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

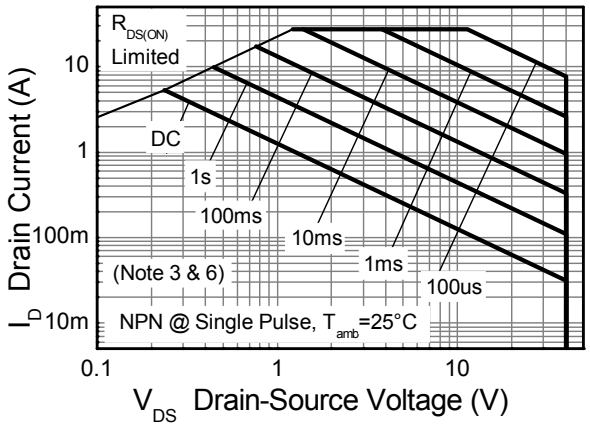
Characteristic			Symbol	N-Channel - Q1	P-Channel - Q2	Units
Drain-Source Voltage			V_{DSS}	40	-40	V
Gate-Source Voltage		(Note 5)	V_{GSS}	±20	±20	V
Continuous Drain Current	V_{GS} = 10V	(Notes 7 & 9)	I_D	7.2	5.2	A
		T_A = 70°C (Notes 7 & 9)		5.5	4.2	
		(Notes 6 & 9)		5.4	4	
		(Notes 6 & 10)		6.5	4.8	
Pulsed Drain Current	V_{GS} = 10V	(Notes 7 & 9)	I_{DM}	27.3	20.4	A
Continuous Source Current (Body diode)		(Notes 7 & 9)	I_S	3.35	3.15	A
Pulsed Source Current (Body diode)		(Notes 8 & 9)	I_{SM}	27.3	20.4	A

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

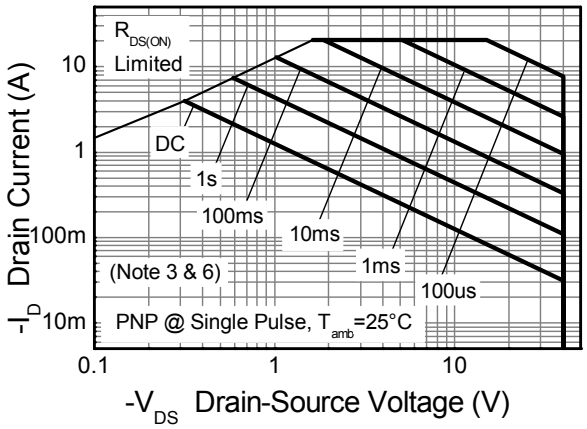
Characteristic		Symbol	N-Channel - Q1	P-Channel - Q2	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 9)	P_D	1.25 10		W mW/°C
	(Notes 6 & 10)		1.8 14.3		
	(Notes 7 & 9)		2.16 17.2		
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	$R_{\theta JA}$	100		°C/W
	(Notes 6 & 10)		70		
	(Notes 7 & 9)		58		
Thermal Resistance, Junction to Lead	(Notes 9 & 11)	$R_{\theta JL}$	53	53	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150		°C

Notes:
5. AEC-Q101 V_{GS} maximum is ±16V.
6. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
7. Same as note (5), except the device is measured at t ≤ 10 sec.
8. Same as note (5), except the device is pulsed with D= 0.02 and pulse width 300 µs. The pulse current is limited by the maximum junction temperature.
9. For a dual device with one active die.
10. For a device with two active die running at equal power.
11. Thermal resistance from junction to solder-point (at the end of the drain lead).

