

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 7) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	450 350	mA
	t<5s	T _A = +25°C T _A = +70°C	I _D	520 410	mA
Continuous Drain Current (Note 7) V _{GS} = 1.8V	Steady State	T _A = +25°C T _A = +70°C	I _D	330 260	mA
	t<5s	T _A = +25°C T _A = +70°C	I _D	390 310	mA
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	440	mA
Pulsed Drain Current (Note 8)			I _{DM}	800	mA

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-310 -240	mA
	t<5s	T _A = +25°C T _A = +70°C	I _D	-360 -280	mA
Continuous Drain Current (Note 5) V _{GS} = -1.8V	Steady State	T _A = +25°C T _A = +70°C	I _D	-240 -190	mA
	t<5s	T _A = +25°C T _A = +70°C	I _D	-280 -220	mA
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	-440	mA
Pulsed Drain Current (Note 8)			I _{DM}	-800	mA

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 7)		P _D	350	mW
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	R _{θJA}	360	°C/W
	t<5s		270	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes: 7. Device mounted on FR-4 PCB, with minimum recommended pad layout.
8. Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	-	-	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current @T _C = +25°C	I _{DSS}	-	-	100	nA	V _{DS} = 16V, V _{GS} = 0V
		-	-	50		V _{DS} = 5V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±5V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(th)}	0.4	-	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	-	0.60	0.99	Ω	V _{GS} = 4.5V, I _D = 100mA
		-	0.75	1.2		V _{GS} = 2.5V, I _D = 50mA
		-	0.90	1.8		V _{GS} = 1.8V, I _D = 20mA
		-	1.2	2.4		V _{GS} = 1.5V, I _D = 10mA
		-	2.0	-		V _{GS} = 1.2V, I _D = 1mA
Forward Transfer Admittance	Y _{fs}	180	850	-	mS	V _{DS} = 5V, I _D = 125mA
Diode Forward Voltage	V _{SD}	-	0.6	1.0	V	V _{GS} = 0V, I _S = 10mA
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	-	27.6	-	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	4.0	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	2.8	-	pF	
Gate Resistance	R _G	-	113	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	-	0.5	-	nC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA
Gate-Source Charge	Q _{gs}	-	0.07	-	nC	
Gate-Drain Charge	Q _{gd}	-	0.07	-	nC	
Turn-On Delay Time	t _{D(on)}	-	4.0	-	ns	V _{DD} = 15V, V _{GS} = 4.5V, R _L = 47Ω, R _G = 2Ω, I _D = 200mA
Turn-On Rise Time	t _r	-	3.3	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	19.0	-	ns	
Turn-Off Fall Time	t _f	-	6.4	-	ns	

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	-	-	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current @T _C = +25°C	I _{DSS}	-	-	100	nA	V _{DS} = -16V, V _{GS} = 0V
		-	-	50		V _{DS} = -5V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±5V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(th)}	-0.4	-	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(on)}	-	1.2	1.9	Ω	V _{GS} = -4.5V, I _D = -100mA
		-	1.5	2.4		V _{GS} = -2.5V, I _D = -50mA
		-	2.1	3.4		V _{GS} = -1.8V, I _D = -20mA
		-	2.5	5		V _{GS} = -1.5V, I _D = -10mA
		-	4.0	-		V _{GS} = -1.2V, I _D = -1mA
Forward Transfer Admittance	Y _{fs}	100	450	-	mS	V _{DS} = -5V, I _D = -125mA
Diode Forward Voltage	V _{SD}	-	-0.6	-1.0	V	V _{GS} = 0V, I _S = -10mA
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	-	28.7	-	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	4.2	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	2.9	-	pF	
Gate Resistance	R _G	-	399	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	-	0.4	-	nC	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -250mA
Gate-Source Charge	Q _{gs}	-	0.08	-	nC	
Gate-Drain Charge	Q _{gd}	-	0.06	-	nC	
Turn-On Delay Time	t _{D(on)}	-	5.8	-	ns	V _{DD} = -15V, V _{GS} = -4.5V, R _G = 2Ω, I _D = -200mA
Turn-On Rise Time	t _r	-	5.7	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	31.1	-	ns	
Turn-Off Fall Time	t _f	-	16.4	-	ns	

