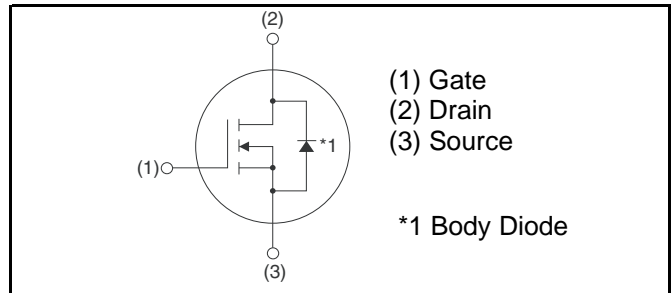


$V_{DSS}$	1200V
$R_{DS(on)}$ (Typ.)	30m $\Omega$
$I_D$	72A <sup>*1</sup>

### ●Features

- 1) Low on-resistance
- 2) Fast switching speed
- 3) Fast reverse recovery
- 4) Easy to parallel
- 5) Simple to drive

### ●Inner circuit



### ●Application

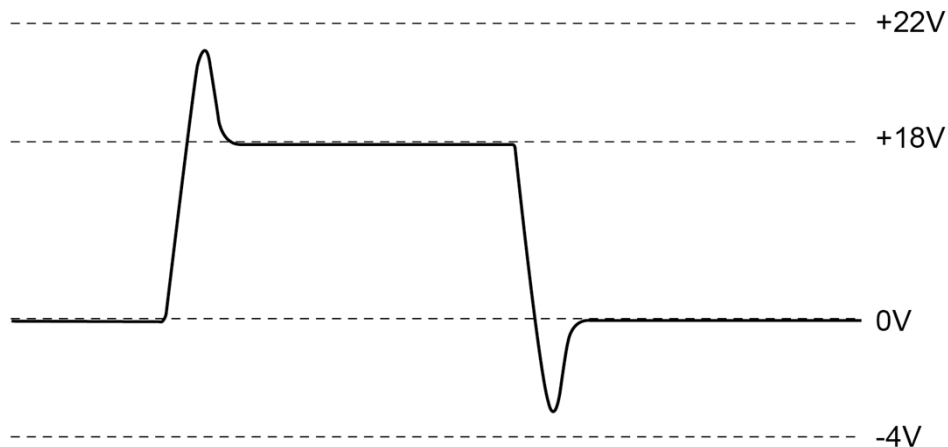
- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating
- Motor drives

### ●Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Value	Unit
Drain - Source voltage	$V_{DSS}$	1200	V
Continuous drain current	$I_D$ <sup>*1</sup>	72	A
Pulsed drain current	$I_{D,pulse}$ <sup>*2</sup>	180	A
Gate - Source voltage	$V_{GSS}$	-4 to 22	V
Gate-Source Surge Voltage	$V_{GSS,surge}$	-4 to 22	V
Recommended Drive Voltage	$V_{GS,op}$	0 / 18	V
Junction temperature	$T_j$	175	$^\circ\text{C}$
Range of storage temperature	$T_{stg}$	-55 to +175	$^\circ\text{C}$

**●Electrical characteristics ( $T_a = 25^\circ\text{C}$ )**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1mA$	1200	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 1200V, V_{GS} = 0V$ $T_j = 25^\circ\text{C}$	-	1	10	$\mu\text{A}$
		$T_j = 150^\circ\text{C}$	-	2	-	
Gate - Source leakage current	$I_{GSS+}$	$V_{GS} = +22V, V_{DS} = 0V$	-	-	100	nA
Gate - Source leakage current	$I_{GSS-}$	$V_{GS} = -4V, V_{DS} = 0V$	-	-	-100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 13.3mA$	2.7	-	5.6	V
Static drain - source on - state resistance	$R_{DS(on)}^{*3}$	$V_{GS} = 18V, I_D = 27A$ $T_j = 25^\circ\text{C}$	-	30	37.5	$m\Omega$
		$T_j = 125^\circ\text{C}$	-	45	-	
Gate input resistance	$R_G$	$f = 1MHz, \text{open drain}$	-	5	-	$\Omega$

