

RoHS Compliant Product

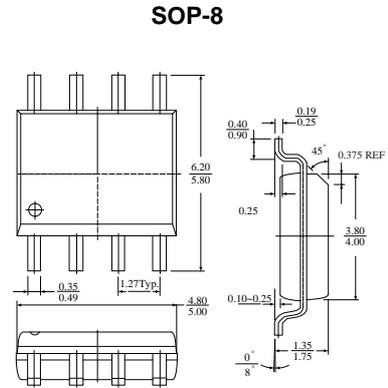
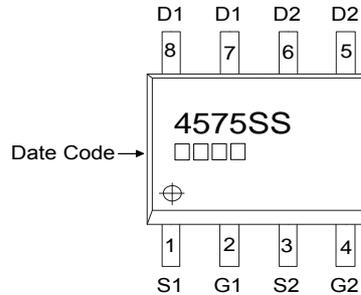
## Description

The SSG4575 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

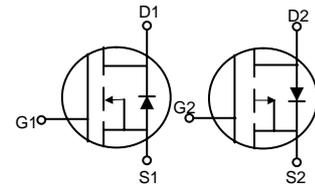
The SOP-8 package is universally preferred for all commercial industrial surface mount application and suited for low voltage applications such as DC/DC converters.

## Features

- \* Simple Drive Requirement
- \* Lower On-resistance
- \* Fast Switching Performance



Dimensions in millimeters



## Absolute Maximum Ratings

Parameter	Symbol	Ratings		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	V <sub>DS</sub>	60	-60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	±20	V
Continuous Drain Current <sup>3</sup>	I <sub>D</sub> @T <sub>A</sub> =25°C	6	-4.2	A
Continuous Drain Current <sup>3</sup>	I <sub>D</sub> @T <sub>A</sub> =70°C	4.7	-3.3	A
Pulsed Drain Current <sup>1</sup>	I <sub>DM</sub>	30	-30	A
Total Power Dissipation	P <sub>D</sub> @T <sub>A</sub> =25°C	2		W
Linear Derating Factor		0.016		W/°C
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55~+150		°C

## Thermal Data

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-ambient <sup>3</sup>	R <sub>thj-a</sub>	62.5	°C/W

**Electrical Characteristics N Channel( T<sub>j</sub>=25°C Unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA
Breakdown Voltage Temp. Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	-	0.04	-	V/°C	Reference to 25°C, I <sub>D</sub> =1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	-	3.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±20V
Drain-Source Leakage Current (T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	1	uA	V <sub>DS</sub> =60V, V <sub>GS</sub> =0
Drain-Source Leakage Current (T <sub>j</sub> =70°C)		-	-	25	uA	V <sub>DS</sub> =48V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	-	-	36	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =5A
		-	-	42		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	18	29	nC	I <sub>D</sub> =5A V <sub>DS</sub> =48V V <sub>GS</sub> =4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	5	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	10	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(ON)</sub>	-	10	-	nS	V <sub>DD</sub> =30V I <sub>D</sub> =1A V <sub>GS</sub> =10V R <sub>G</sub> =3.3Ω R <sub>D</sub> =30Ω
Rise Time	T <sub>r</sub>	-	6	-		
Turn-off Delay Time	T <sub>d(OFF)</sub>	-	32	-		
Fall Time	T <sub>f</sub>	-	10	-		
Input Capacitance	C <sub>iss</sub>	-	1670	2670	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	160	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	117	-		
Forward Transconductance	G <sub>fs</sub>	-	8	-	S	V <sub>DS</sub> =10V, I <sub>D</sub> =4A

**Source-Drain Diode**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Forward On Voltage <sup>2</sup>	V <sub>DS</sub>	-	-	1.2	V	I <sub>S</sub> =1.7A, V <sub>GS</sub> =0V.
Reverse Recovery Time <sup>2</sup>	T <sub>rr</sub>	-	34	-	nS	I <sub>S</sub> = 5A, V <sub>GS</sub> =0V dI/dt=100A/uS
Reverse Recovery Charge	Q <sub>rr</sub>	-	48	-	nC	

Notes: 1.Pulse width limited by Max. junction temperature.

2.Pulse width ≤300us, dutycycle≤2%.

3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 135°C/W when mounted on Min. copper pad.