Notes: 9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

Q1 N-CHANNEL

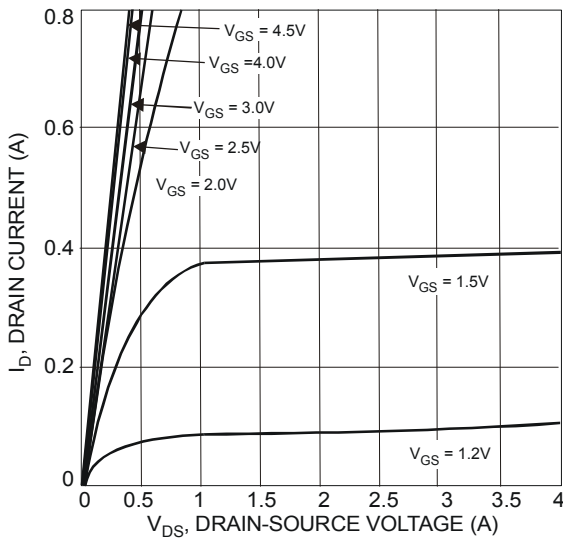


Fig. 1 Typical Output Characteristics

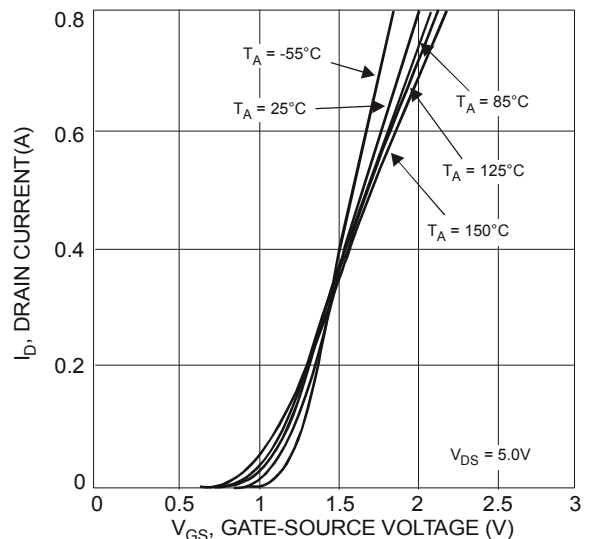


Fig. 2 Typical Transfer Characteristics

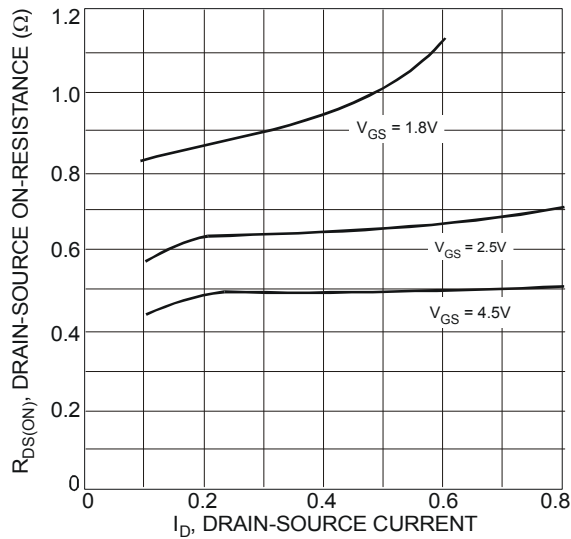


