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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	12.2 9.8	A
Continuous Drain Current (Note 6) V_{GS} = 2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	10.4 8.3	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	80	A
Maximum Body Diode Continuous Current			I_S	2.5	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	18	A
Repetitive Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	17	mJ

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 6)	P_D	2.1	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)	$R_{\theta JA}$	59.1	°C/W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	7.1	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°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_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1	µA	V_{DS} = 16V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±10V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	0.3	—	1.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	9.5	mΩ	V_{GS} = 4.5V, I_D = 10A
			—	10		V_{GS} = 4.0V, I_D = 10A
			—	10.5		V_{GS} = 3.5V, I_D = 9A
			—	11.5		V_{GS} = 3.1V, I_D = 9A
			—	13		V_{GS} = 2.5V, I_D = 8A
Diode Forward Voltage	V_{SD}	—	—	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2,248	—	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	295	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	265	—	pF	
Gate Resistance	R_g	—	1.5	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	24	—	nC	V_{DS} = 10V, I_D = 8.5A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	56	—	nC	
Gate-Source Charge	Q_{gs}	—	3.5	—	nC	
Gate-Drain Charge	Q_{gd}	—	5.1	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	3.6	—	ns	V_{DS} = 10V, I_D = 8.5A V_{GS} = 4.5V, R_G = 1.8Ω
Turn-On Rise Time	t_r	—	2.6	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	21.6	—	ns	
Turn-Off Fall Time	t_f	—	13.5	—	ns	
Body Diode Reverse Recovery Time	t_{rr}	—	12.8	—	nS	I_F = 8.5A, dI/dt = 210A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	6.9	—	nC	I_F = 8.5A, dI/dt = 210A/µs

