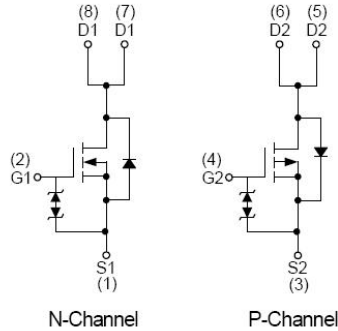
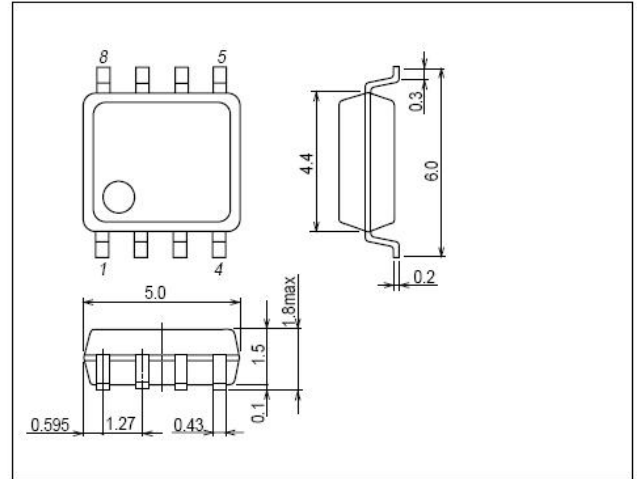


## Features

- Low On resistance.
- 2.5V drive.
- RoHS compliant.



## Package Dimensions

 unit : mm  
 SOP-8


## Specifications

### N-Channel

#### Absolute Maximum Ratings at $T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		20	V
Gate-to-Source Voltage	$V_{GSS}$		$\pm 12$	V
Drain Current (DC)	$I_D$		7	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	30	A
Allowable Power Dissipation	$P_D$	Mounted on a ceramic board ( $1000\text{mm}^2 \times 0.8\text{mm}$ ) 1unit	1.3	W
Total Dissipation	$P_T$	Mounted on a ceramic board ( $1000\text{mm}^2 \times 0.8\text{mm}$ )	1.7	W
Channel Temperature	$T_{ch}$		150	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$		-55~+150	$^{\circ}\text{C}$

#### Electrical Characteristics at $T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	20	-	-	V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20\text{V}$ , $V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10\text{V}$ , $V_{DS}=0\text{V}$	-	-	$\pm 10$	$\mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	0.55	0.7	0.95	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	$I_D=5\text{A}$ , $V_{GS}=4.5\text{V}$	-	12	15	$\text{m}\Omega$
	$R_{DS(ON)}$	$I_D=4\text{A}$ , $V_{GS}=2.5\text{V}$	-	14	18	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$	-	500	-	pF
Output Capacitance	$C_{oss}$	$V_{DS}=10\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$	-	300	-	pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=10\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$	-	140	-	pF

**Electrical Characteristics at  $T_a=25^{\circ}\text{C}$  (Continued)**

Parameter	Symbol	Conditions	Ratings			Unit
			min	Typ	max	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10\text{V}$ , $R_L=1.35\Omega$ , $R_{GEN}=3\Omega$ , $V_{GEN}=5\text{V}$	-	20	-	nS
Rise Time	$t_r$		-	19	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	65	-	nS
Fall Time	$t_f$		-	25	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=10\text{V}$ , $V_{GS}=4.5\text{V}$ , $I_D=5\text{A}$	-	10	-	nC
Gate-to-Source Charge	$Q_{gs}$		-	2.3	-	nC
Gate-to-Drain “Miller” Charge	$Q_{gd}$		-	2.9	-	nC
Diode Forward Voltage	$V_{SD}$	$I_S=1.7\text{A}$ , $V_{GS}=0\text{V}$	-	0.76	1.2	V