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

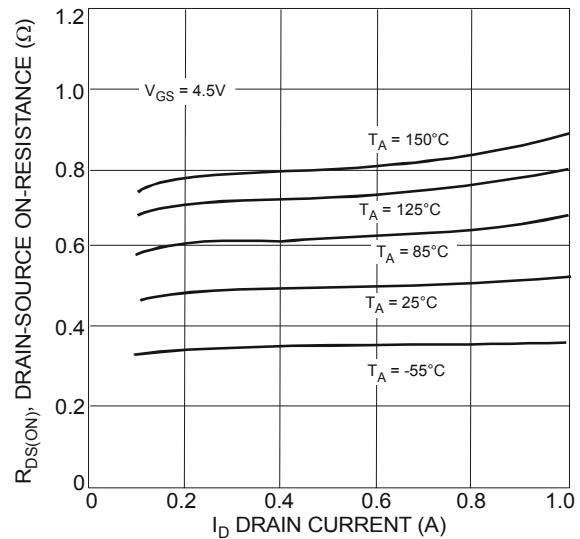


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

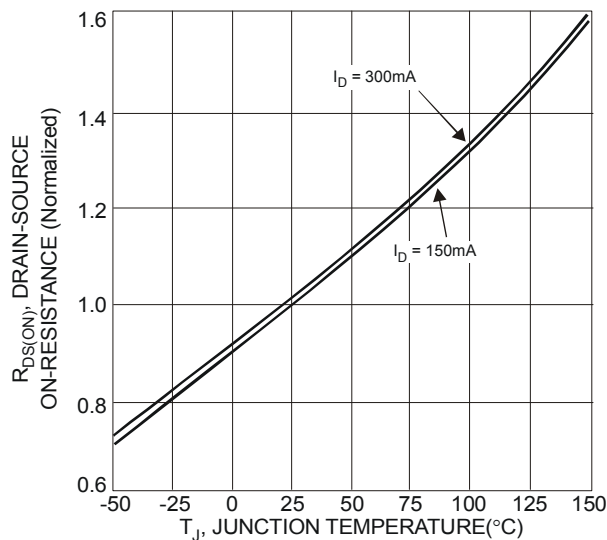


Fig. 5 On-Resistance Variation with Temperature