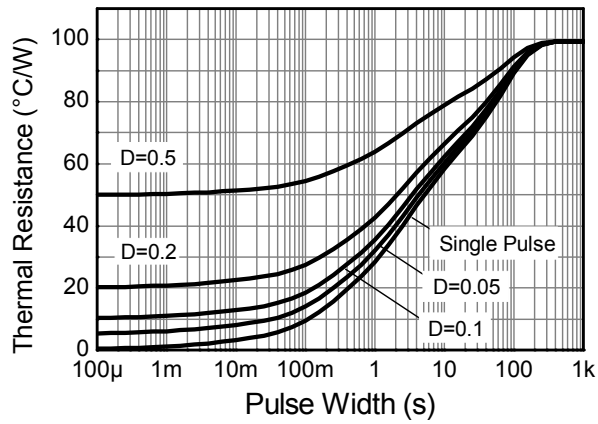
Thermal Characteristics



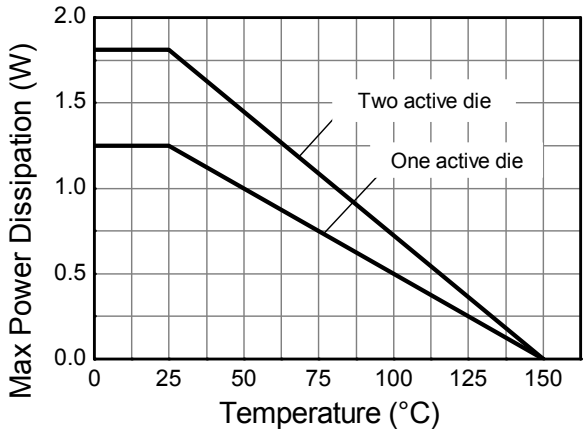
N-channel Safe Operating Area



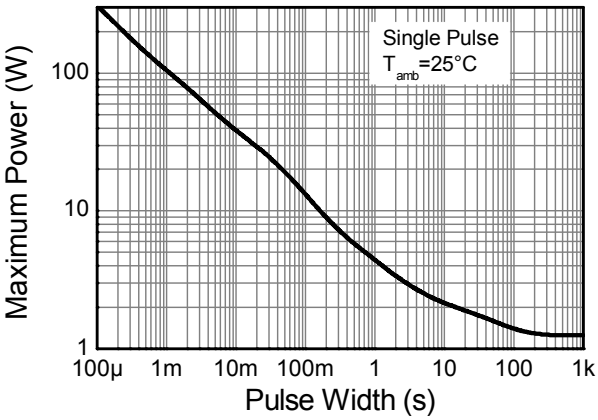
P-channel Safe Operating Area



Transient Thermal Impedance



Derating Curve



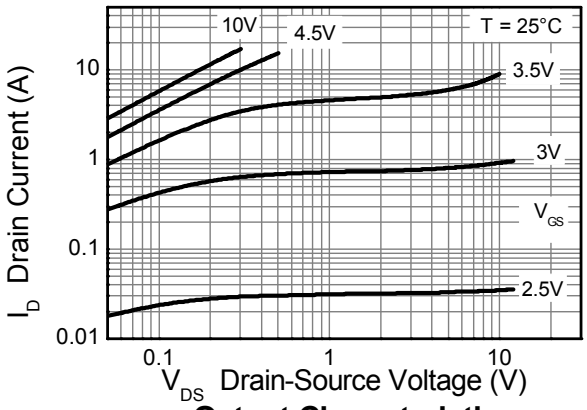
Pulse Power Dissipation

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

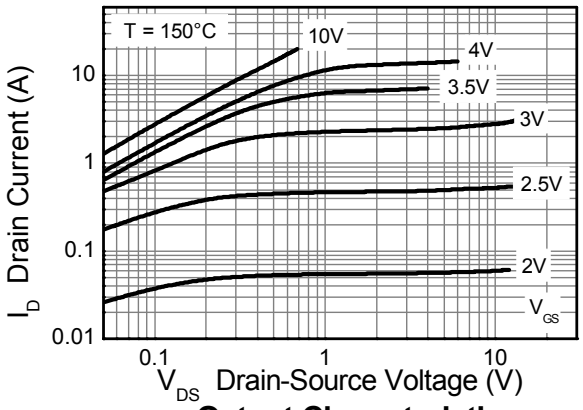
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	40	—	—	V	I_D = 250μA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	V_{DS} = 40V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	3.0	V	I_D = 250μA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 12)	$R_{DS\ (ON)}$	—	0.018	0.028	Ω	V_{GS} = 10V, I_D = 6A
			0.033	0.049		V_{GS} = 4.5V, I_D = 5A
Forward Transconductance (Notes 12 & 13)	g_{fs}	—	22.8	—	S	V_{DS} = 15V, I_D = 6A
Diode Forward Voltage (Note 12)	V_{SD}	—	0.845	1.1	V	I_S = 6A, V_{GS} = 0V
Reverse recovery time (Note 13)	t_{rr}		135	—	ns	I_S = 6A, di/dt = 100A/μs
Reverse recovery charge (Note 13)	Q_{rr}	—	799	—	nC	
DYNAMIC CHARACTERISTICS (Note 13)						
Input Capacitance	C_{iss}	—	604	—	pF	V_{DS} = 20V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	106	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	59.6	—	pF	
Total Gate Charge (Note 14)	Q_g	—	6.5	—	nC	V_{GS} = 4.5V; V_{DS} = 20V, I_D = 6A
Total Gate Charge (Note 14)	Q_g	—	12.9	—	nC	V_{GS} = 10V; V_{DS} = 20V, I_D = 6A
Gate-Source Charge (Note 14)	Q_{gs}	—	2.3	—	nC	V_{GS} = 10V; V_{DS} = 20V, I_D = 6A
Gate-Drain Charge (Note 14)	Q_{gd}	—	3.6	—	nC	V_{GS} = 10V; V_{DS} = 20V, I_D = 6A
Turn-On Delay Time (Note 14)	$t_{D(on)}$	—	4.2	—	ns	V_{DD} = 20V, V_{GS} = 10V I_D = 6A, $R_G \cong$ 6.0Ω
Turn-On Rise Time (Note 14)	t_r	—	12.4	—	ns	
Turn-Off Delay Time (Note 14)	$t_{D(off)}$	—	13.8	—	ns	
Turn-Off Fall Time (Note 14)	t_f	—	10.7	—	ns	