**Typical Characteristics at  $T_a=25^{\circ}\text{C}$**

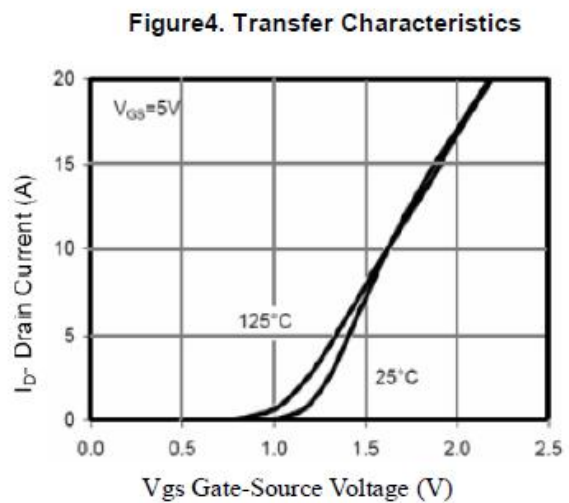
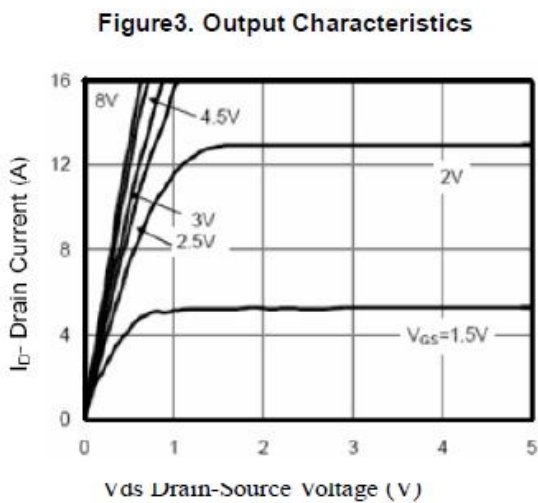
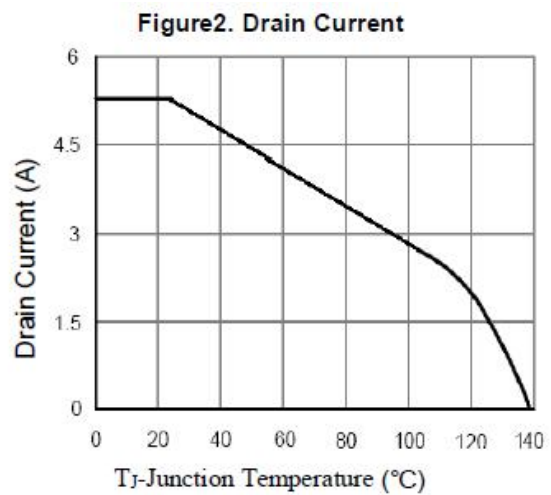
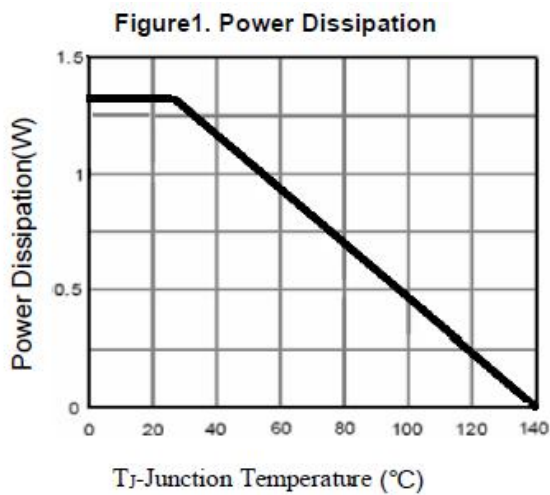


