N- AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET

	N-CH	P-CH
BV_{DSS}	60V	-60V
I_D	4.5A	-3.5A
R_{DSON}(typ.) @V_{GS}=(-)10V	37mΩ	70mΩ
R_{DSON}(typ.) @V_{GS}=(-)4.5V	42mΩ	93mΩ

Description

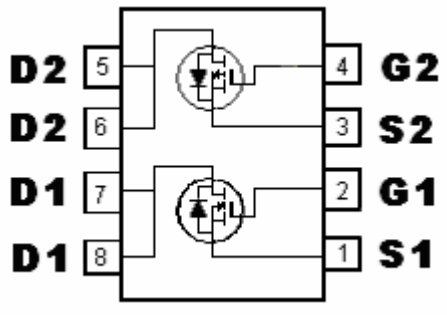
The UM4599 consists of a N-channel and a P-ch annel enhancement-mode MOSFET in a single SOP-8 package, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.
The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

Features

- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Pb-free package

Equivalent Circuit

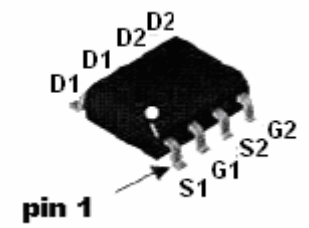
UM4599



G：Gate
S：Source
D：Drain

Outline

SOP-8



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
		N-channel	P-channel	
Drain-Source Breakdown Voltage	BV_{DSS}	60	-60	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current @T_A=25 °C (Note 2)	I_D	4.5	-3.5	A
Continuous Drain Current @T_A=70 °C (Note 2)	I_D	3.6	-2.8	A
Pulsed Drain Current (Note 1)	I_{DM}	20	-20	A
Power Dissipation for Dual Operation	P_D	2		W
Power Dissipation for Single Operation		1.6 (Note 2)		
		0.9 (Note 3)		
Operating Junction and Storage Temperature Range	Tj; Tstg	-55~+150		°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	40	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	78 (Note 2)	°C/W
		135 (Note 3)	°C/W

Note : 1.Pulse width limited by maximum junction temperature.
2.Surface mounted on 1 in² copper pad of FR-4 board, pulse width≤10s.
3.Surface mounted on minimum copper pad, pulse width≤10s.

N-Channel Electrical Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	1.0	1.7	2.5	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS}=48V, V_{GS}=0
	-	-	10		V_{DS}=40V, V_{GS}=0, Tj=55°C
*$R_{DS(ON)}$	-	37	58	mΩ	V_{GS}=10V, I_D=4.5A
	-	42	60		V_{GS}=4.5V, I_D=4A
*G_{FS}	-	6	-	S	V_{DS}=10V, I_D=4.5A
Dynamic					
Ciss	-	1173	-	pF	V_{DS}=25V, V_{GS}=0, f=1MHz
Coss	-	45	-		
Crss	-	35	-		
*$t_{d(ON)}$	-	8	20	ns	V_{DS}=30V, I_D=1A, V_{GS}=10V, R_G=6Ω
*t_r	-	12	18		
*$t_{d(OFF)}$	-	30	35		
*t_f	-	7	15		

*Qg	-	14	16	nC	V_{DS}=30V, I_D=4.5A, V_{GS}=10V
*Qgs	-	3.9	-		
*Qgd	-	4.7	-		
Source-Drain Diode					
*V_{SD}	-	0.75	1.0	V	V_{GS}=0V, I_S=1.3A
*I_S	-	-	1.3	A	
*I_{SM}	-	-	2.6	A	

*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

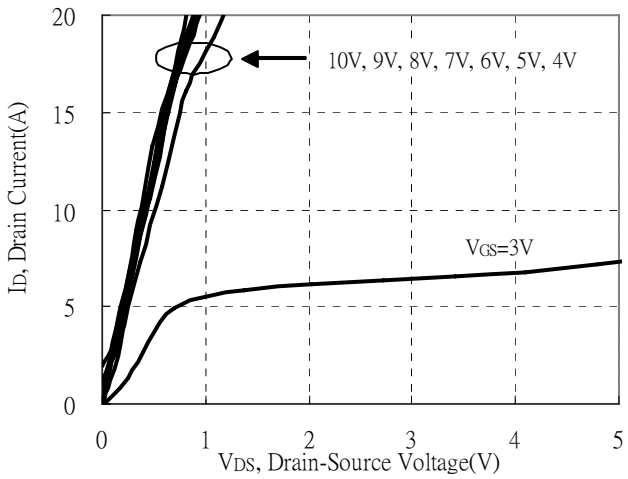
P-Channel Electrical Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-60	-	-	V	V_{GS}=0, I_D=-250μA
$V_{GS(th)}$	-1.0	-1.8	-2.5	V	V_{DS}=V_{GS}, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	-1	μA	V_{DS}=-48V, V_{GS}=0
	-	-	-10		V_{DS}=-40V, V_{GS}=0, Tj=55°C
*$R_{DS(ON)}$	-	70	90	mΩ	V_{GS}=-10V, I_D=-3.5A
	-	93	125		V_{GS}=-4.5V, I_D=-3A
*G_{FS}	-	5	-	S	V_{DS}=-10V, I_D=-3.5A
Dynamic					
Ciss	-	940	-	pF	V_{DS}=-30V, V_{GS}=0, f=1MHz
Coss	-	49	-		
Crss	-	35	-		
*$t_{d(ON)}$	-	6	13	ns	V_{DS}=-30V, I_D=-1A, V_{GS}=-10V, R_G=6Ω
*t_r	-	8	18	ns	
*$t_{d(OFF)}$	-	26	31		
*t_f	-	11	20		
*Qg	-	10	15	nC	V_{DS}=-30V, I_D=-3.5A, V_{GS}=-10V
*Qgs	-	3	-		
*Qgd	-	3.1	-		
Source-Drain Diode					
*V_{SD}	-	-0.75	-1.0	V	V_{GS}=0V, I_S=-1.3A
*I_S	-	-	-1.3	A	
*I_{SM}	-	-	-2.6		