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
13. For design aid only, not subject to production testing.
14. Switching characteristics are independent of operating junction temperatures.

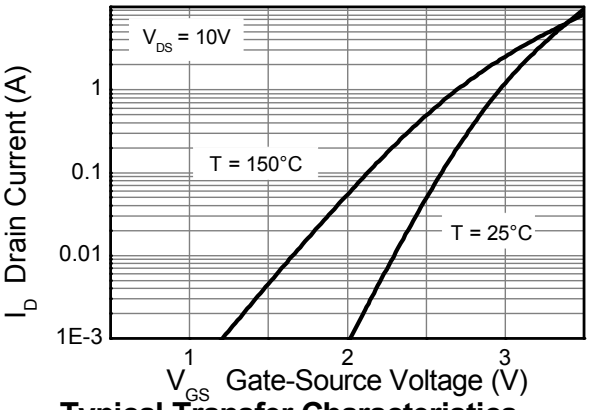
Typical Characteristics – Q1 N-Channel



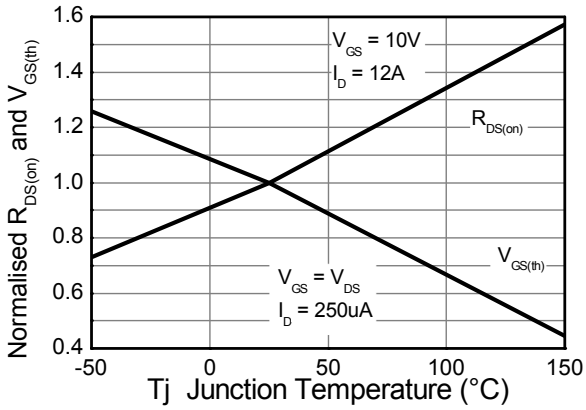
Output Characteristics



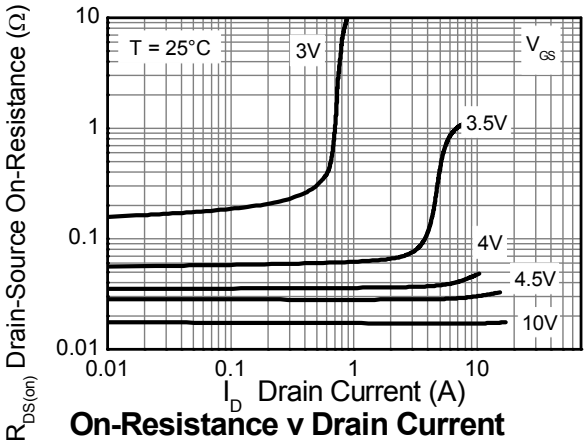
Output Characteristics



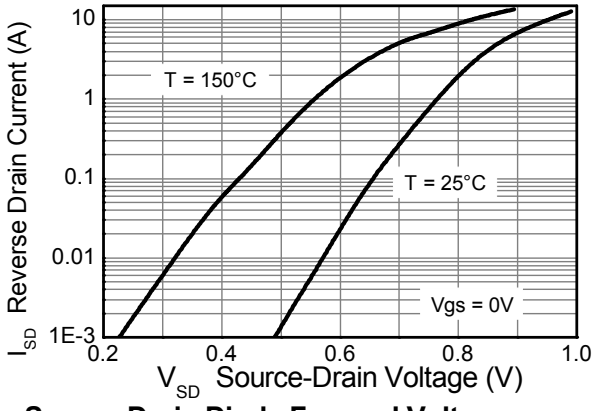
Typical Transfer Characteristics



Normalised Curves v Temperature