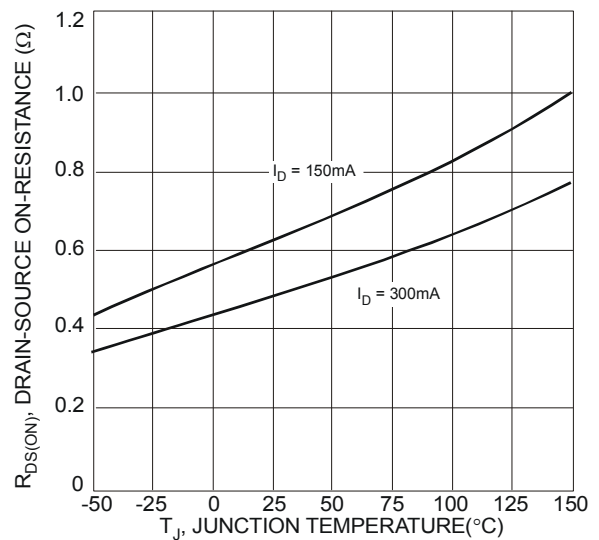


Fig. 6 On-Resistance Variation with Temperature

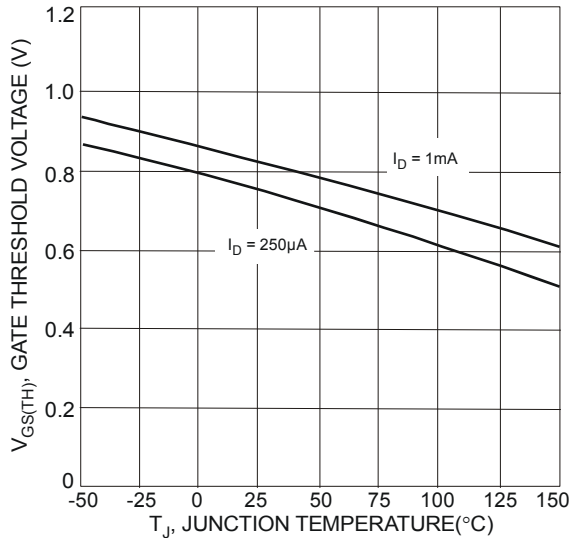


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

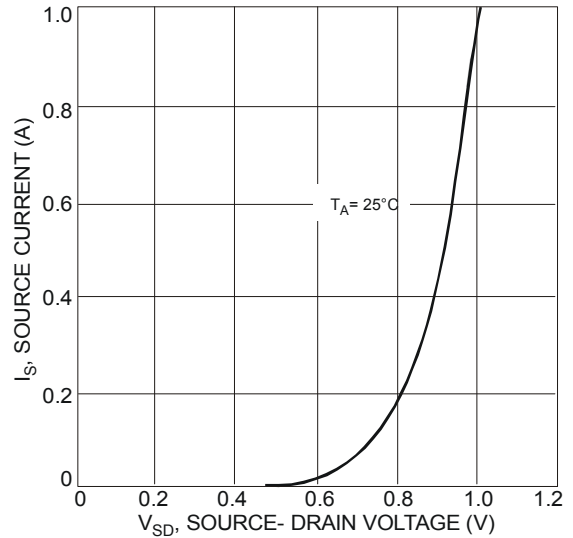


Fig. 8 Diodes Forward Voltage vs. Current