**Electrical Characteristics P-Channel( T<sub>j</sub>=25°C Unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-60	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA
Breakdown Voltage Temp. Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	-	-0.04	-	V/°C	Reference to 25°C, I <sub>D</sub> =-1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.0	-	-3.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±20V
Drain-Source Leakage Current (T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	-1	uA	V <sub>DS</sub> =-60V, V <sub>GS</sub> =0
Drain-Source Leakage Current (T <sub>j</sub> =70°C)		-	-	-25	uA	V <sub>DS</sub> =-48V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	-	-	72	mΩ	V <sub>GS</sub> =-10V, I <sub>D</sub> =-4A
		-	-	88		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	21	34	nC	I <sub>D</sub> =-4A V <sub>DS</sub> =-48V V <sub>GS</sub> =-4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	5	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	9	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(ON)</sub>	-	12	-	nS	V <sub>DS</sub> =-30V I <sub>D</sub> =-1A V <sub>GS</sub> =-10V R <sub>G</sub> =3.3Ω R <sub>D</sub> =30Ω
Rise Time	T <sub>r</sub>	-	6	-		
Turn-off Delay Time	T <sub>d(OFF)</sub>	-	82	-		
Fall Time	T <sub>f</sub>	-	36	-		
Input Capacitance	C <sub>iss</sub>	-	1780	2850	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =-25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	157	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	130	-		
Forward Transconductance	G <sub>fs</sub>	-	6	-	S	V <sub>DS</sub> =-10V, I <sub>D</sub> =-4A

**Source-Drain Diode**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Forward On Voltage <sup>2</sup>	V <sub>DS</sub>	-	-	-1.2	V	I <sub>S</sub> =-1.7A, V <sub>GS</sub> =0V.
Reverse Recovery Time <sup>2</sup>	T <sub>rr</sub>	-	43	-	nS	I <sub>S</sub> =-4A, V <sub>GS</sub> =0V dI/dt=100A/uS
Reverse Recovery Charge	Q <sub>rr</sub>	-	87	-	nC	

Notes: 1.Pulse width limited by Max. junction temperature.

2.Pulse width ≤300us, duty cycle ≤2%.

3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 135°C/W when mounted on Min. copper pad.