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

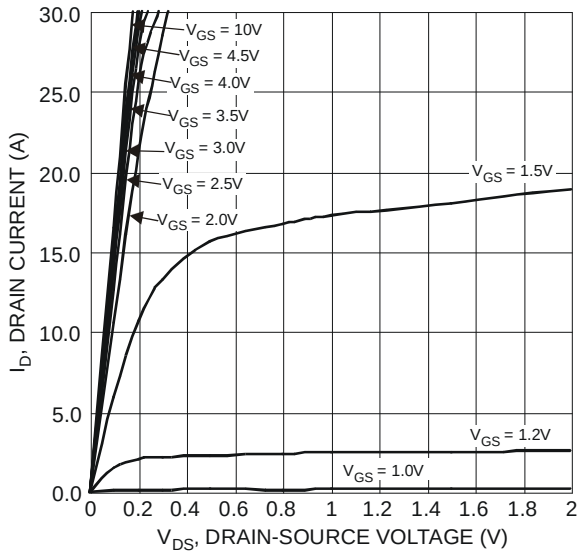


Figure 1 Typical Output Characteristics

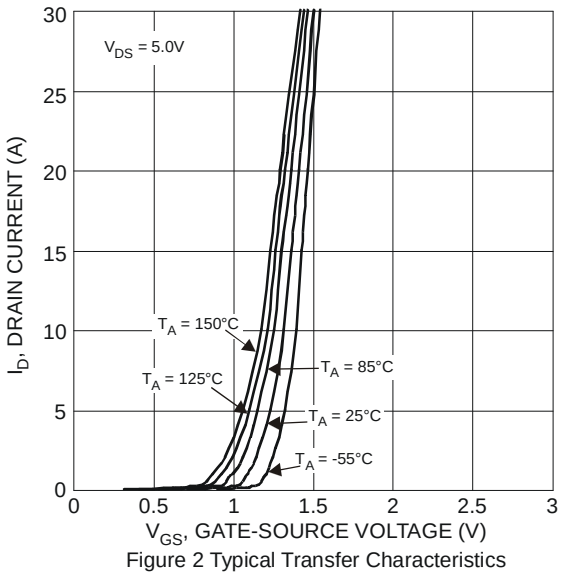


Figure 2 Typical Transfer Characteristics

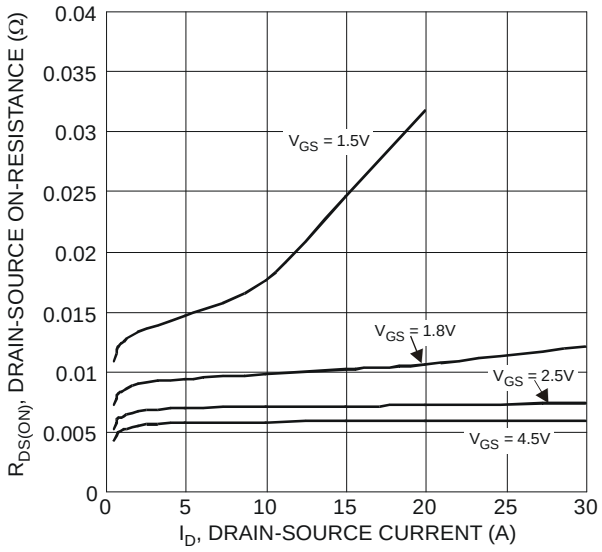


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

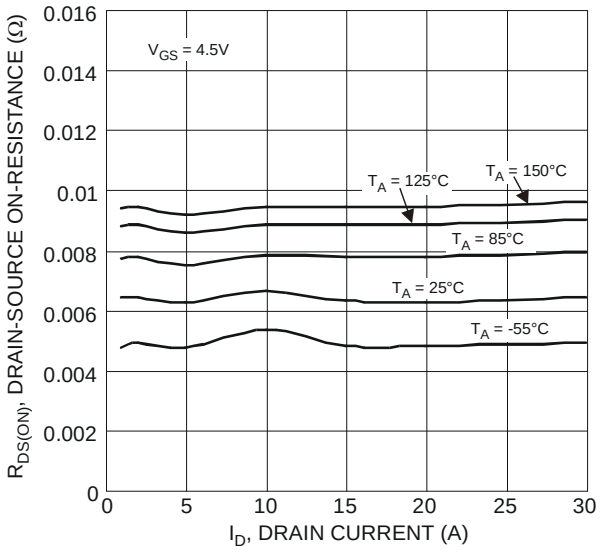


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