**●Example of acceptable Vgs waveform**


**●Electrical characteristics (T<sub>a</sub> = 25°C)**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Transconductance	$g_{fs}^{*3}$	V <sub>DS</sub> = 10V, I <sub>D</sub> = 27A	-	10.8	-	S
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V	-	2222	-	pF
Output capacitance	C <sub>oss</sub>	V <sub>DS</sub> = 800V	-	180	-	
Reverse transfer capacitance	C <sub>rss</sub>	f = 1MHz	-	72	-	
Effective output capacitance, energy related	C <sub>o(er)</sub>	V <sub>GS</sub> = 0V V <sub>DS</sub> = 0V to 600V	-	157	-	pF
Turn - on delay time	$t_{d(on)}^{*3}$	V <sub>DD</sub> = 400V, I <sub>D</sub> = 18A	-	24	-	ns
Rise time	$t_r^{*3}$	V <sub>GS</sub> = 18V/0V	-	42	-	
Turn - off delay time	$t_{d(off)}^{*3}$	R <sub>L</sub> = 22Ω	-	61	-	
Fall time	$t_f^{*3}$	R <sub>G</sub> = 0Ω	-	29	-	
Turn - on switching loss	E <sub>on</sub> <sup>*3</sup>	V <sub>DD</sub> = 600V, I <sub>D</sub> =27A V <sub>GS</sub> = 18V/0V	-	468	-	μJ
Turn - off switching loss	E <sub>off</sub> <sup>*3</sup>	R <sub>G</sub> = 0Ω L=250μH *E <sub>on</sub> includes diode reverse recovery	-	204	-	

**●Gate Charge characteristics (T<sub>a</sub> = 25°C)**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q <sub>g</sub> <sup>*3</sup>	V <sub>DD</sub> = 600V	-	131	-	nC
Gate - Source charge	Q <sub>gs</sub> <sup>*3</sup>	I <sub>D</sub> = 27A	-	30	-	
Gate - Drain charge	Q <sub>gd</sub> <sup>*3</sup>	V <sub>GS</sub> = 18V	-	55	-	
Gate plateau voltage	V <sub>(plateau)</sub>	V <sub>DD</sub> = 600V, I <sub>D</sub> = 27A	-	9.6	-	V

\*1 For T<sub>j</sub>=175°C and thermal dissipation to ambience of 339W or more.  
Limited only by maximum temperature allowed.

\*2 PW ≤ 10μs, Duty cycle ≤ 1%

\*3 Pulsed

**●Body diode electrical characteristics (Source-Drain) ( $T_a = 25^\circ\text{C}$ )**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Inverse diode continuous, forward current	$I_S^{*1}$	$T_c = 25^\circ\text{C}$	-	-	72	A
Inverse diode direct current, pulsed	$I_{SM}^{*2}$		-	-	180	A
Forward voltage	$V_{SD}^{*3}$	$V_{GS} = 0\text{V}, I_S = 27\text{A}$	-	3.2	-	V
Reverse recovery time	$t_{rr}^{*3}$	$I_F = 27\text{A}, V_R = 600\text{V}$ $di/dt = 1100\text{A}/\mu\text{s}$	-	27	-	ns
Reverse recovery charge	$Q_{rr}^{*3}$		-	135	-	nC
Peak reverse recovery current	$I_{rrm}^{*3}$		-	10	-	A

●Electrical characteristic curves

Fig.1 Typical Output Characteristics(I)

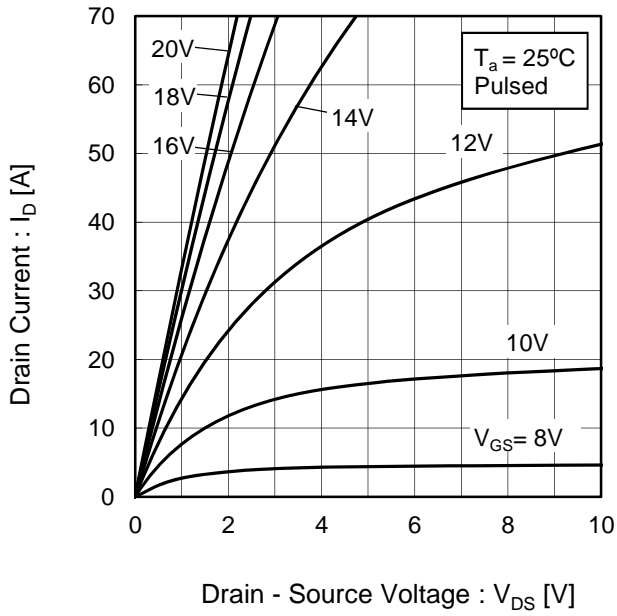


Fig.2 Typical Output Characteristics(II)

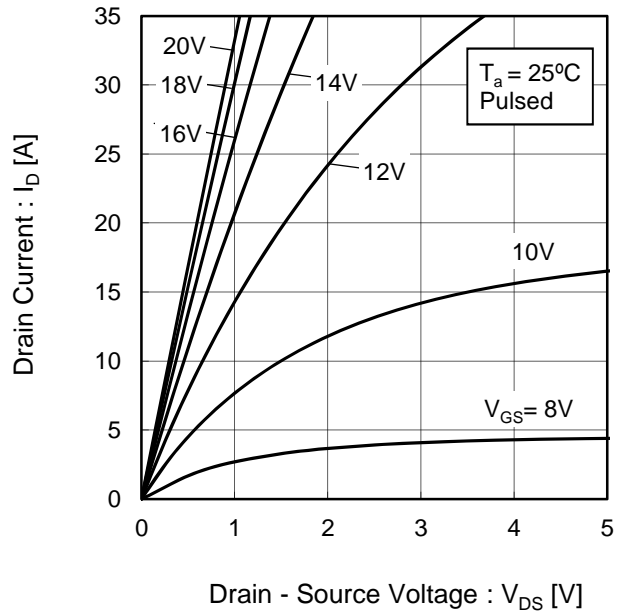


Fig.3  $T_j = 150^\circ\text{C}$  Typical Output Characteristics(I)