#### Characteristics Curve N-Channel

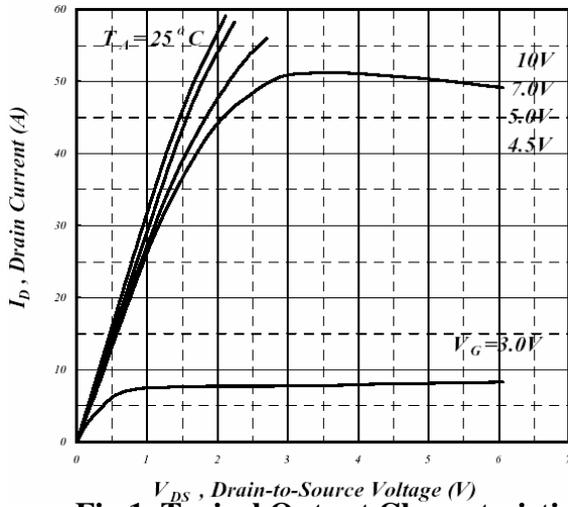


Fig 1. Typical Output Characteristics

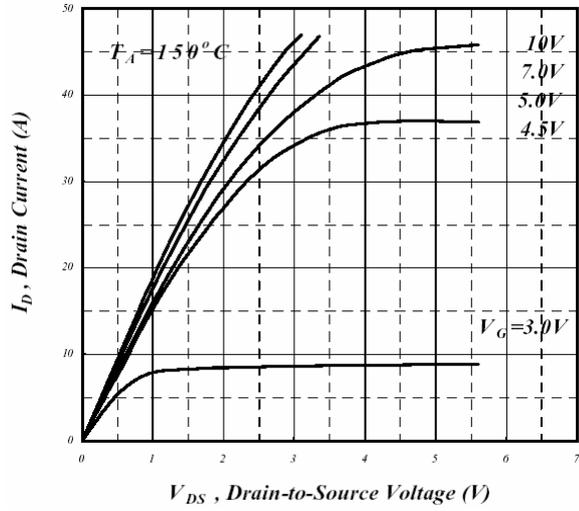


Fig 2. Typical Output Characteristics

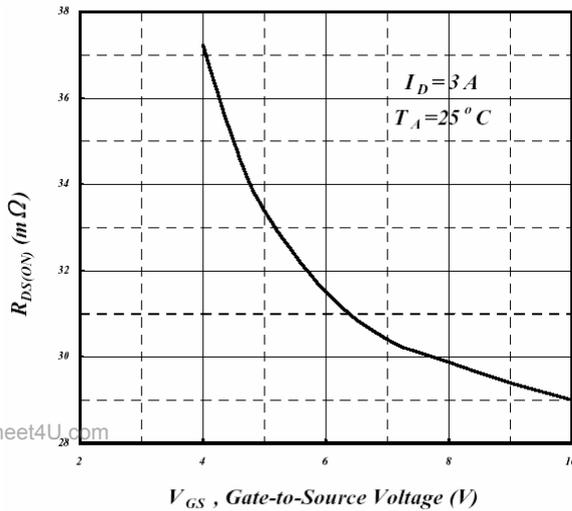


Fig 3. On-Resistance v.s. Gate Voltage