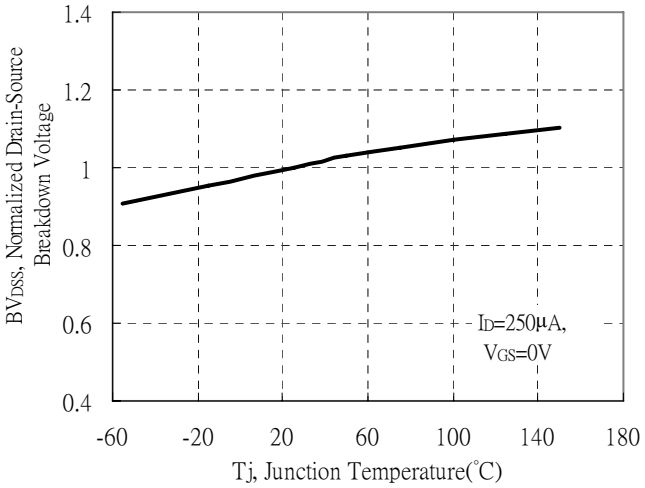
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics : Q1(N-channel)

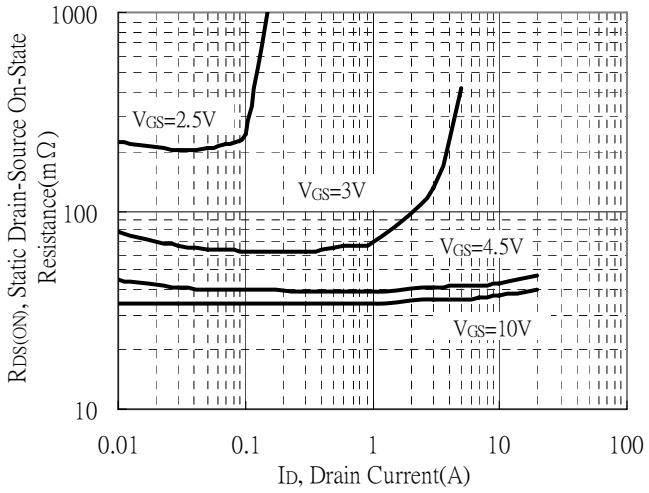
Typical Output Characteristics



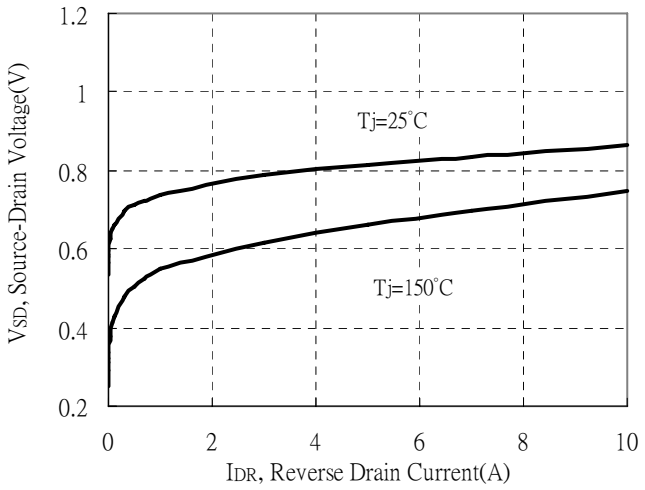
Brekdown Voltage vs Ambient Temperature



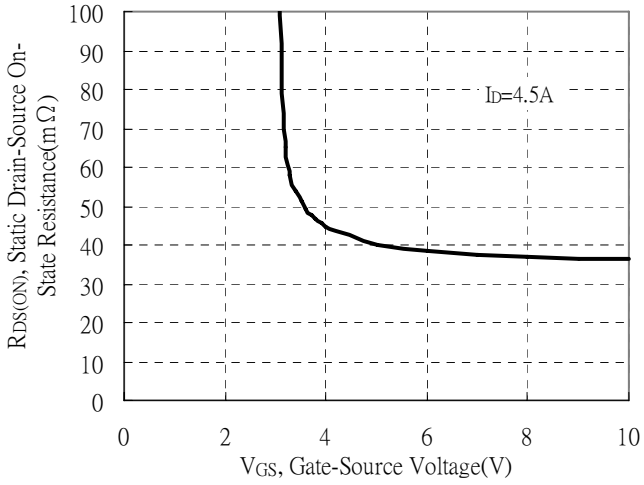