Figure5. Capacitance

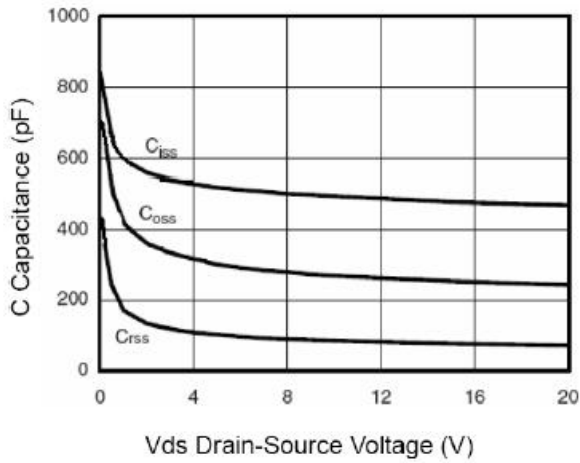


Figure6.  $R_{DS(ON)}$  vs Junction Temperature

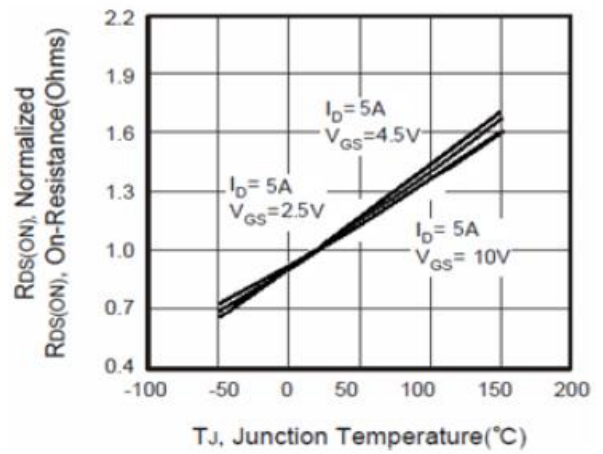


Figure7. Max  $BV_{DSS}$  vs Junction Temperature

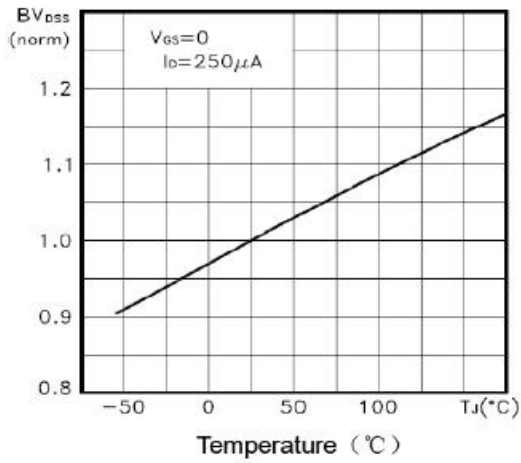


Figure8.  $V_{GS(th)}$  vs Junction Temperature

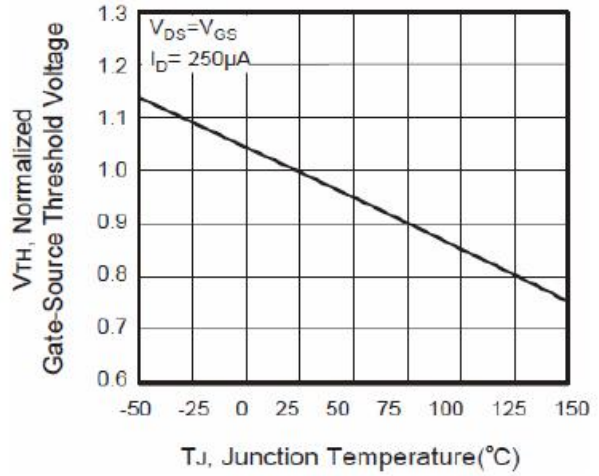


Figure9. Gate Charge Waveforms

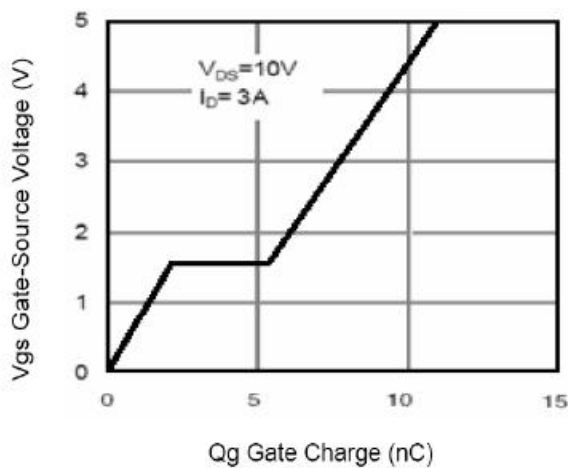


Figure10. Maximum Safe Operating Area

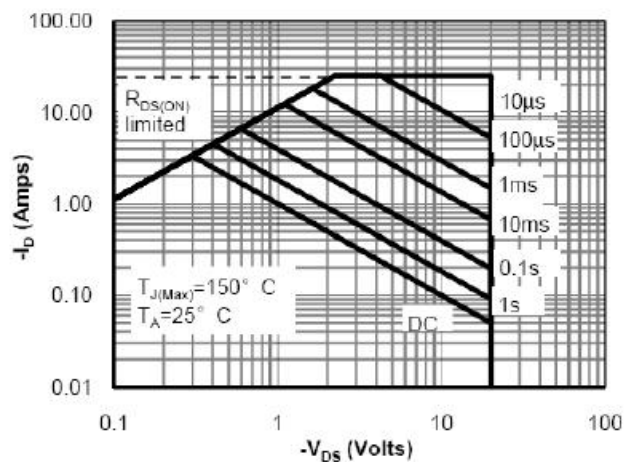
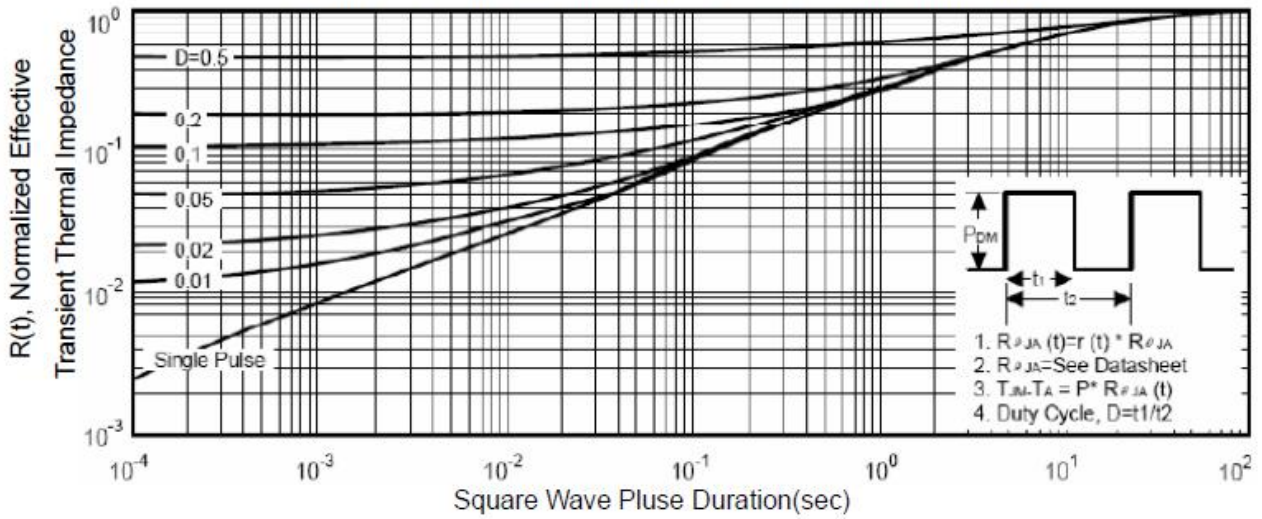


Figure11. Normalized Maximum Transient Thermal Impedance



## Specifications

### P-Channel

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		-18	V
Gate-to-Source Voltage	$V_{GSS}$		+12	V
Drain Current (DC)	$I_D$		-7	A
Drain Current (Pulse)	$I_{DP}$	PW≤10uS, duty cycle≤1%	-40	A
Allowable Power Dissipation	$P_D$	Mounted on a ceramic board (1000mm <sup>2</sup> ×0.8mm) 1unit	1.3	W
Total Dissipation	$P_T$	Mounted on a ceramic board (1000mm <sup>2</sup> ×0.8mm)	1.7	W
Channel Temperature	$T_{ch}$		150	°C
Storage Temperature	$T_{stg}$		-55~+150	°C