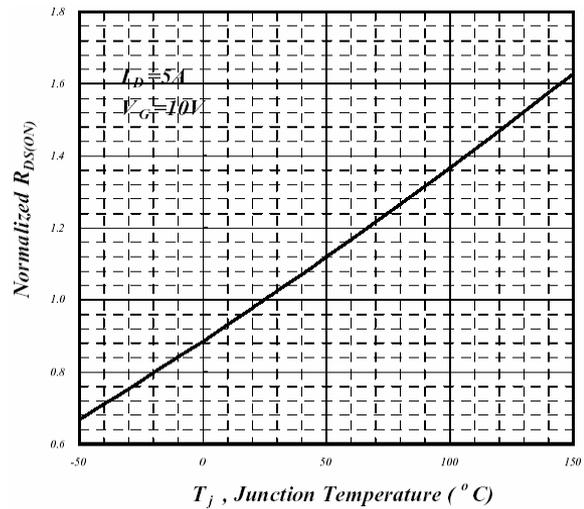


Fig 4. Normalized On-Resistance v.s. Junction Temperature

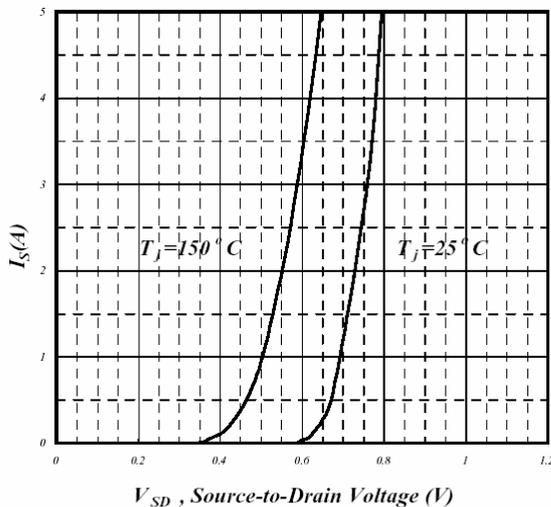


Fig 5. Forward Characteristics of Reverse Diode

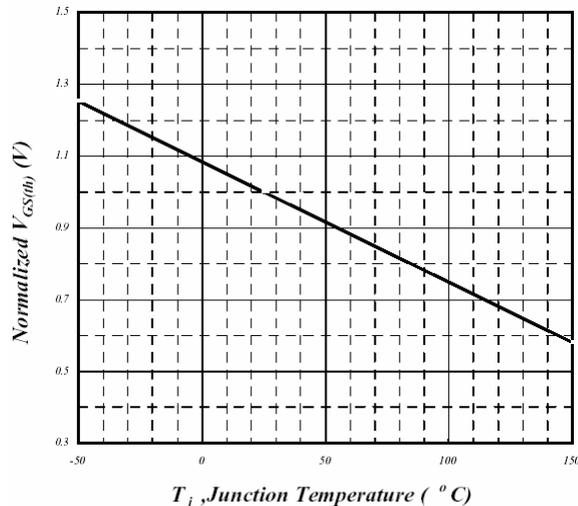
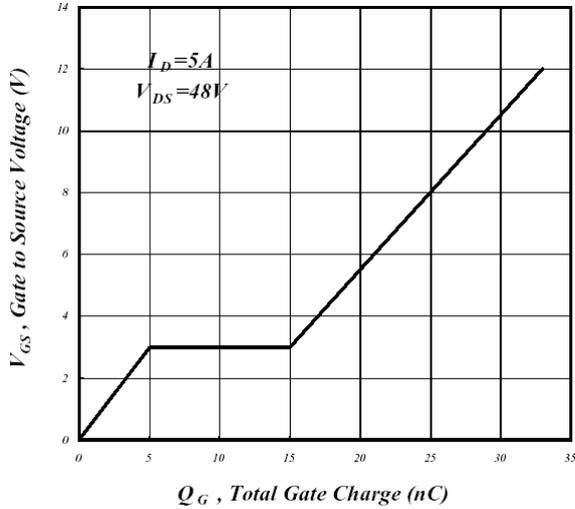
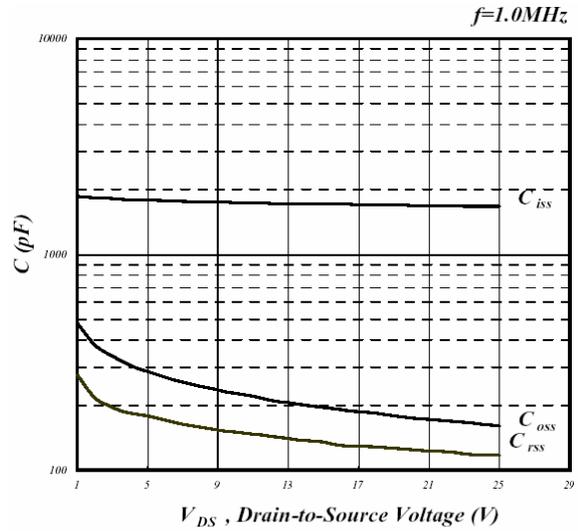