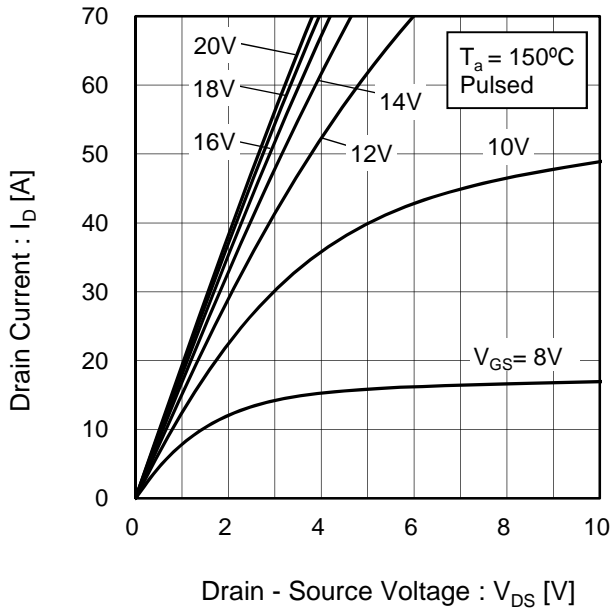
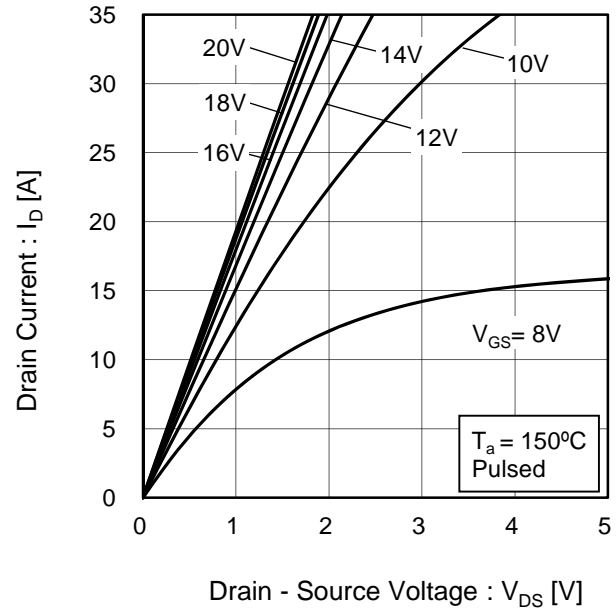


Fig.4  $T_j = 150^\circ\text{C}$  Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.5 Typical Transfer Characteristics (I)

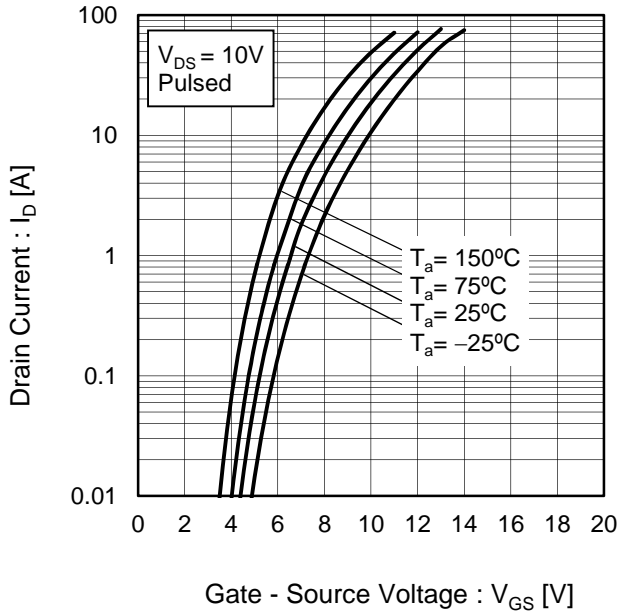


Fig.6 Typical Transfer Characteristics (II)