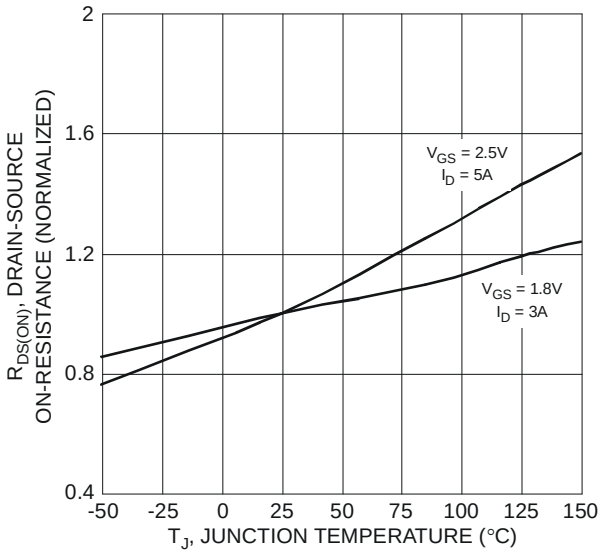


Figure 5 On-Resistance Variation with Temperature

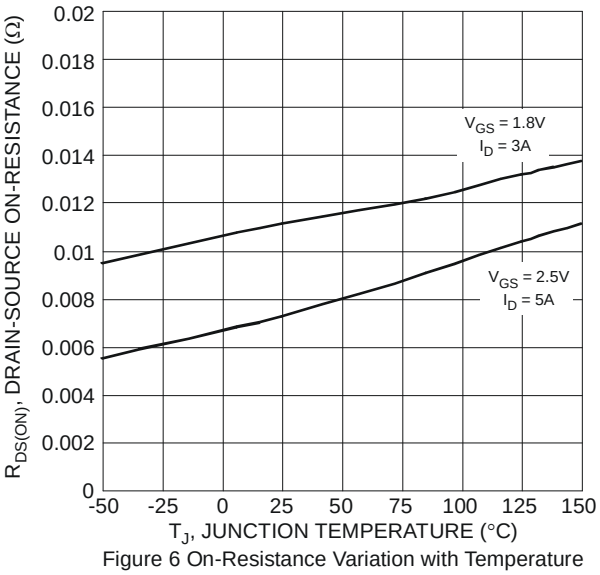


Figure 6 On-Resistance Variation with Temperature

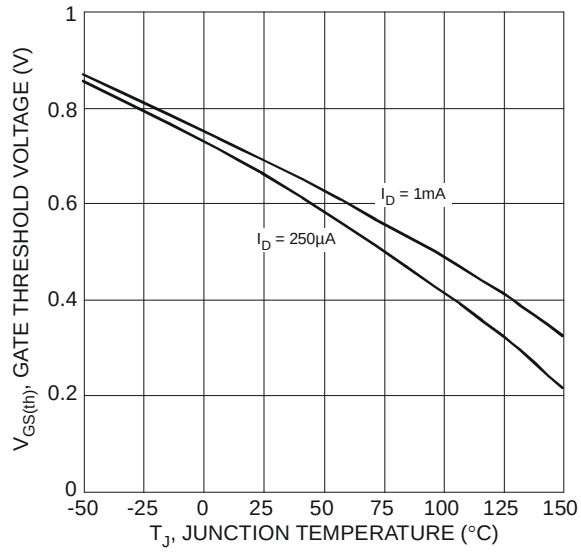


Figure 7 Gate Threshold Variation vs. Ambient Temperature

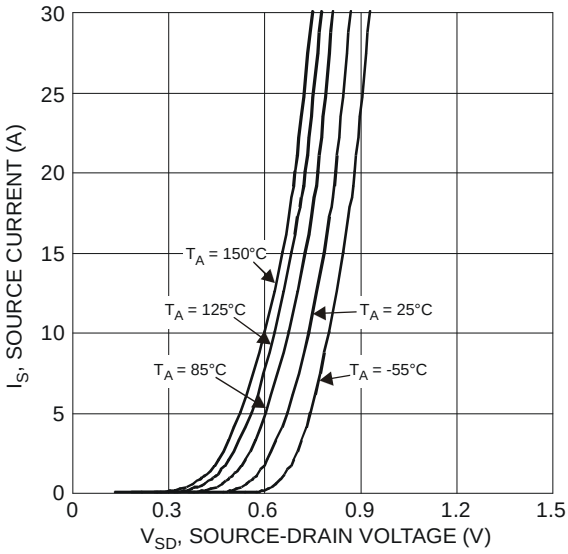


Figure 8 Diode Forward Voltage vs. Current

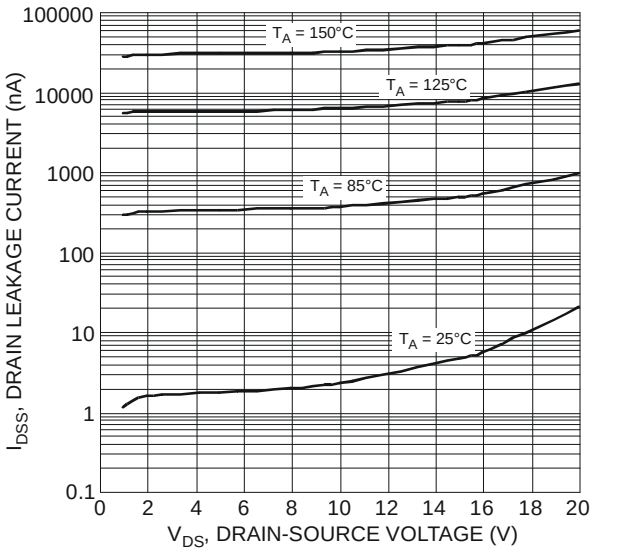


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