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

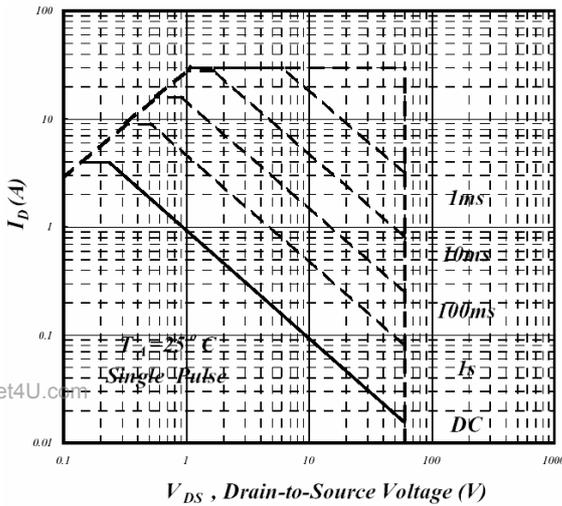
**N-Channel**



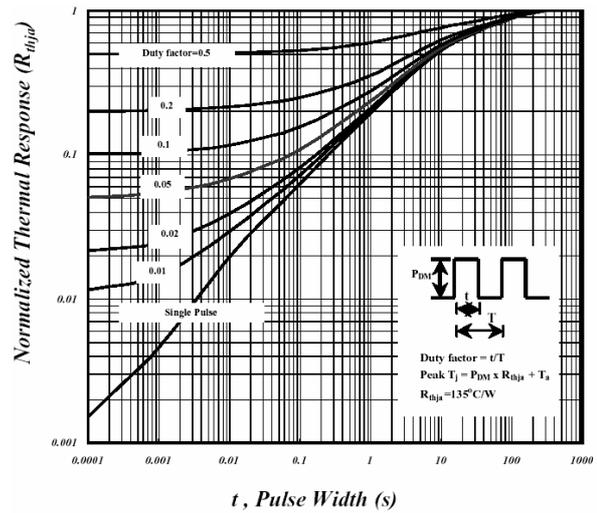
**Fig 7. Gate Charge Characteristics**



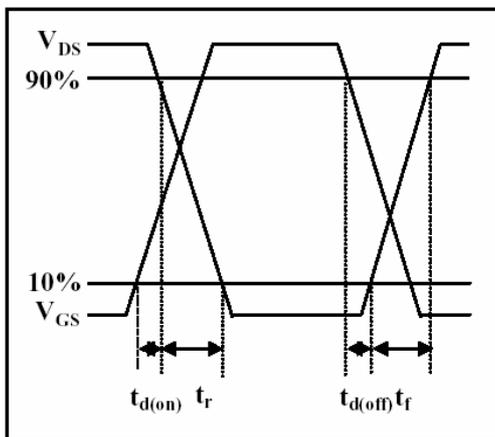
**Fig 8. Typical Capacitance Characteristics**