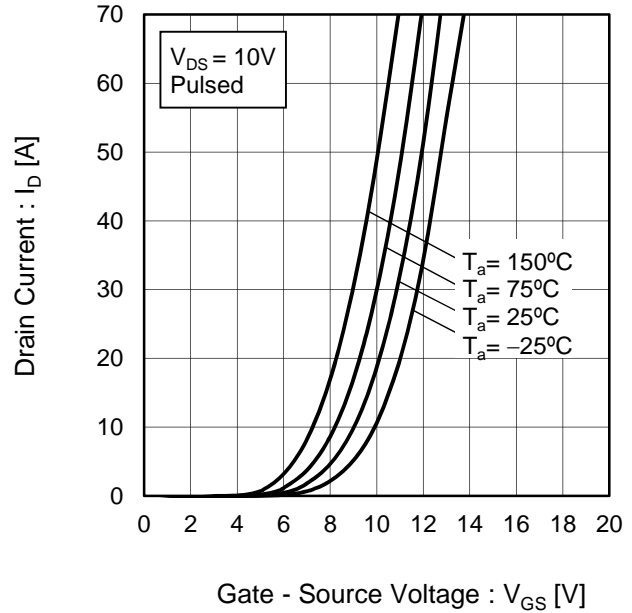


Fig.7 Gate Threshold Voltage vs. Junction Temperature

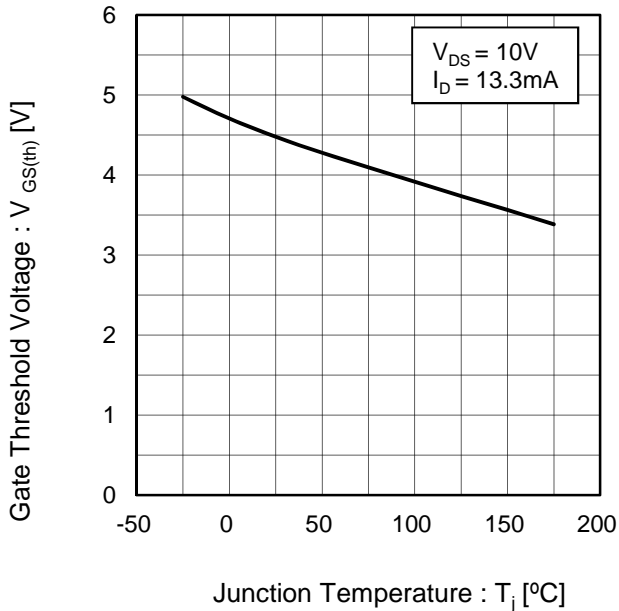
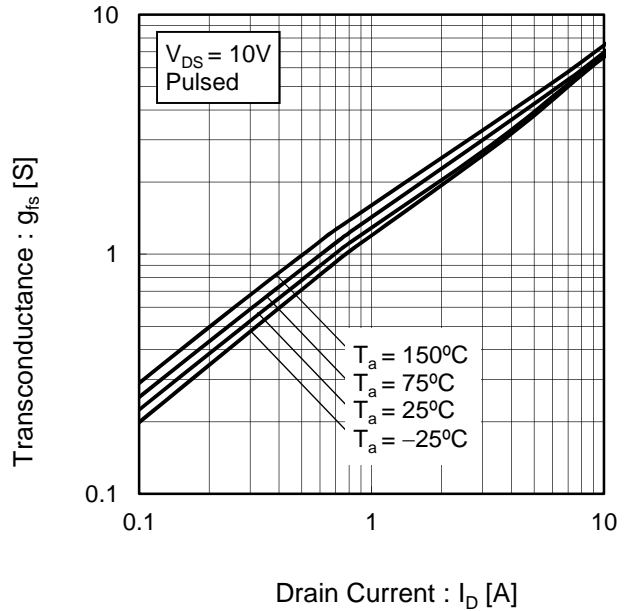