Static Drain-Source On-State resistance vs Drain Current



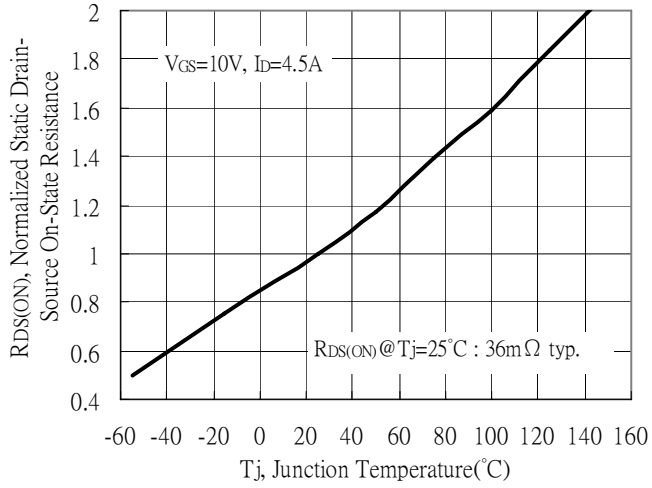
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

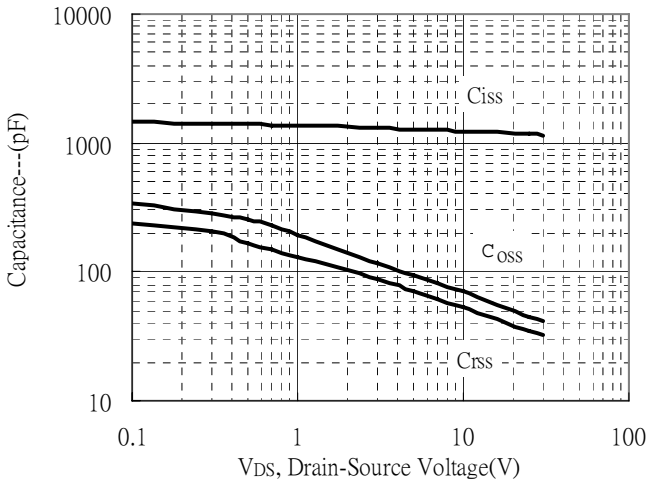


Drain-Source On-State Resistance vs Junction Tempearture

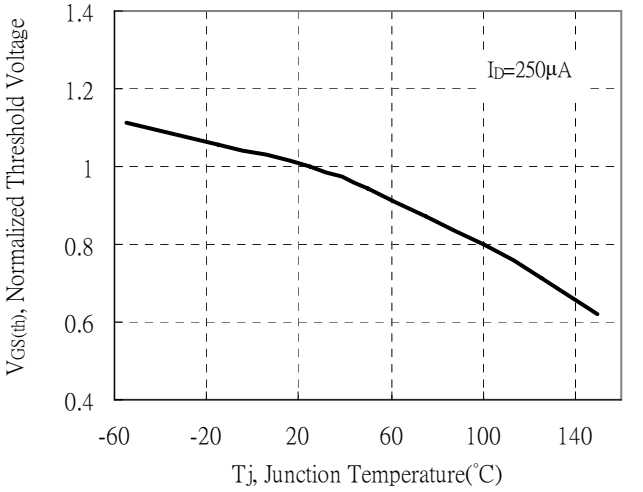


Typical Characteristics(Cont.) : Q1(N-channel)