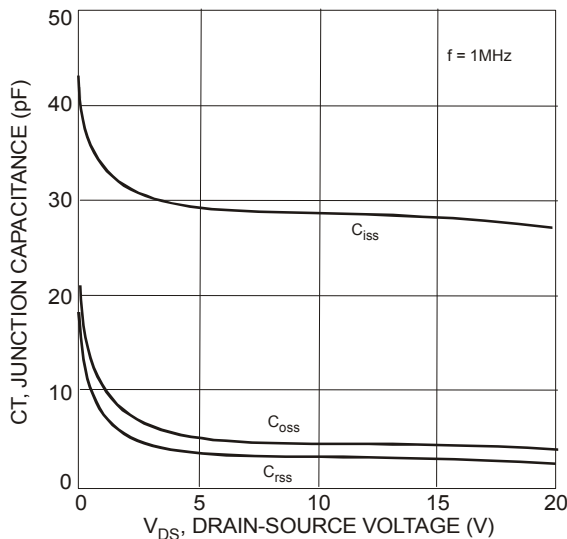


Fig. 9 Typical Junction Capacitance

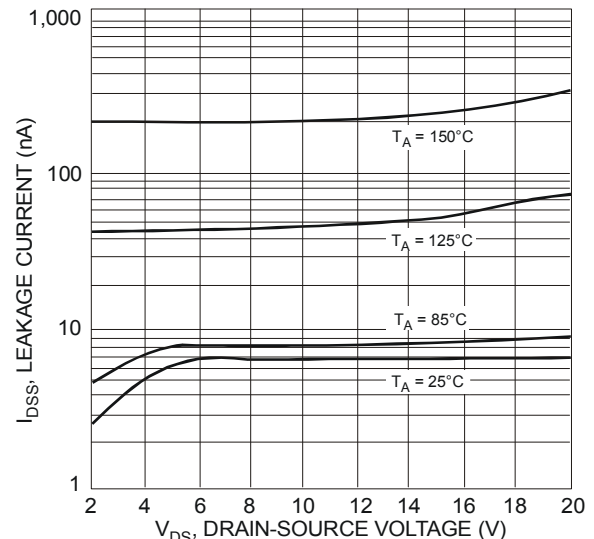


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

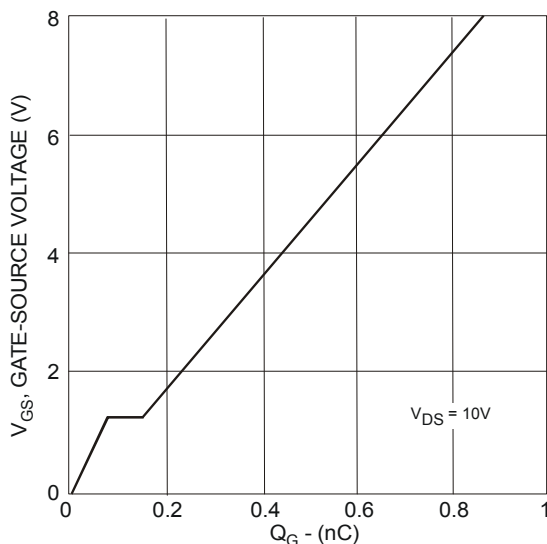


Fig. 11 Gate Charge Characteristics

