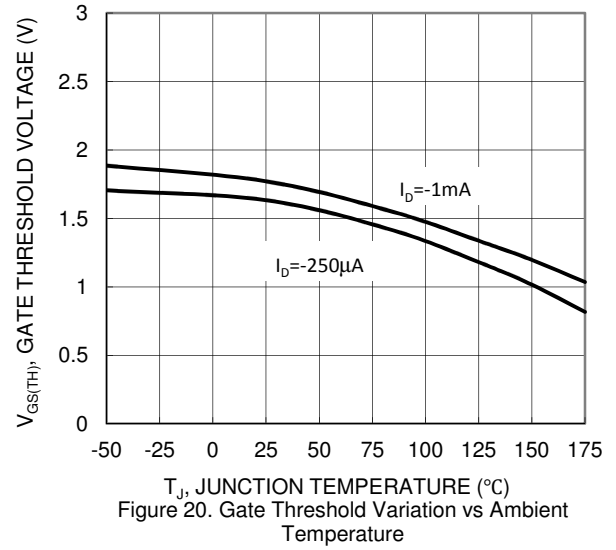
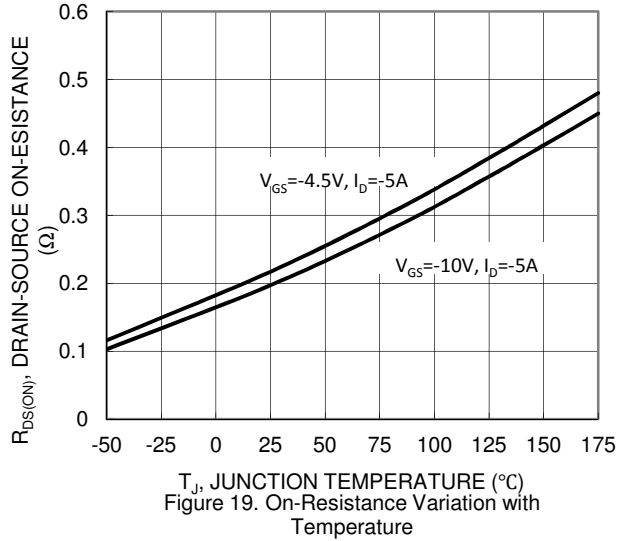
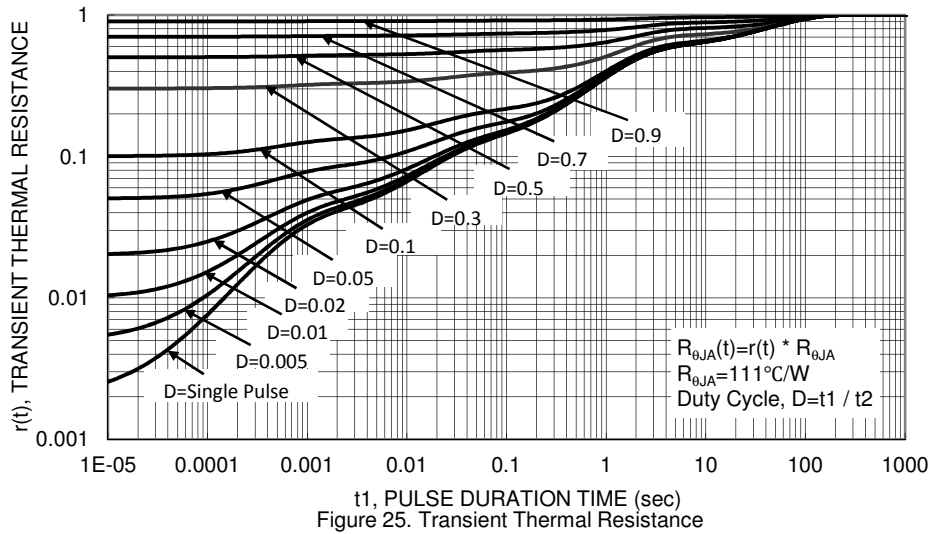


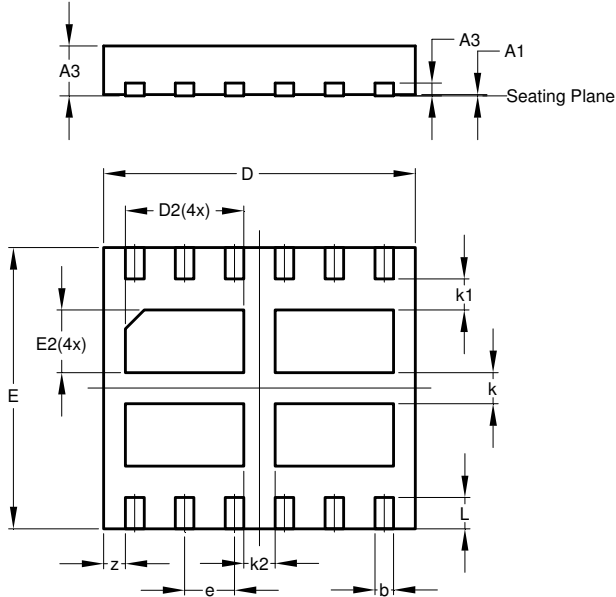
Figure 18. On-Resistance Variation with Temperature





Package Outline Dimensions

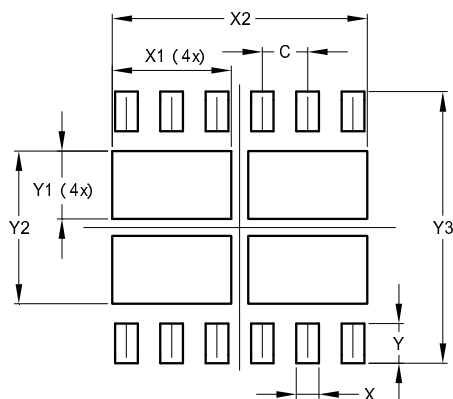
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



V-DFN5045-12			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.25	0.35	0.30
D	4.95	5.05	5.00
D2	1.80	2.00	1.90
E	4.45	4.55	4.50
E2	0.90	1.10	1.00
e	-	-	0.80
k	-	-	0.50
k1	-	-	0.50
k2	-	-	0.50
L	0.45	0.55	0.50
z	-	-	0.35
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	0.800
X	0.400
X1	2.100
X2	4.500
Y	0.700
Y1	1.200
Y2	2.700
Y3	4.800

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