### Electrical Characteristics at $T_a=25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-18	-	-	V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20\text{V}$ , $V_{GS}=0\text{V}$	-	-	-1	uA
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12\text{V}$ , $V_{DS}=0\text{V}$	-	-	+100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-0.5	-0.7	-1.4	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	$I_D=-5\text{A}$ , $V_{GS}=-4.5\text{V}$	-	25	32	mΩ
	$R_{DS(ON)}$	$I_D=-4\text{A}$ , $V_{GS}=-2.5\text{V}$	-	35	46	mΩ
Input Capacitance	$C_{iss}$	$V_{DS}=-10\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$	-	740	-	pF
Output Capacitance	$C_{oss}$	$V_{DS}=-10\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$	-	290	-	pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=-10\text{V}$ , $V_{GS}=0\text{V}$ , $f=1\text{MHz}$	-	190	-	pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-10\text{V}$ , $I_D=-1\text{A}$ , $R_{GEN}=6\Omega$ , $V_{GEN}=-4.5\text{V}$	-	12	-	nS
Rise Time	$t_r$		-	35	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	30	-	nS
Fall Time	$t_f$		-	10	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-10\text{V}$ , $V_{GS}=-4.5\text{V}$ , $I_D=-5\text{A}$	-	7.8	-	nC