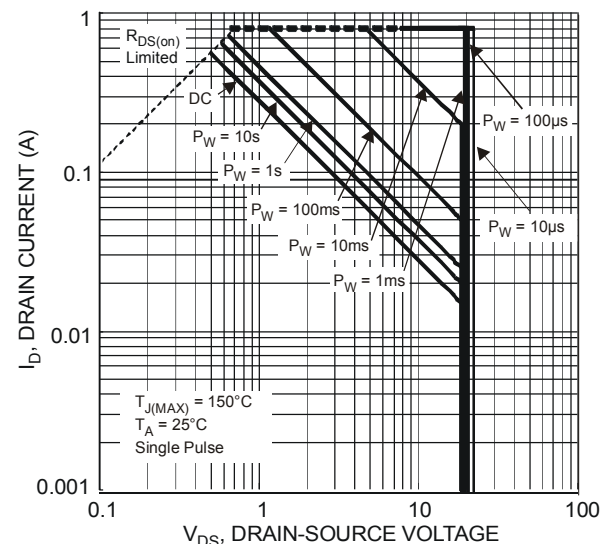
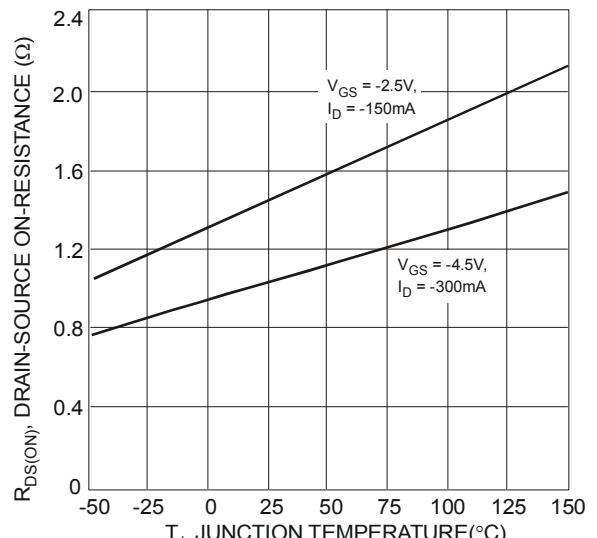
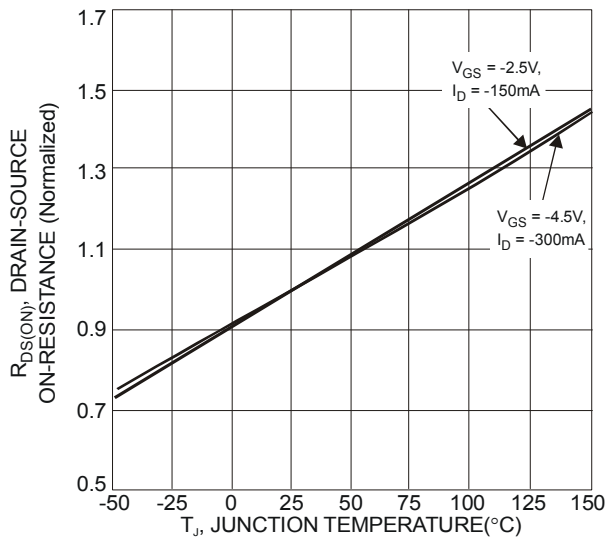
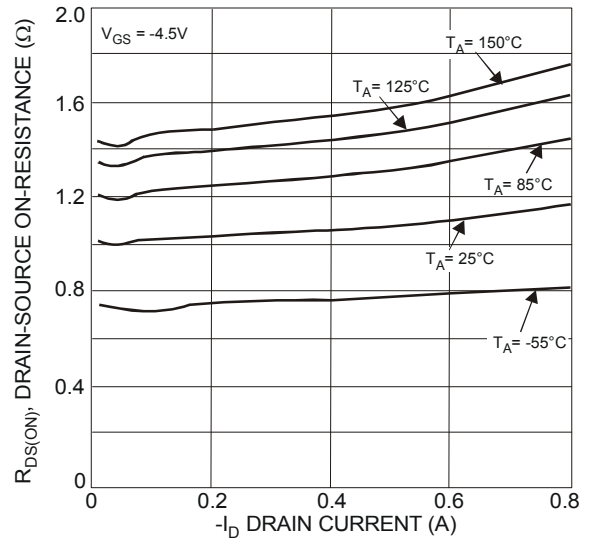
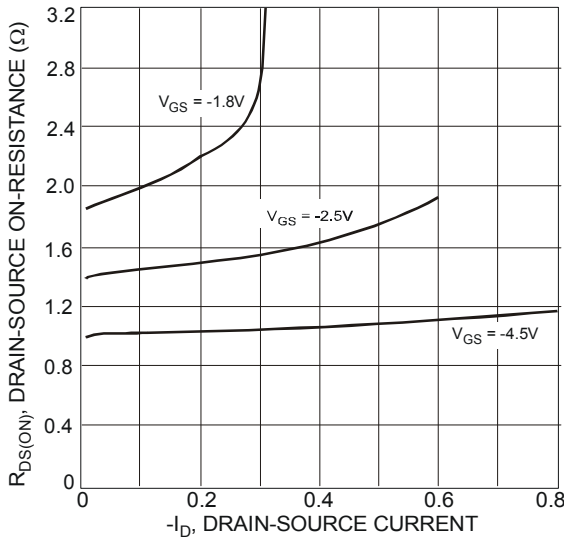
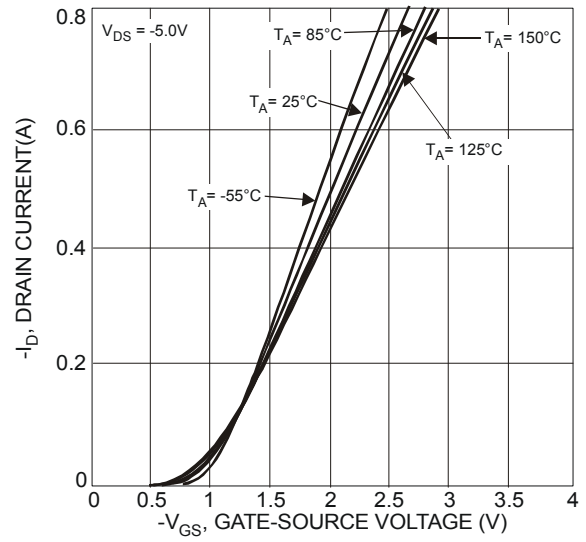
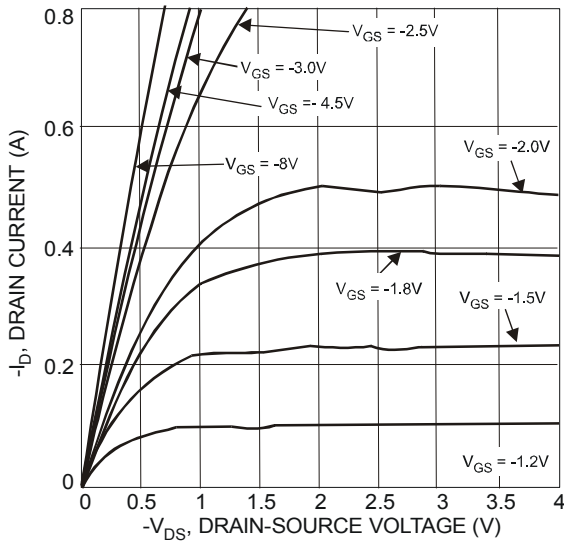