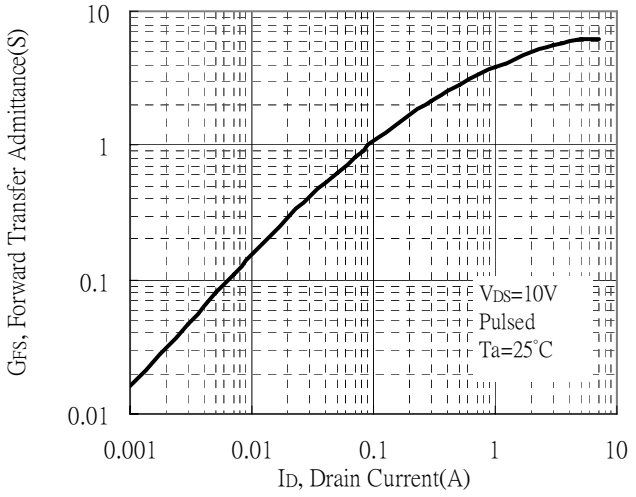
Capacitance vs Drain-to-Source Voltage



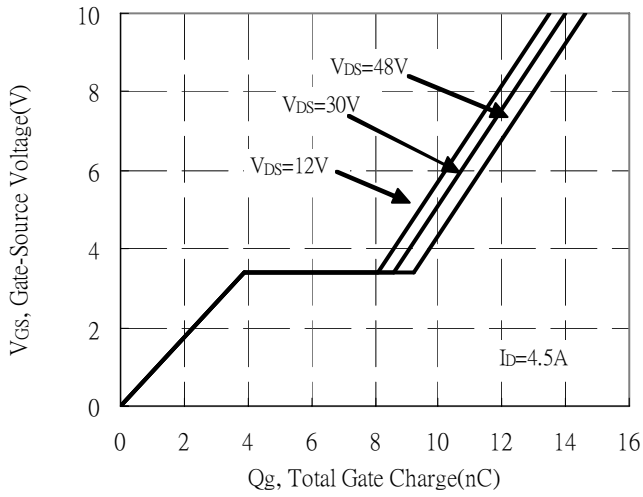
Threshold Voltage vs Junction Tempearture



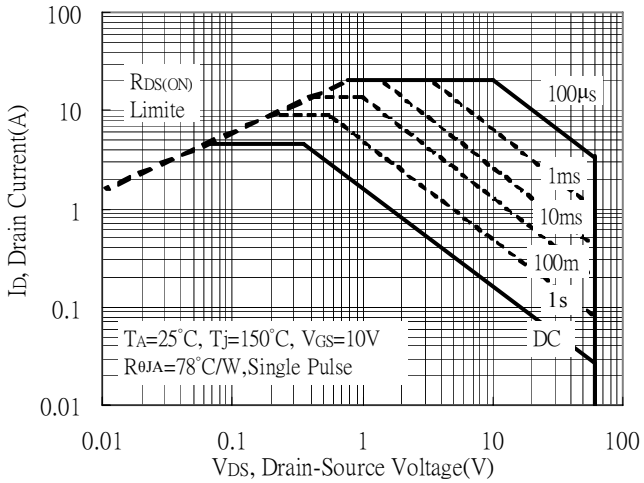
Forward Transfer Admittance vs Drain Current