Fig.8 Transconductance vs. Drain Current



●Electrical characteristic curves

Fig.9 Static Drain - Source On - State Resistance vs. Gate - Source Voltage

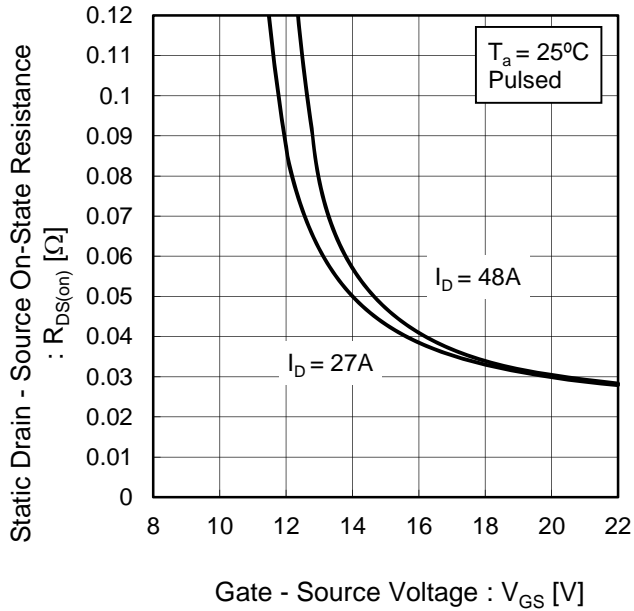


Fig.10 Static Drain - Source On - State Resistance vs. Junction Temperature

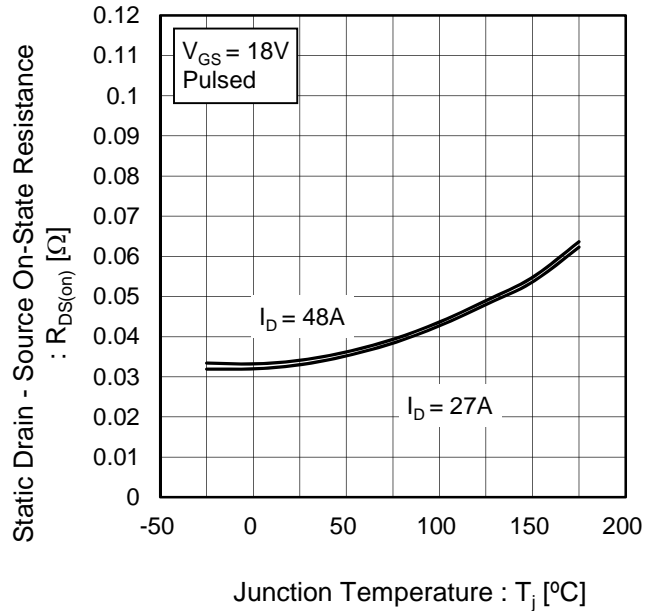
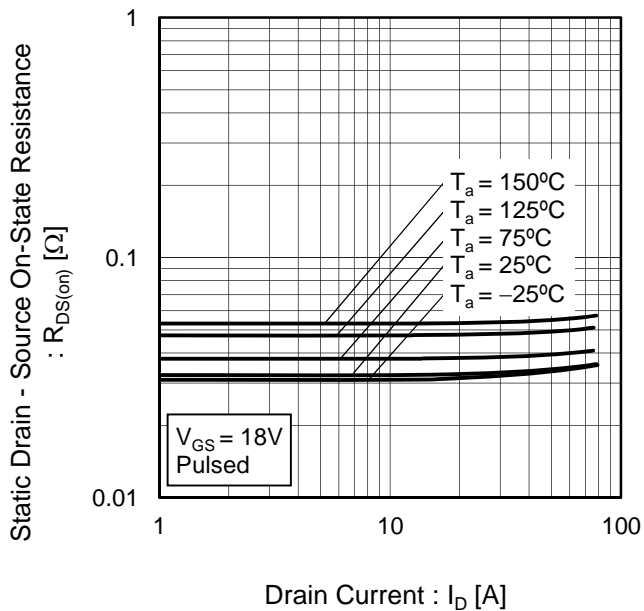