Fig. 12 SOA, Safe Operation Area

Q2 P-CHANNEL



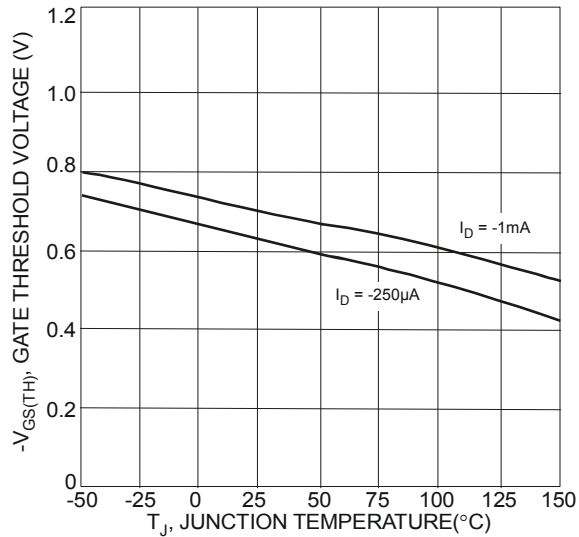


Fig. 19 Gate Threshold Variation vs. Ambient Temperature

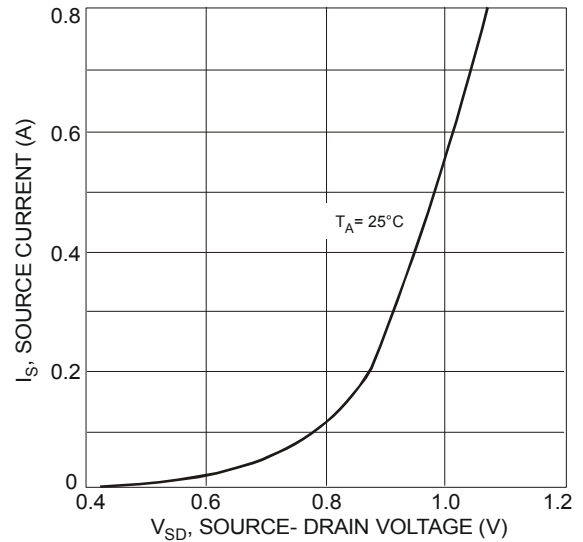


Fig. 20 Diodes Forward Voltage vs. Current

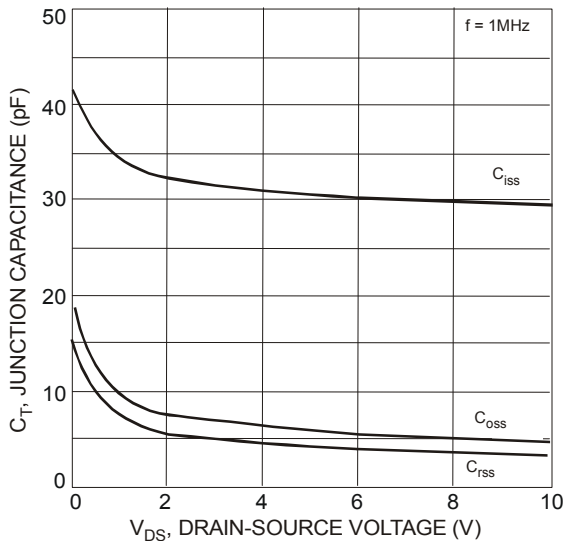


Fig. 21 Typical Junction Capacitance

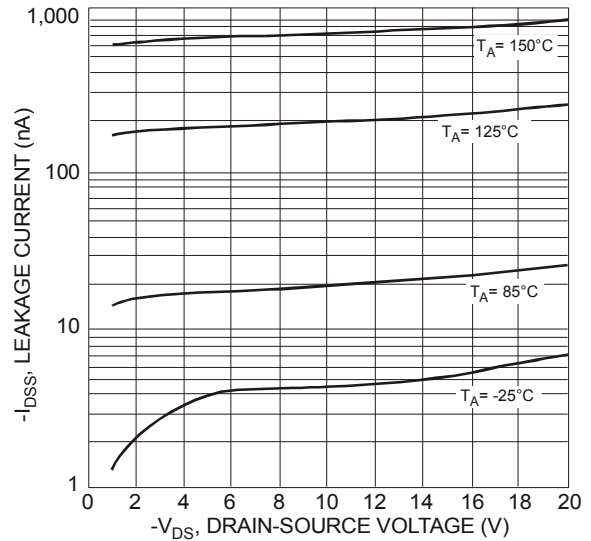


Fig. 22 Typical Leakage Current vs. Drain-Source Voltage

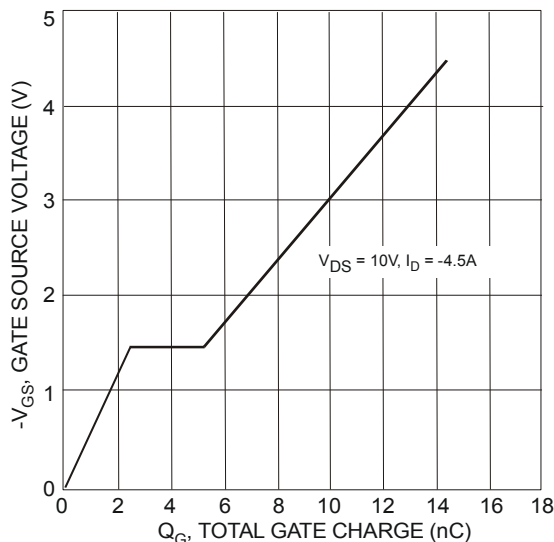


Fig. 23 Gate Charge Characteristics

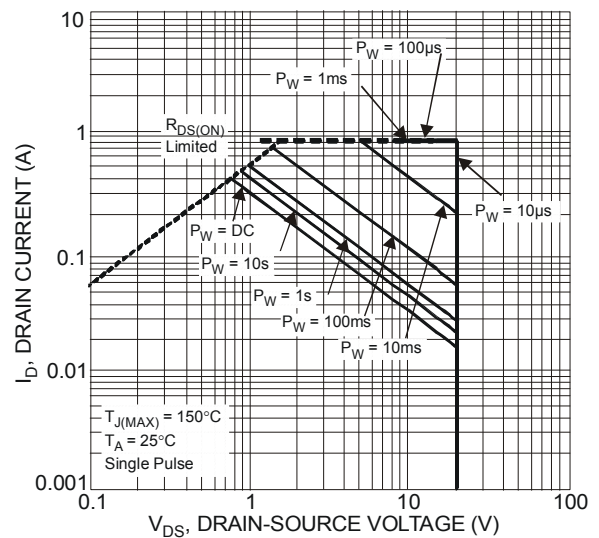