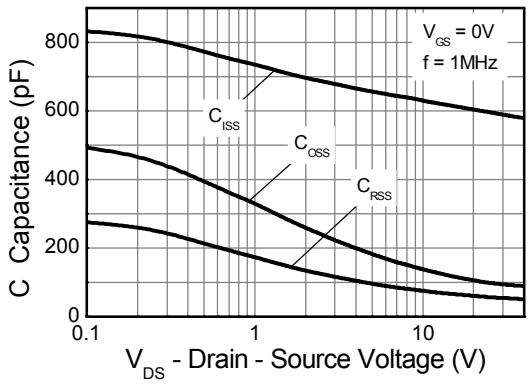


On-Resistance v Drain Current

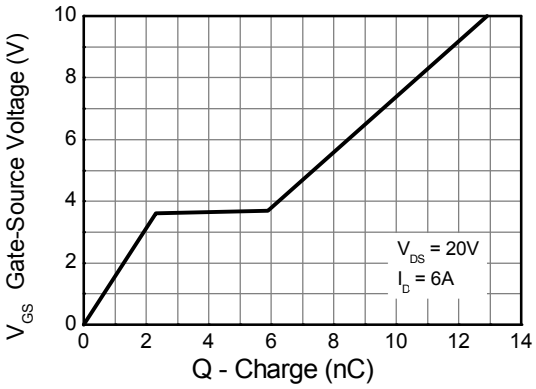


Source-Drain Diode Forward Voltage

Typical Characteristics – Q1 N-Channel - (cont.)

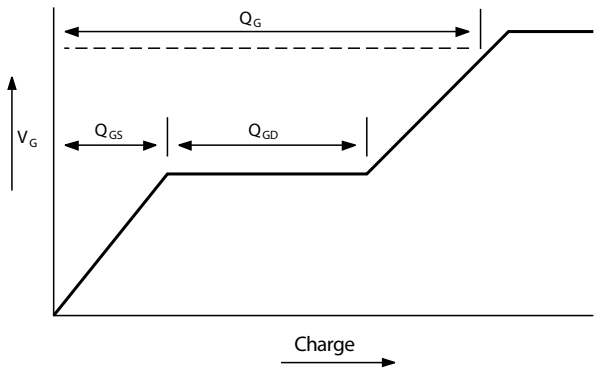


Capacitance v Drain-Source Voltage

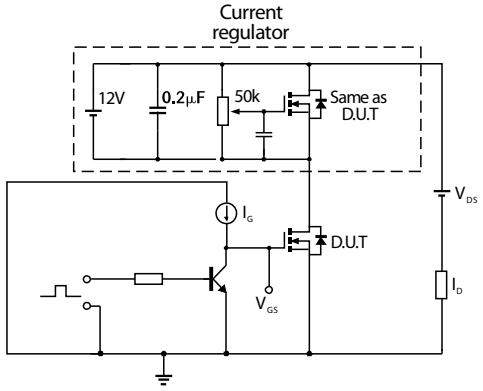


Gate-Source Voltage v Gate Charge

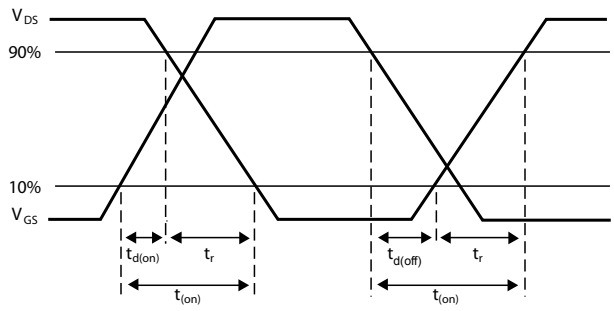
Test Circuits – Q1 N-Channel



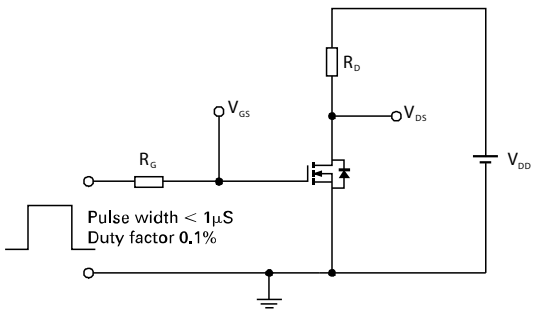
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