Fig.11 Static Drain - Source On - State Resistance vs. Drain Current



●Electrical characteristic curves

Fig.12 Typical Capacitance vs. Drain - Source Voltage

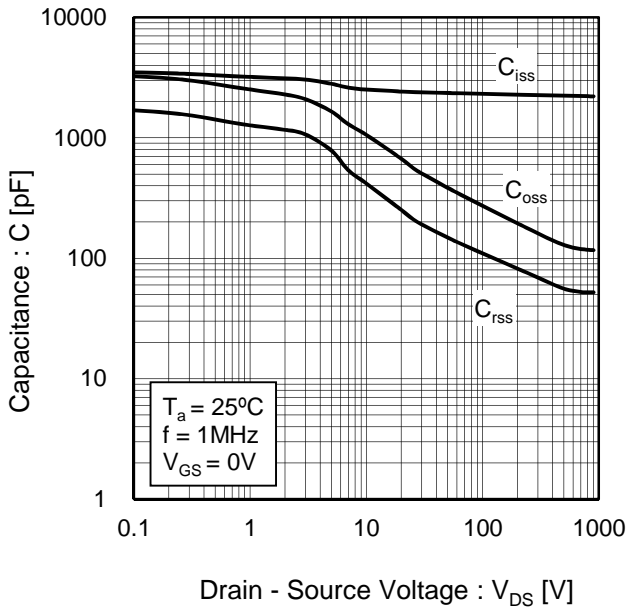


Fig.13 Coss Stored Energy

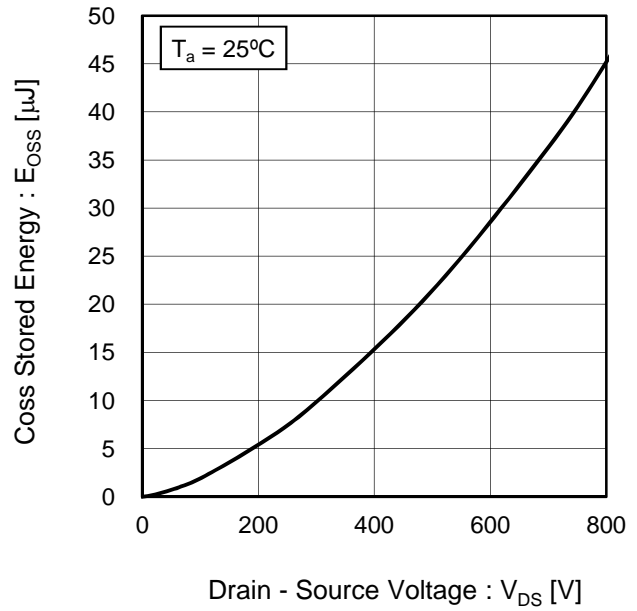


Fig.14 Switching Characteristics

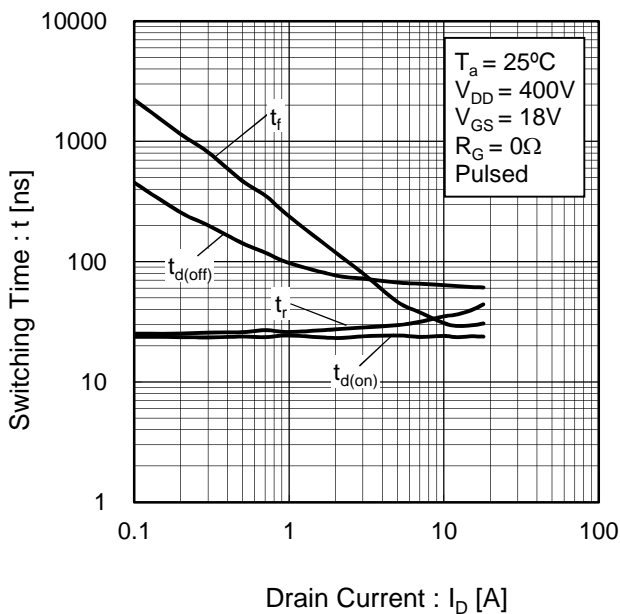
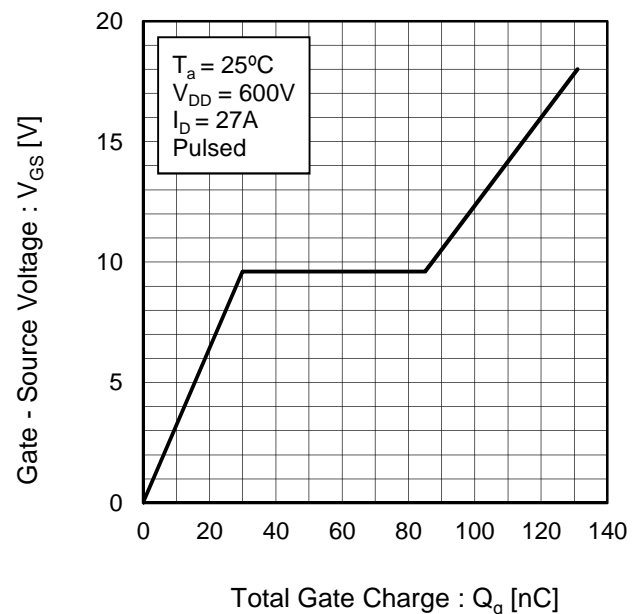