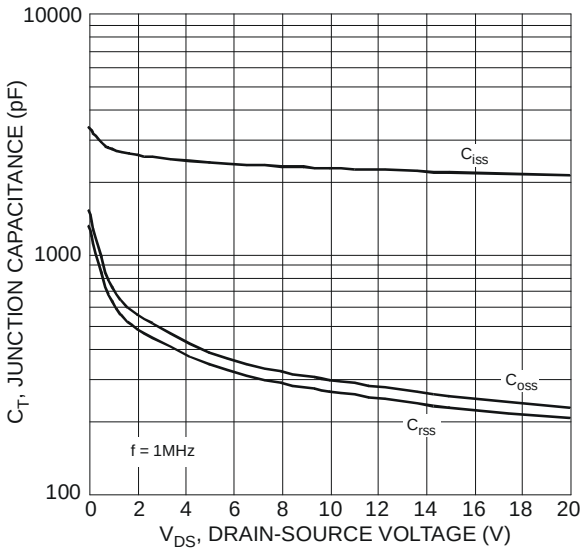


Figure 10 Typical Junction Capacitance

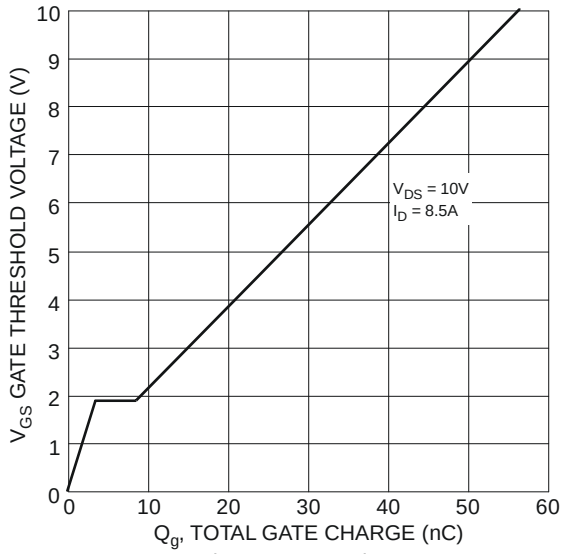


Figure 11 Gate Charge

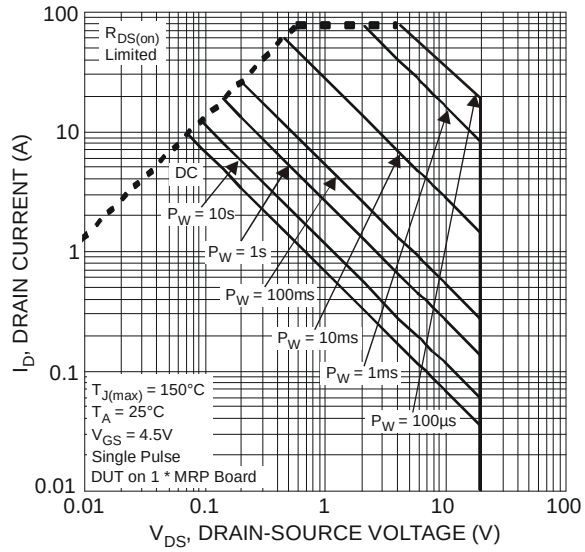


Figure 12 SOA, Safe Operation Area

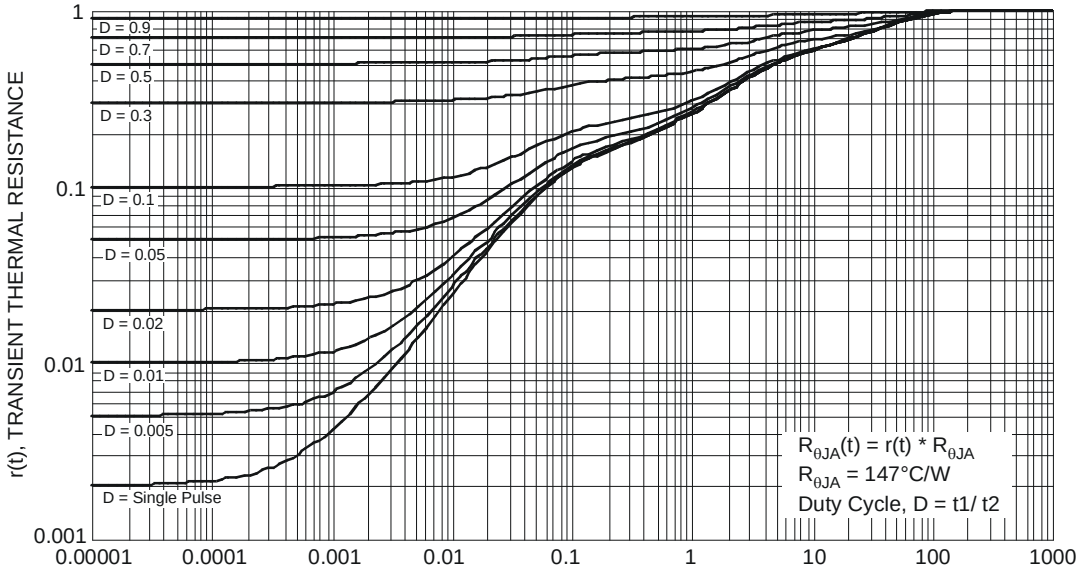
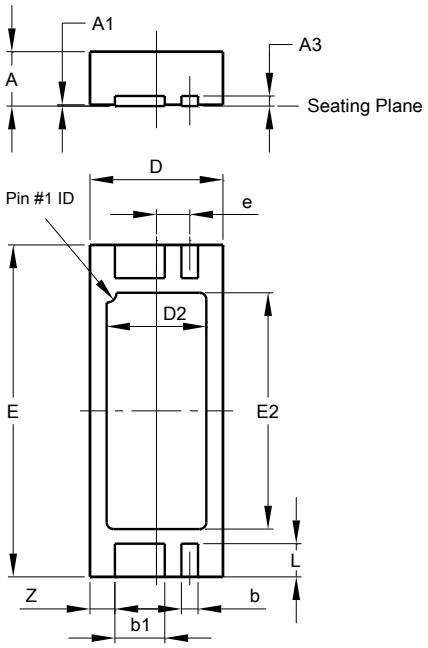


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

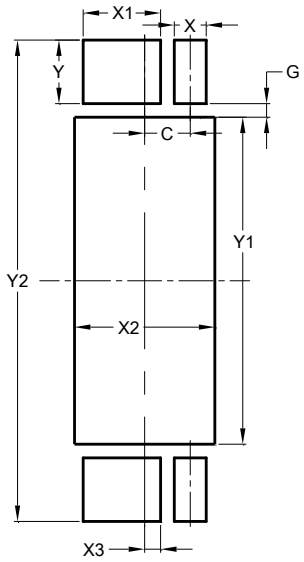
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



V-DFN2050-4			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.20	0.30	0.25
b1	0.70	0.80	0.75
D	1.90	2.10	2.00
D2	1.40	1.60	1.50
E	4.90	5.10	5.00
E2	3.46	3.66	3.56
e	0.50 BSC		
L	0.35	0.65	0.50
Z	-	-	0.375
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	0.500
G	0.150
X	0.350
X1	0.850
X2	1.540
X3	0.175
Y	0.700
Y1	3.600
Y2	5.300

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