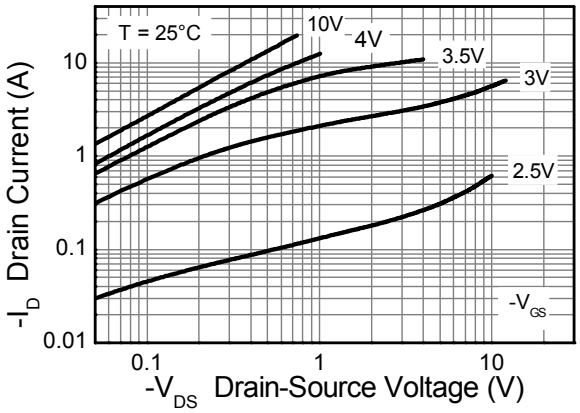
Switching time test circuit

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

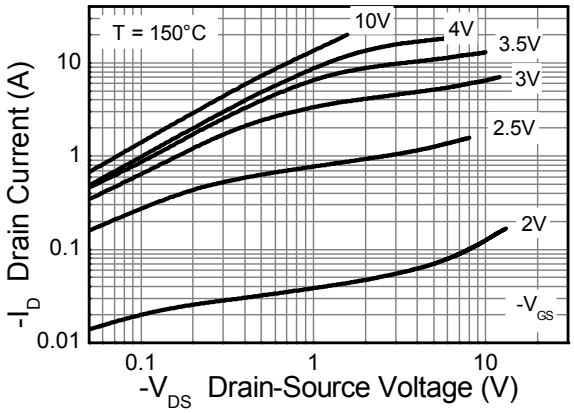
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-40	—	—	V	I_D = -250 µA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	µA	V_{DS} = -40V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	–	-3.0	V	I_D = -250 µA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 12)	$R_{DS(ON)}$	—	0.039	0.050	Ω	V_{GS} = -10V, I_D = -6A
			0.060	0.079		V_{GS} = -4.5V, I_D = -5A
Forward Transconductance (Notes 12 & 13)	g_{fs}	—	16.6	—	S	V_{DS} = -15V, I_D = -6A
Diode Forward Voltage (Note 13)	V_{SD}	—	-0.865	-1.1	V	I_S = -6A, V_{GS} = 0V
Reverse Recovery Time (Note 13)	t_{rr}	—	138	—	ns	I_S = -6A, di/dt = 100A/µs
Reverse Recovery Charge (Note 13)	Q_{rr}	—	841	—	nC	
DYNAMIC CHARACTERISTICS (Note 13)						
Input Capacitance	C_{iss}	—	674	—	pF	V_{DS} = -20V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	115	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	67.7	—	pF	
Total Gate Charge (Note 14)	Q_g	—	7.0	—	nC	V_{GS} = -4.5V; V_{DS} = -20V, I_D = -6A
Total Gate Charge (Note 14)	Q_g	—	14	—	nC	V_{GS} = -10V; V_{DS} = -20V, I_D = -6A
Gate-Source Charge (Note 14)	Q_{gs}	—	2.2	—	nC	V_{GS} = -10V; V_{DS} = -20V, I_D = -6A
Gate-Drain Charge (Note 14)	Q_{gd}	—	3.7	—	nC	V_{GS} = -10V; V_{DS} = -20V, I_D = -6A
Turn-On Delay Time (Note 14)	$t_{D(on)}$	—	2.3	—	ns	V_{DD} = -20V, V_{GS} = -10V I_D = -6A, $R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 14)	t_r	—	14.1	—	ns	
Turn-Off Delay Time (Note 14)	$t_{D(off)}$	—	25.1	—	ns	
Turn-Off Fall Time (Note 14)	t_f	—	14.3	—	ns	

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%
13. For design aid only, not subject to production testing.
14. Switching characteristics are independent of operating junction temperatures.