Fig.15 Dynamic Input Characteristics





●Electrical characteristic curves

Fig.16 Typical Switching Loss vs. Drain - Source Voltage

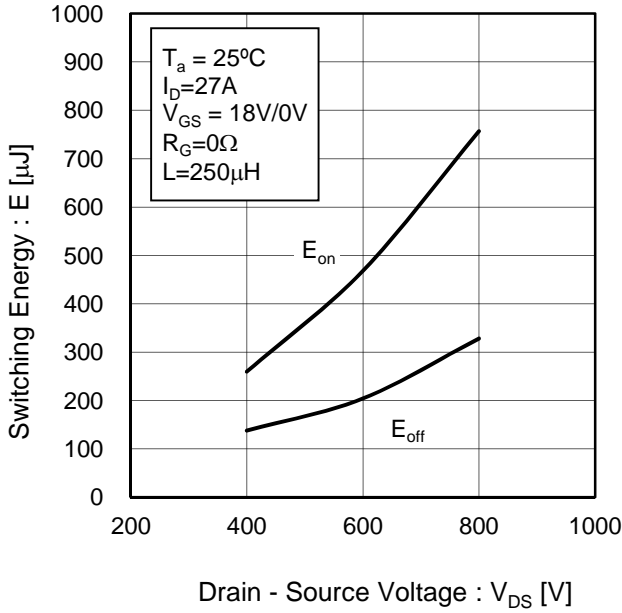


Fig.17 Typical Switching Loss vs. Drain Current

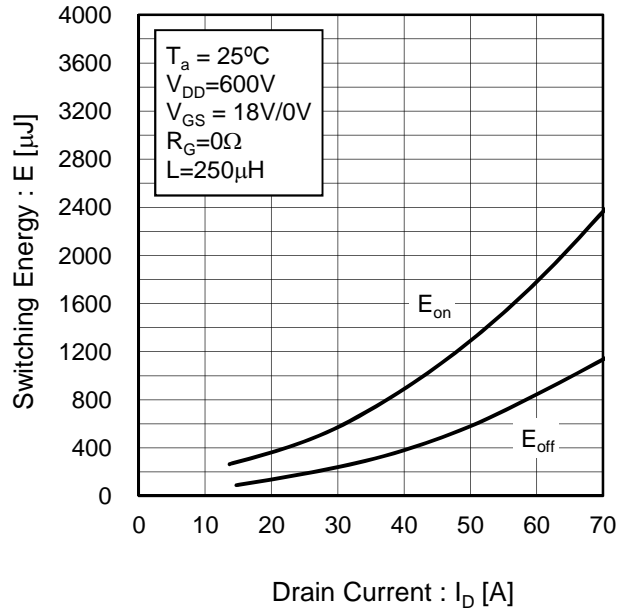
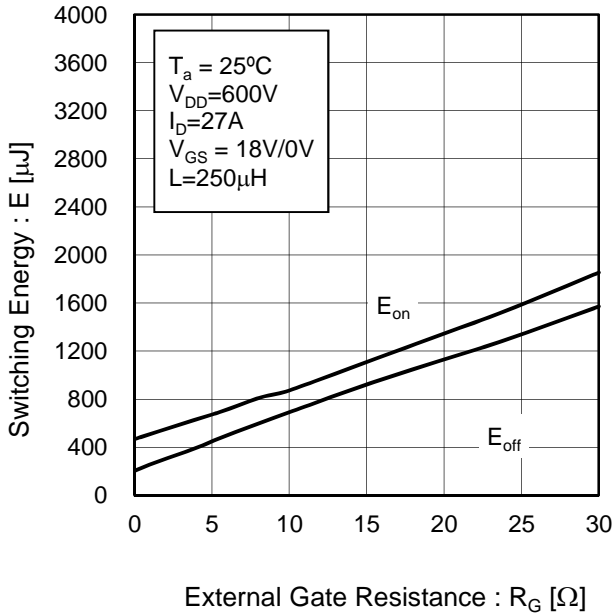


Fig.18 Typical Switching Loss vs. External Gate Resistance



●Electrical characteristic curves

Fig.19 Inverse Diode Forward Current vs. Source - Drain Voltage

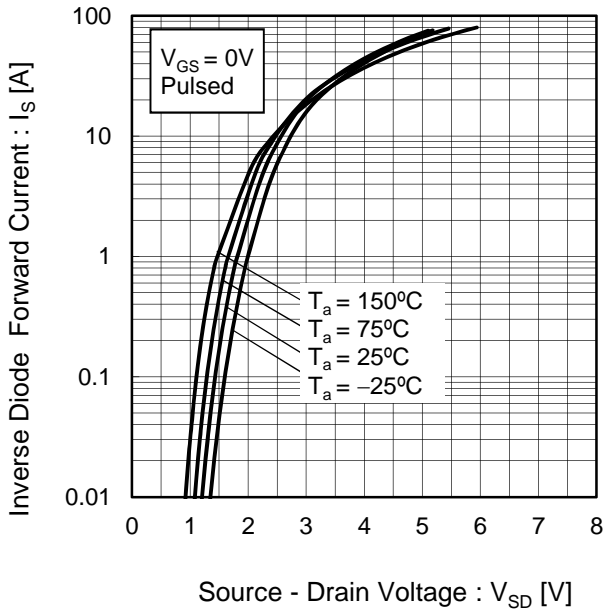
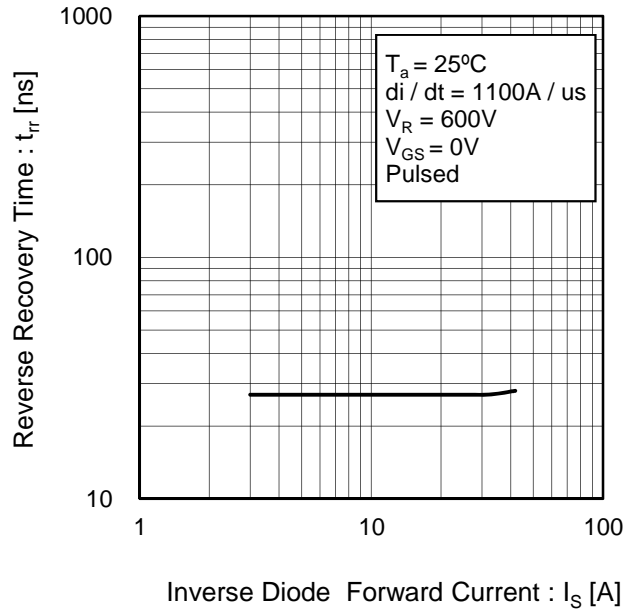