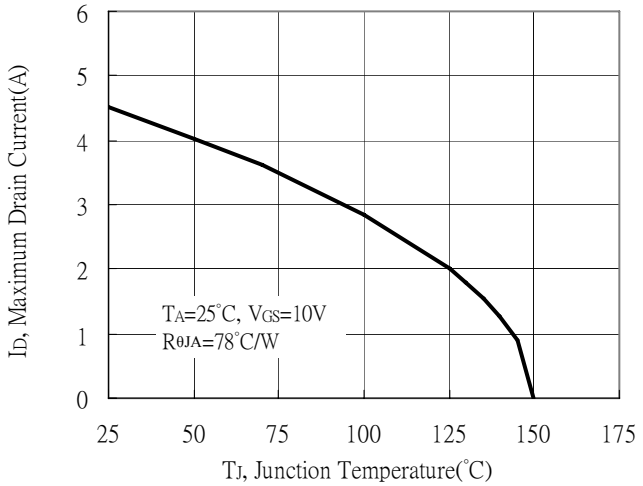
Gate Charge Characteristics



Maximum Safe Operating Area

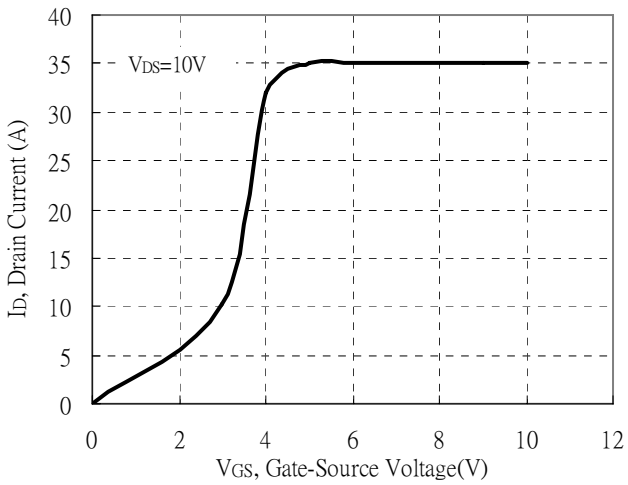


Maximum Drain Current vs Junction Temperature

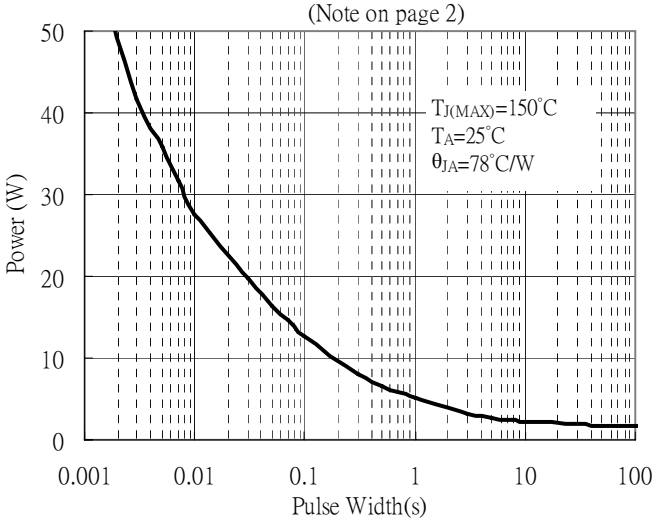


Typical Characteristics(Cont.) : Q1(N-channel)

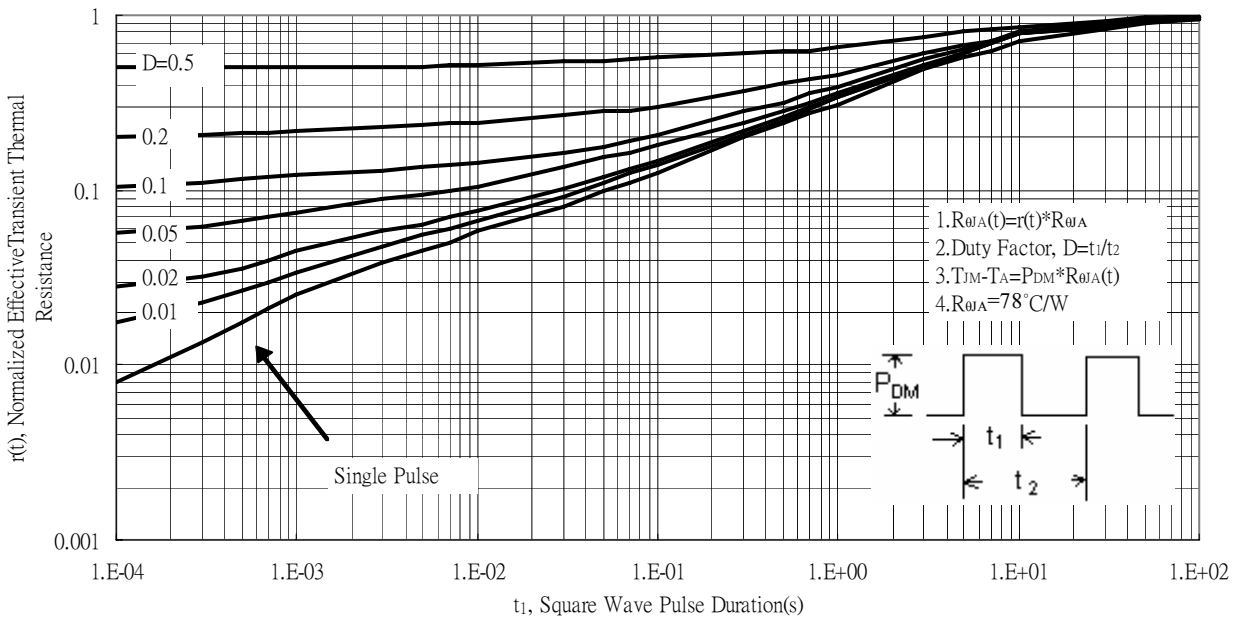
Typical Transfer Characteristics



Single Pulse Power Rating, Junction to Ambient
(Note on page 2)