Gate-to-Source Charge	$Q_{gs}$		-	1.2	-	nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$		-	1.6	-	nC
Diode Forward Voltage	$V_{SD}$	$I_S=-1.7A, V_{GS}=0V$	-	-0.8	-1.2	V

Typical Characteristics at  $T_a=25^{\circ}C$

Figure 1: Switching Test Circuit

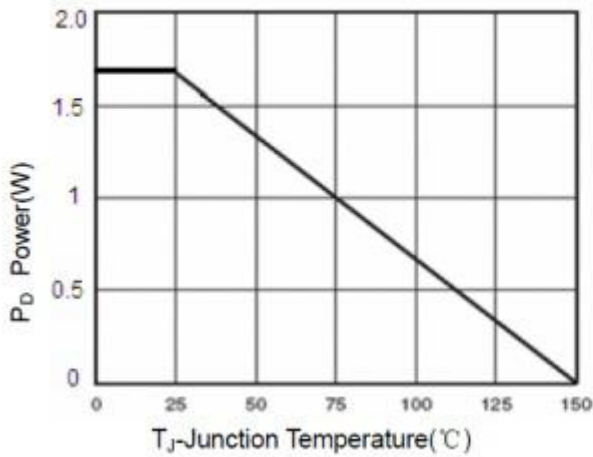


Figure 2: Switching Waveforms

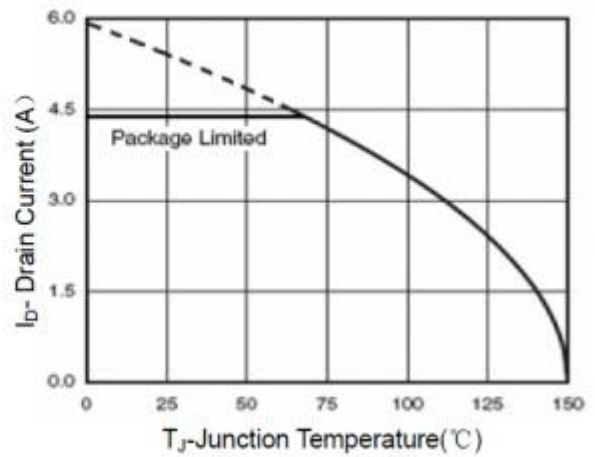