Fig.20 Reverse Recovery Time vs. Inverse Diode Forward Current



● Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

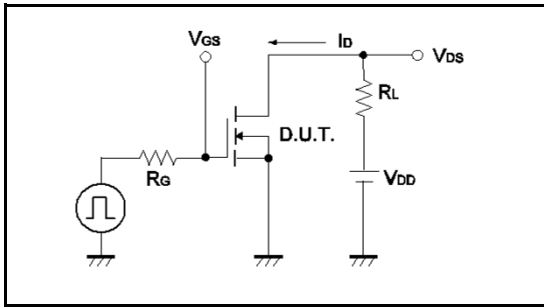


Fig.1-2 Switching Waveforms

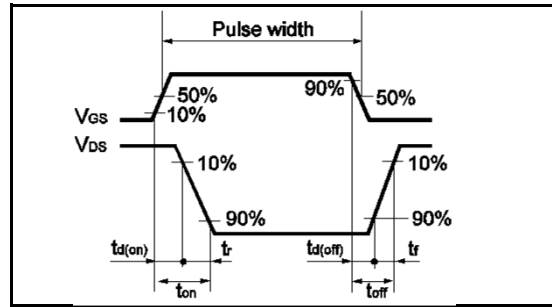


Fig.2-1 Gate Charge Measurement Circuit

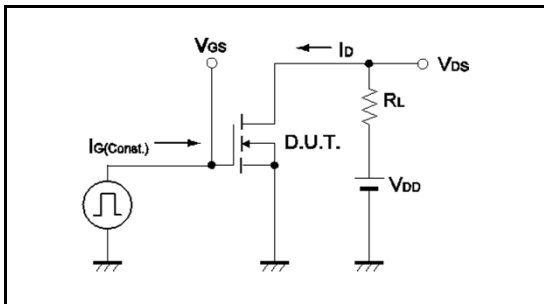


Fig.2-2 Gate Charge Waveform

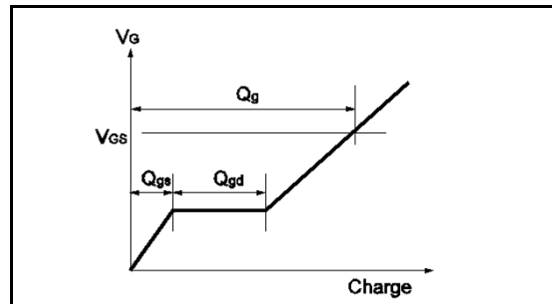


Fig.3-1 Switching Energy Measurement Circuit

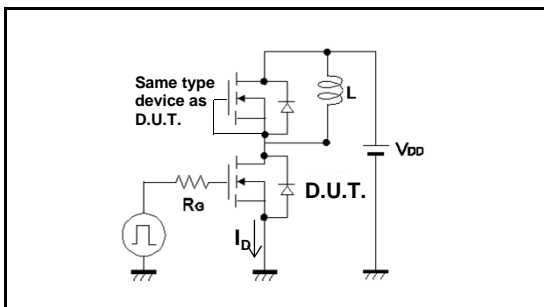


Fig.3-2 Switching Waveforms

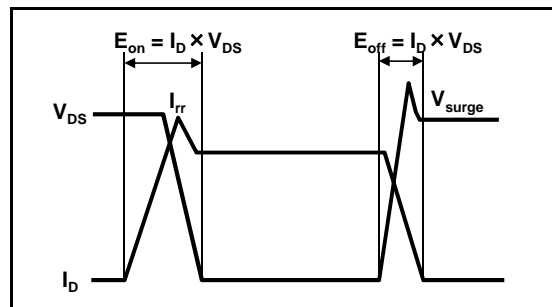


Fig.4-1 Reverse Recovery Time Measurement Circuit

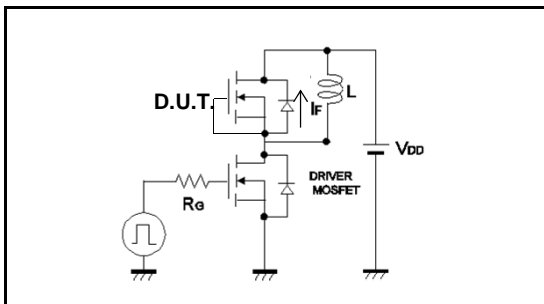
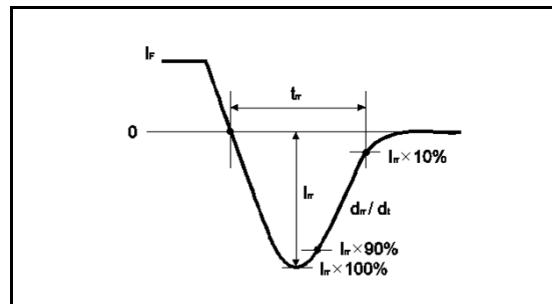


Fig.4-2 Reverse Recovery Waveform



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