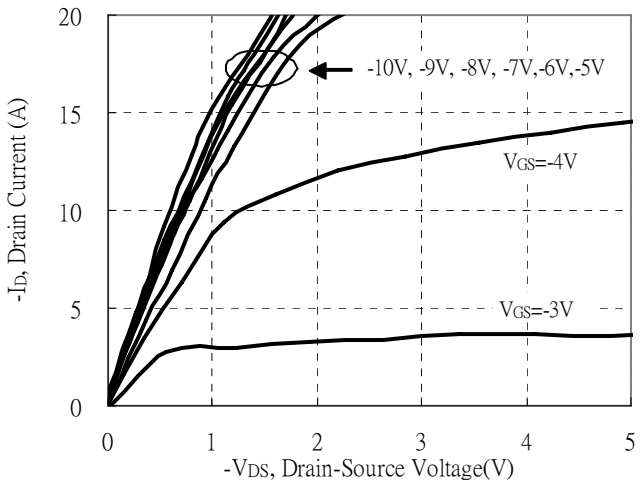


Transient Thermal Response Curves

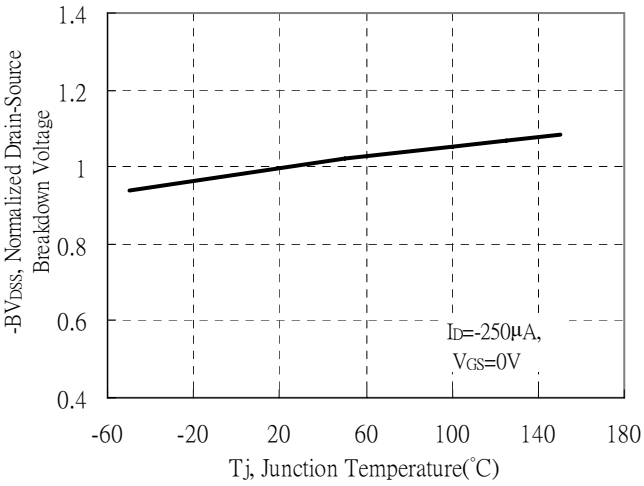


Typical Characteristics : Q2(P-channel)

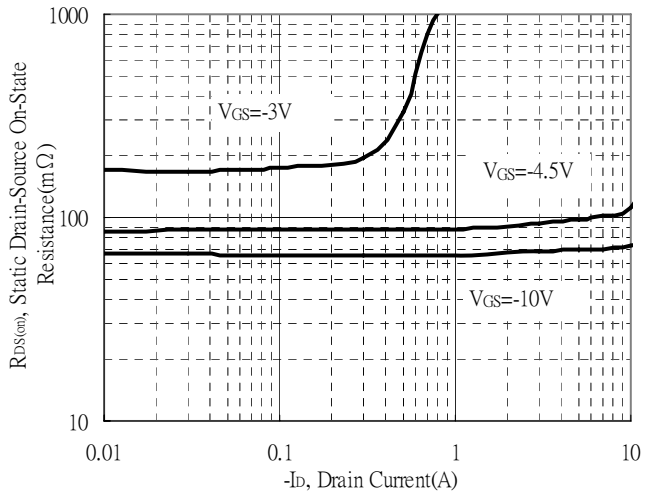
Typical Output Characteristics



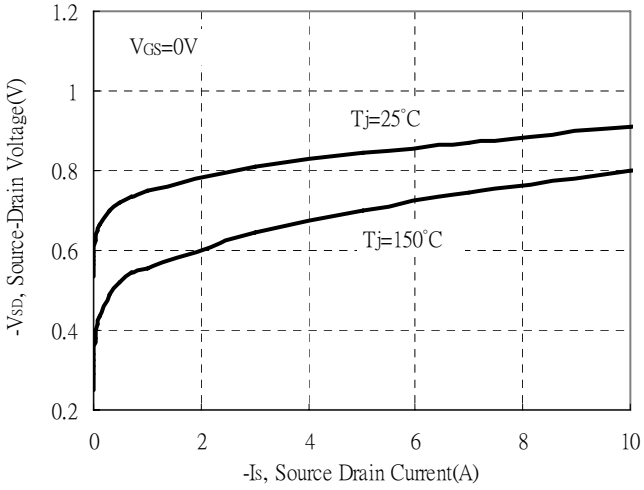
Brekdown Voltage vs Ambient Temperature



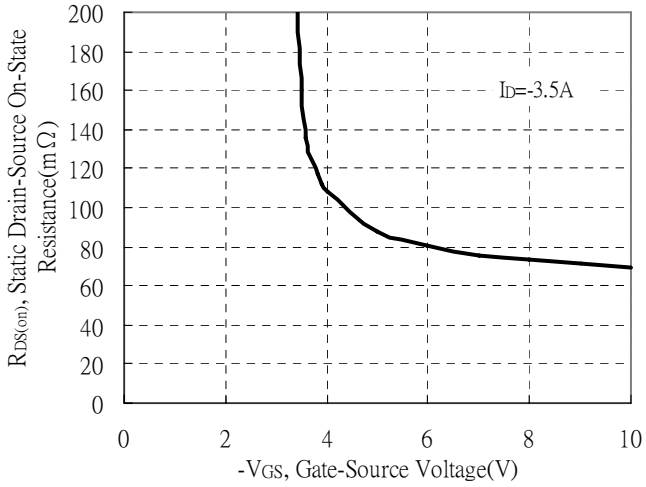
Static Drain-Source On-State resistance vs Drain Current