Figure 3 Power Dissipation

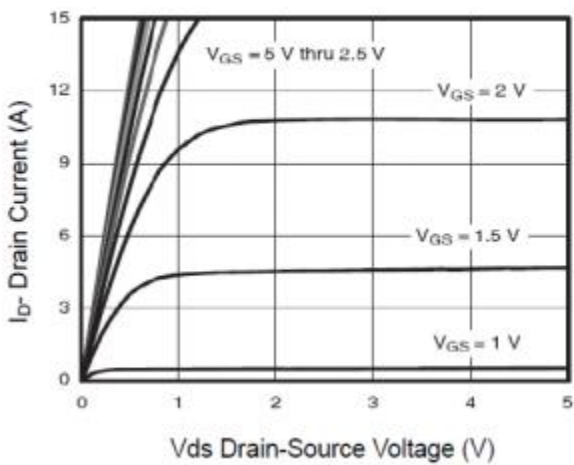


Figure 4 Drain Current

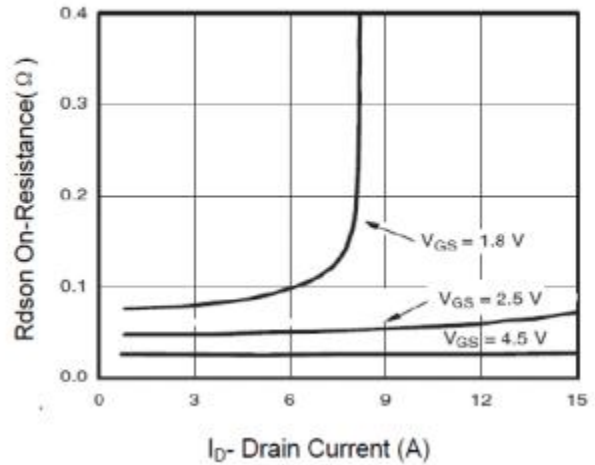


Figure 5 Output Characteristics

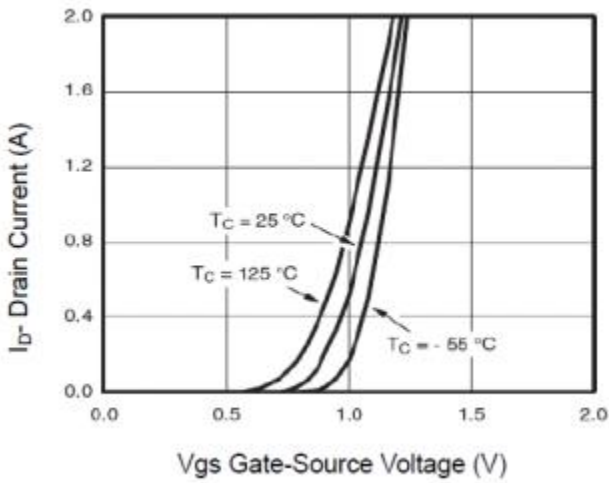


Figure 6 Drain-Source On-Resistance

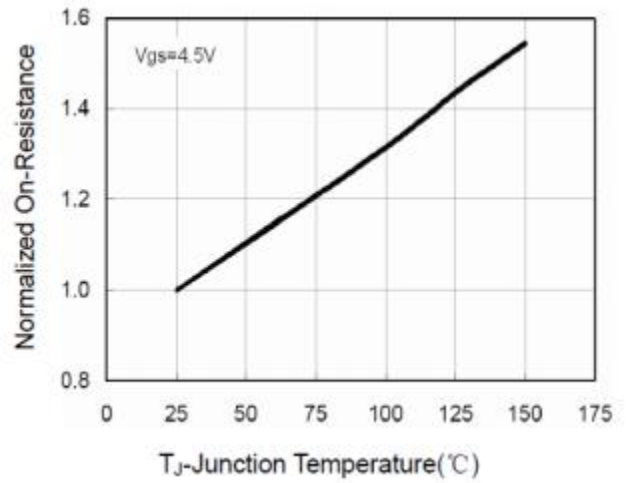


Figure 7 Transfer Characteristics

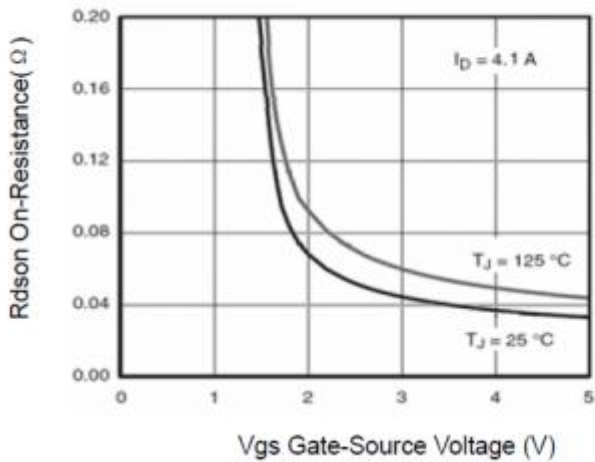