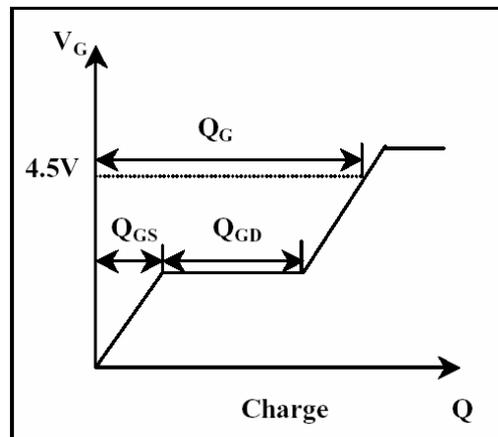
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**

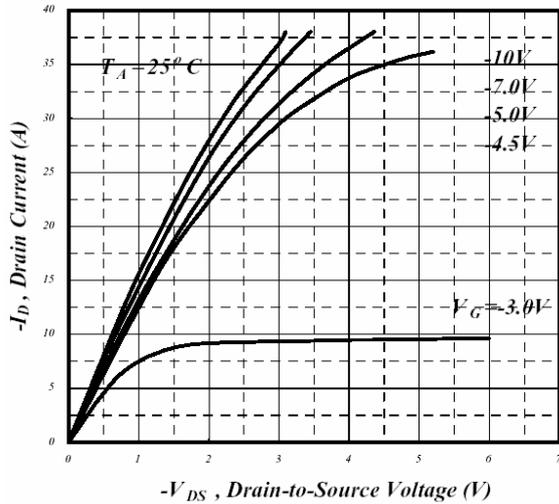


**Fig 11. Switching Time Waveform**

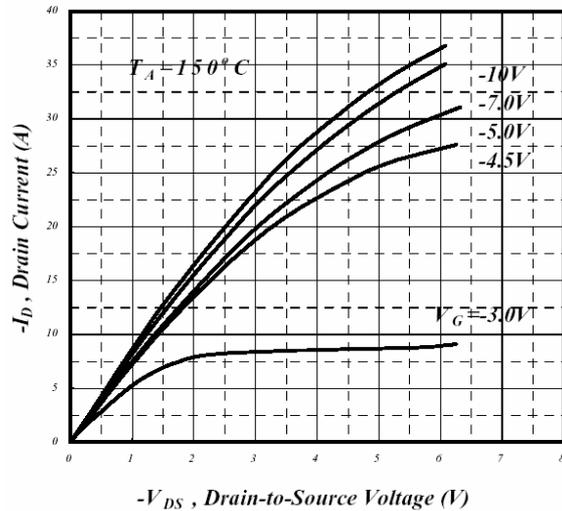


**Fig 12. Gate Charge Waveform**

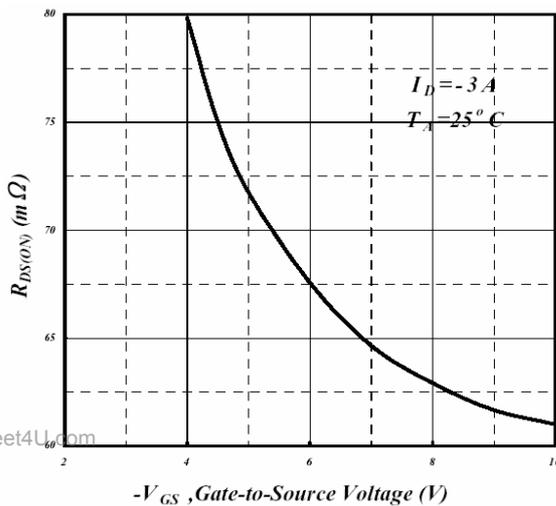
**P-Channel**



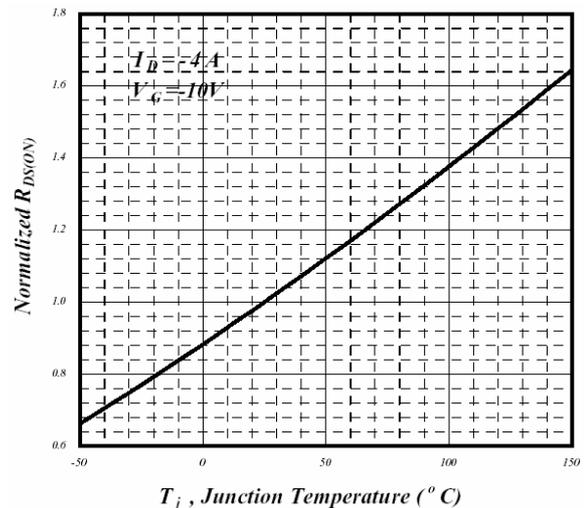
**Fig 1. Typical Output Characteristics**



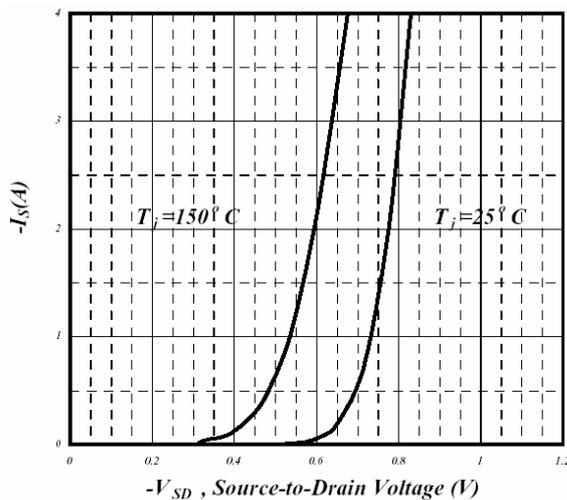
**Fig 2. Typical Output Characteristics**



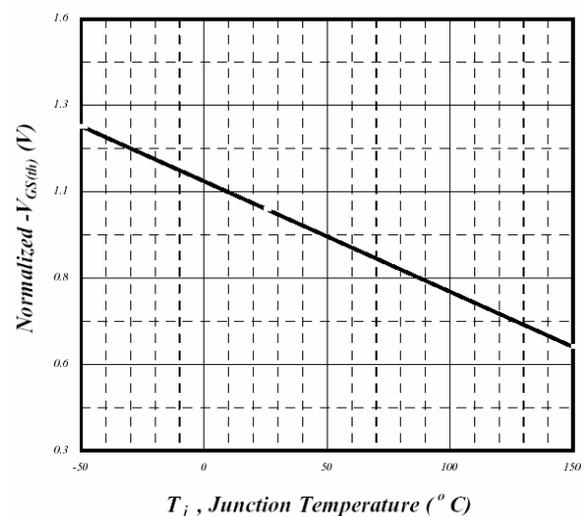
**Fig 3. On-Resistance v.s. Gate Voltage**