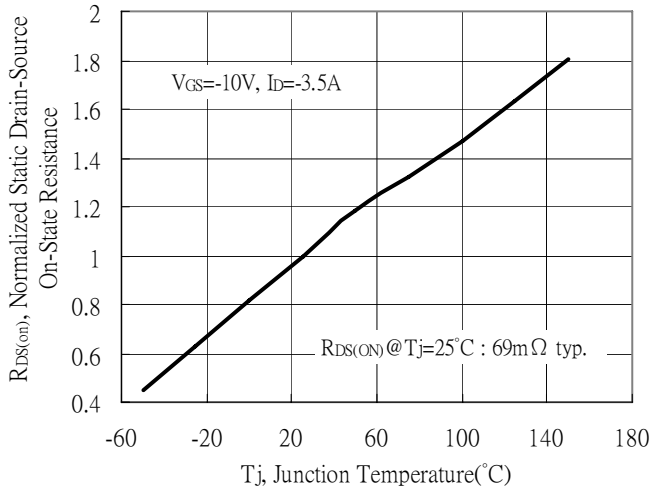
Source Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

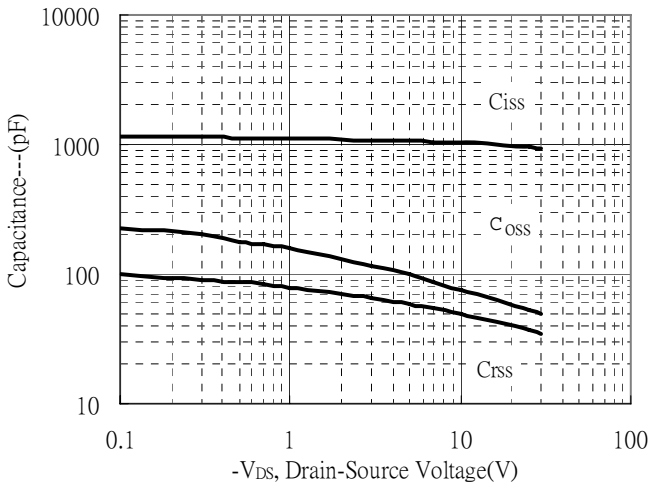


Drain-Source On-State Resistance vs Junction Tempearture

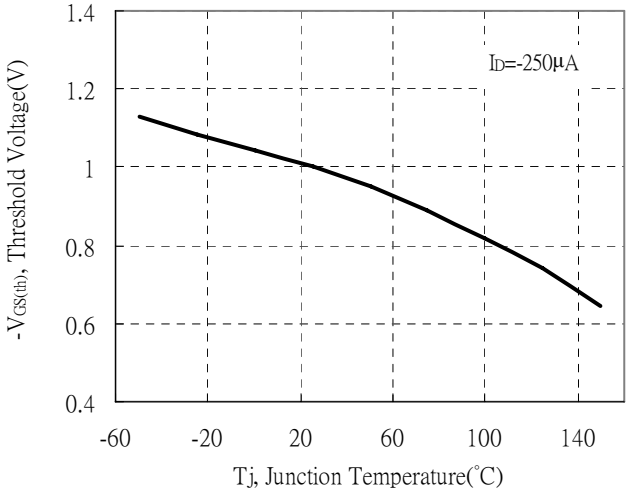


Typical Characteristics(Cont.) : Q2(P-channel)

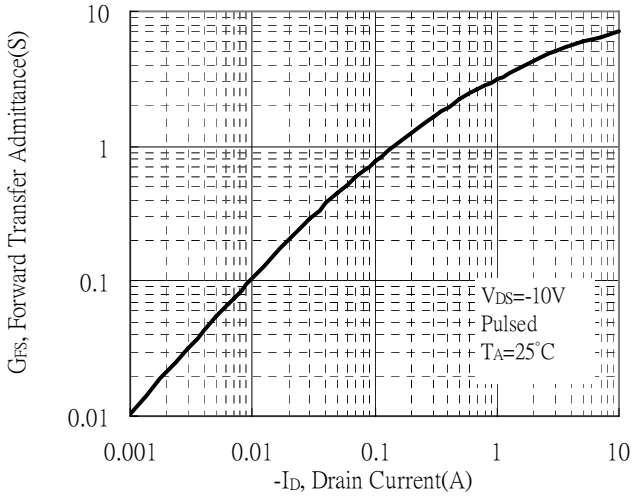
Capacitance vs Drain-to-Source Voltage



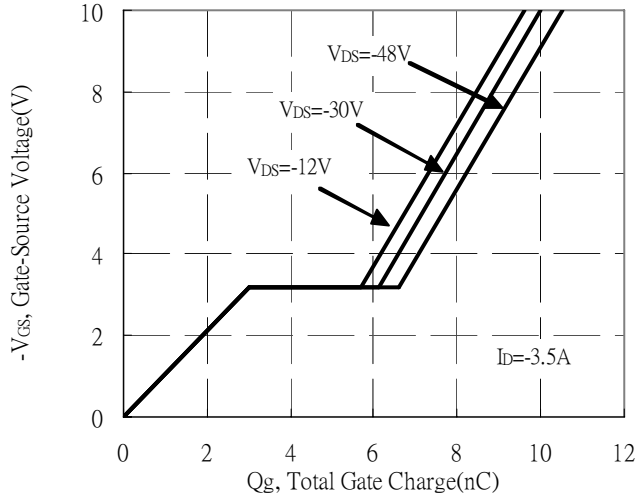
Threshold Voltage vs Junction Tempearture