Figure 8 Drain-Source On-Resistance

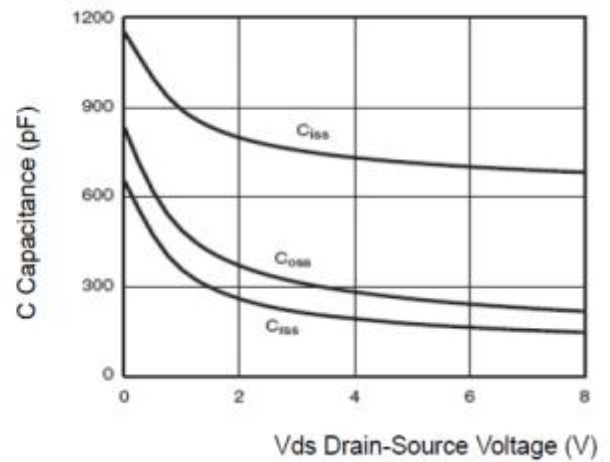


Figure 9 Rdson vs Vgs

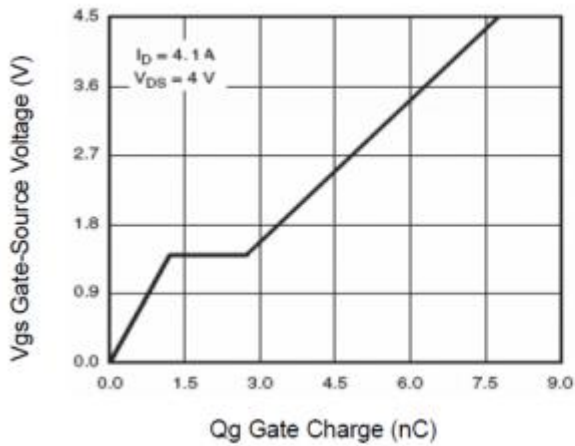


Figure 10 Capacitance vs Vds

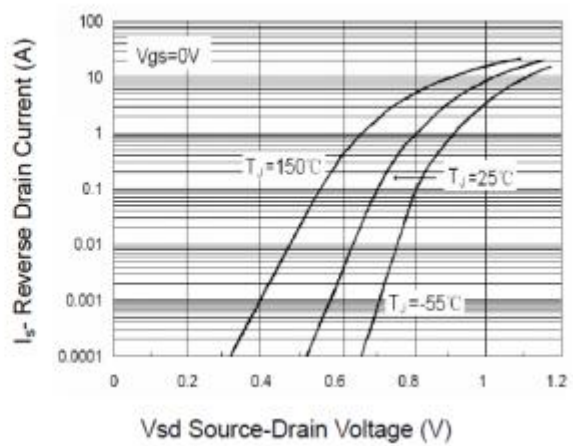


Figure 11 Gate Charge

Figure 12 Source- Drain Diode Forward

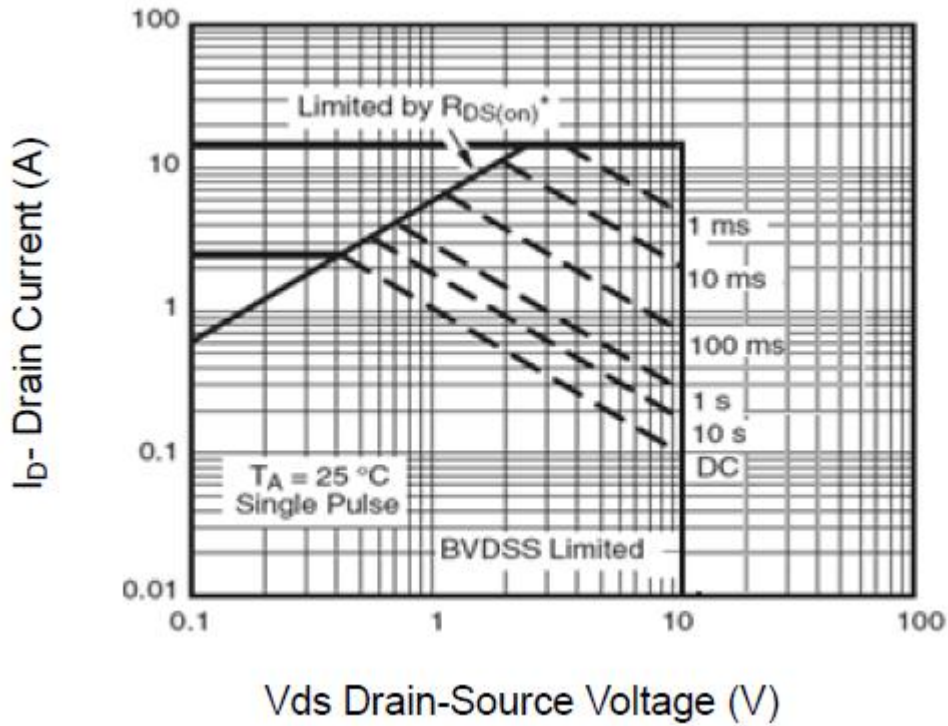


Figure 13 Safe Operation Area