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



**Fig 5. Forward Characteristics of Reverse Diode**



**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

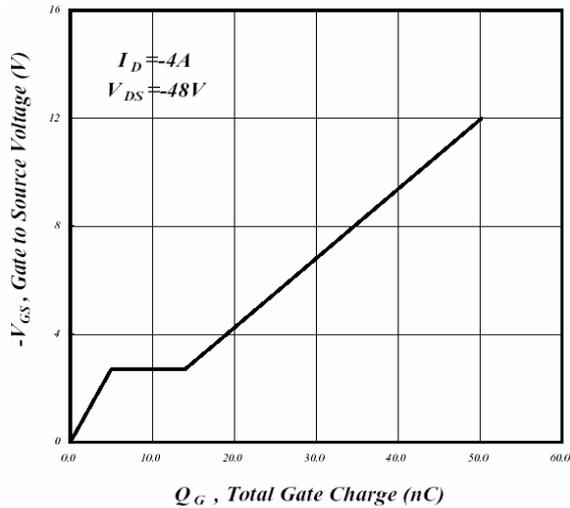
**SSG4575**

N Channel 6A, 60V,  $R_{DS(ON)} 36m\Omega$

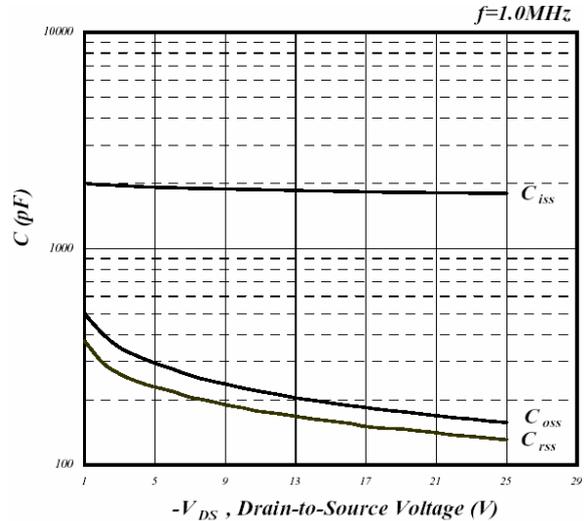
P Channel -4.2A, -60V,  $R_{DS(ON)} 72m\Omega$

Enhancement Mode Power Mos.FET

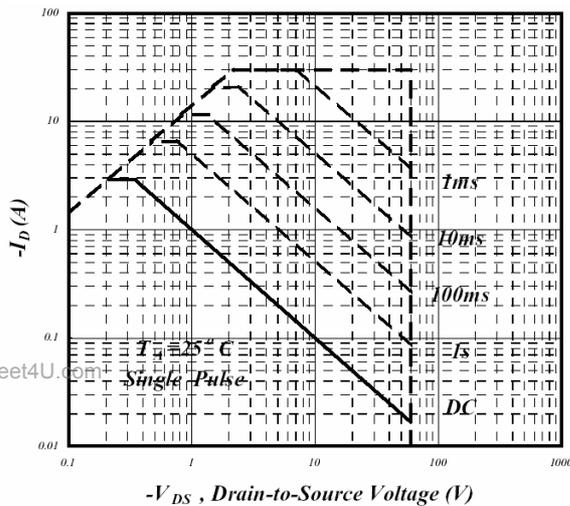
**P-Channel**



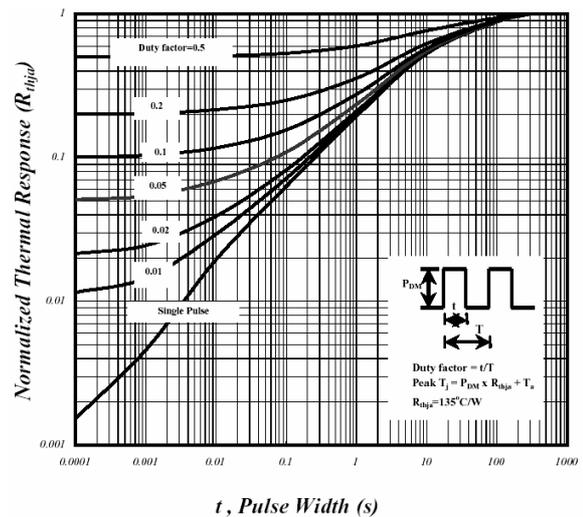
**Fig 7. Gate Charge Characteristics**



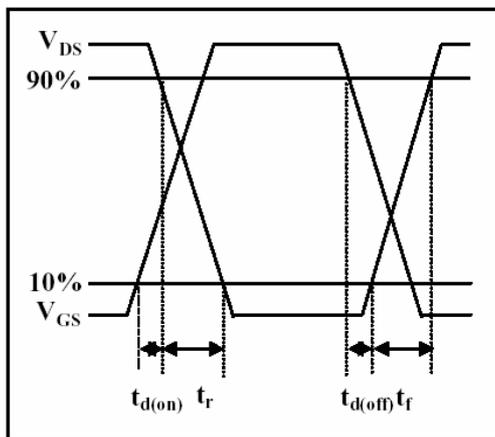
**Fig 8. Typical Capacitance Characteristics**



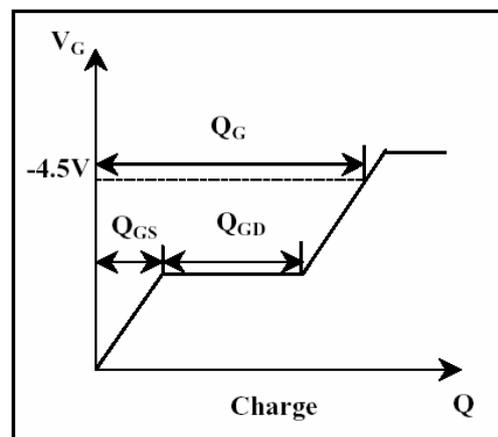
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