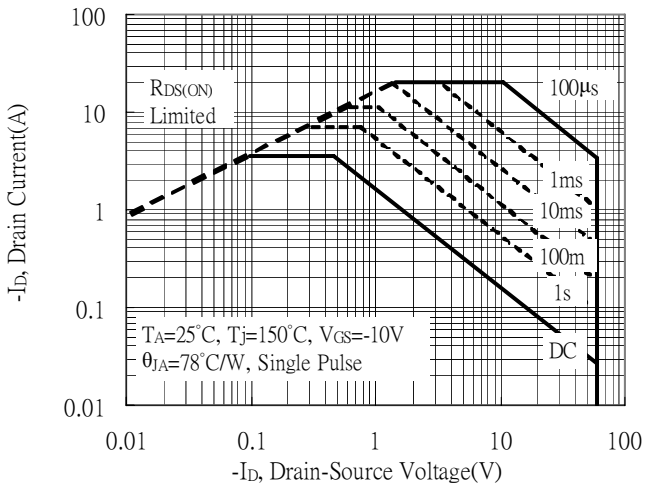
Forward Transfer Admittance vs Drain Current



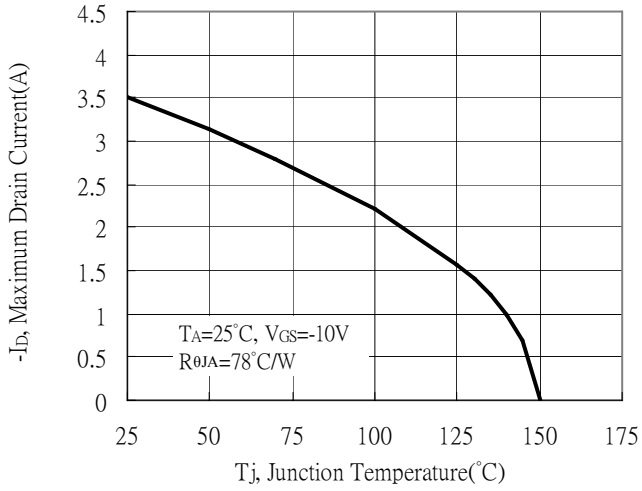
Gate Charge Characteristics



Maximum Safe Operating Area

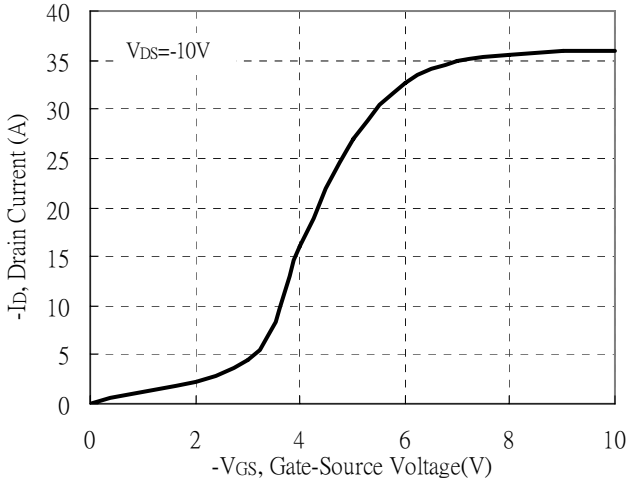


Maximum Drain Current vs Junction Temperature

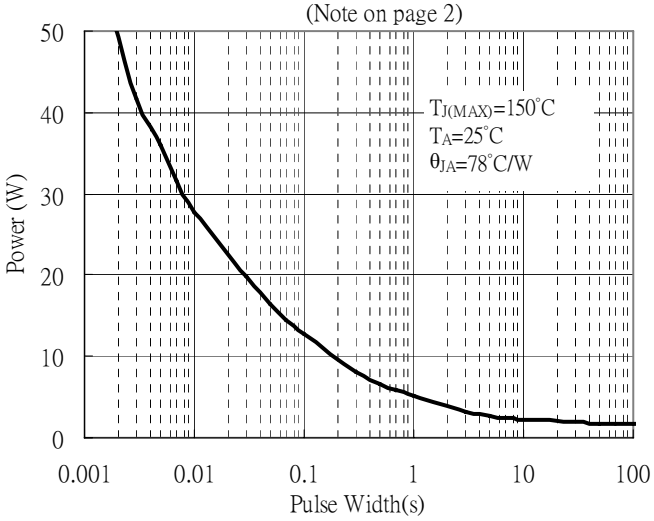


Typical Characteristics(Cont.) : Q2(P-channel)

Typical Transfer Characteristics



Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



Transient Thermal Response Curves