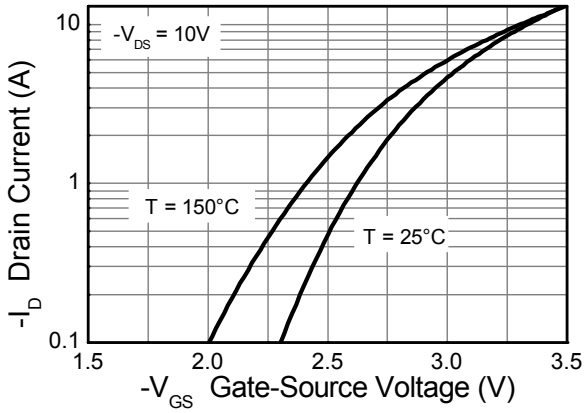
Typical Characteristics – Q2 P-Channel



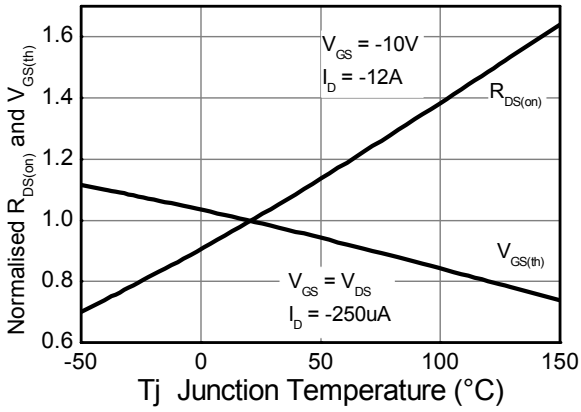
Output Characteristics



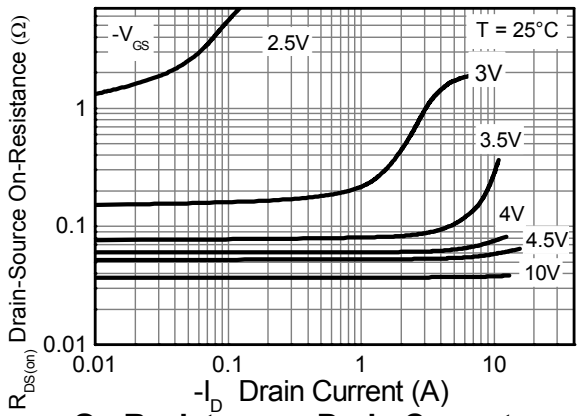
Output Characteristics



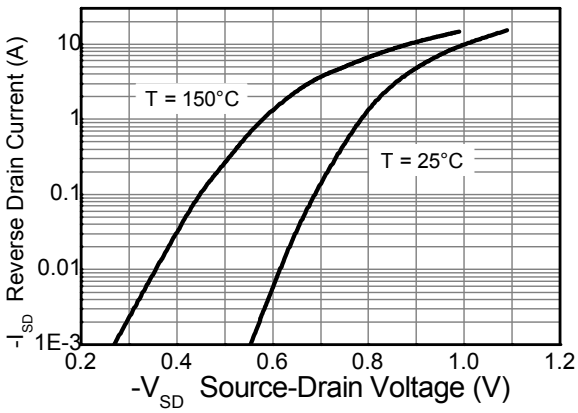
Typical Transfer Characteristics



Normalised Curves v Temperature

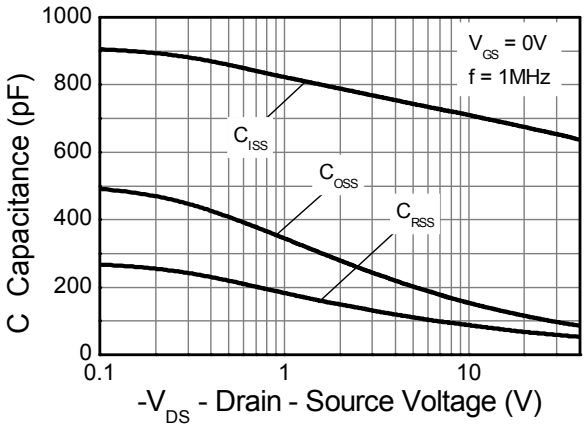


On-Resistance v Drain Current

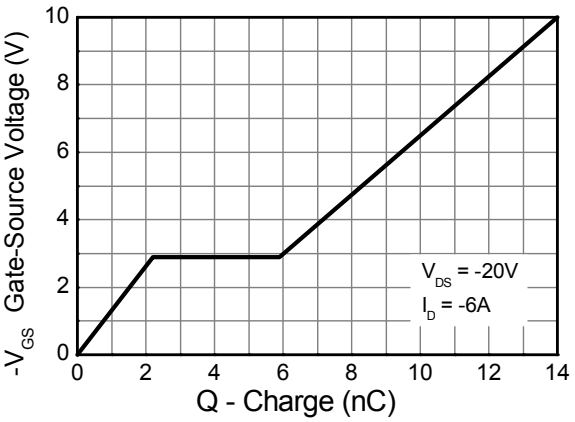


Source-Drain Diode Forward Voltage

Typical Characteristics – Q2 P-Channel – (cont.)

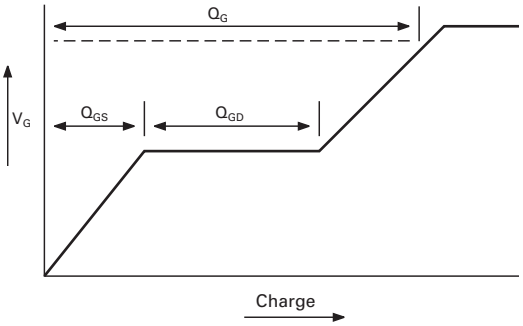


Capacitance v Drain-Source Voltage

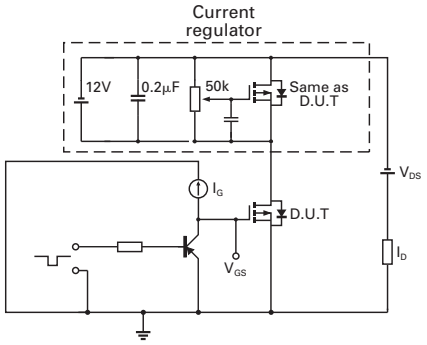