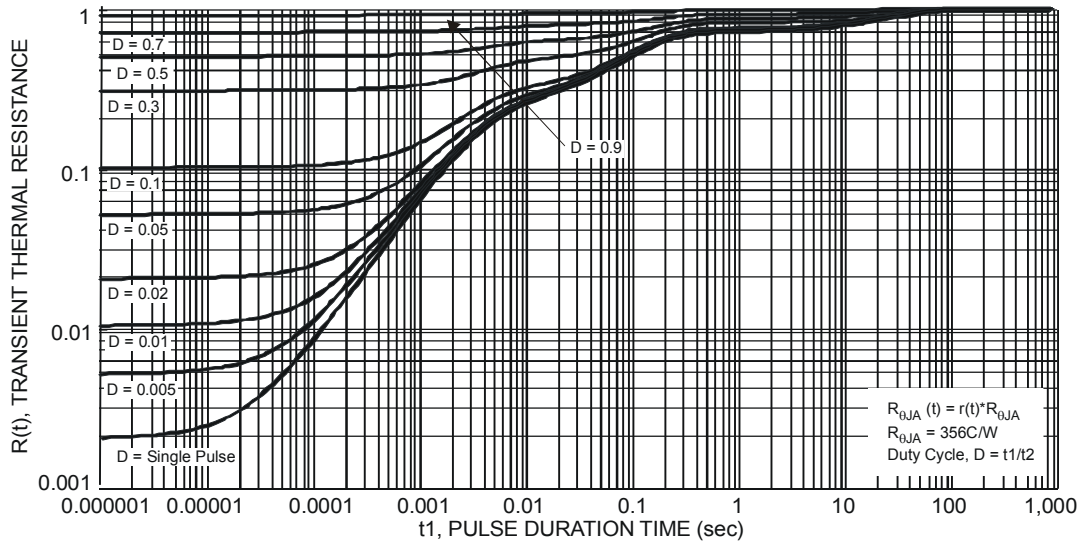
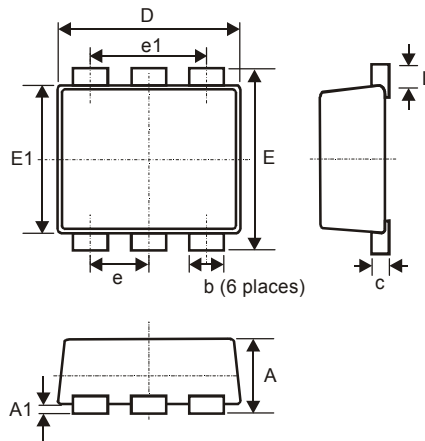


Fig. 24 SOA, Safe Operation Area

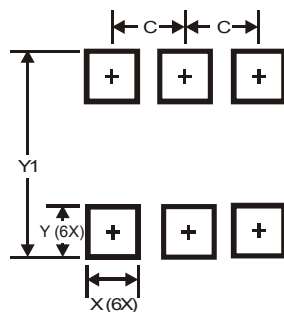


Package Outline Dimensions



SOT963			
Dim	Min	Max	Typ
A	0.40	0.50	0.45
A1	0	0.05	-
c	0.120	0.180	0.150
D	0.95	1.05	1.00
E	0.95	1.05	1.00
E1	0.75	0.85	0.80
L	0.05	0.15	0.10
b	0.10	0.20	0.15
e	0.35 Typ		
e1	0.70 Typ		
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	0.350
X	0.200
Y	0.200
Y1	1.100

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