Gate-Source Voltage v Gate Charge

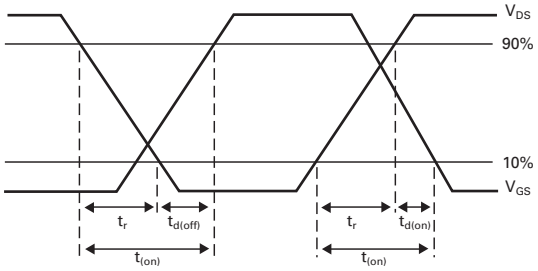
Test Circuits – Q2 P-Channel



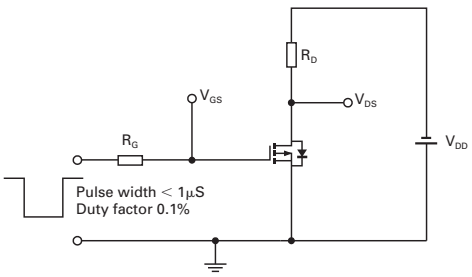
Basic gate charge waveform



Gate charge test circuit



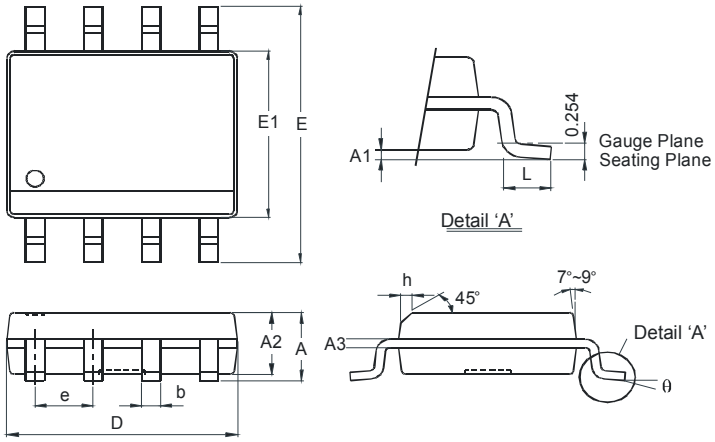
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

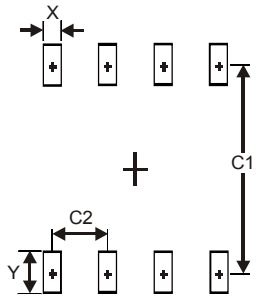
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SO-8		
Dim	**Min**	**Max**
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
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)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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