

## 200V N-Channel MOSFETS

### TO-252 Pin Configuration

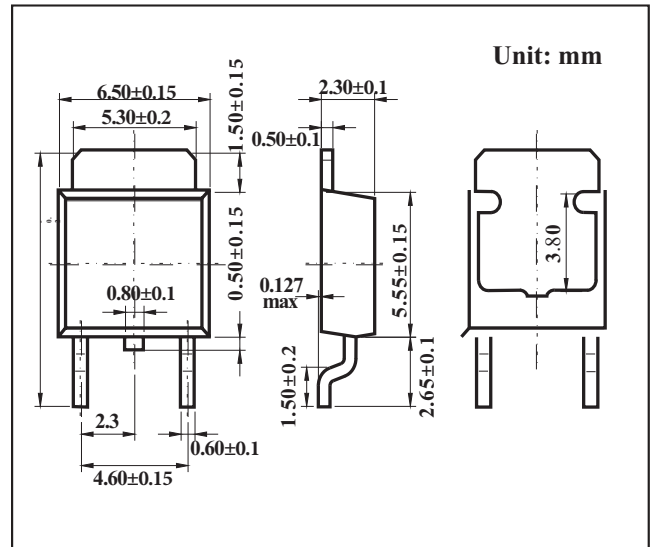
BVDSS	RDSON	ID
200V	0.240	9A

#### Features

- 200V,9A,  $R_{DS(ON)} = 0.24\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available

#### Applications

- Networking
- Load Switch
- LED applications



### MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	200	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current – Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	9	A
Drain Current – Continuous ( $T_C=100^\circ\text{C}$ )		5.7	A
Drain Current – Pulsed <sup>1</sup>	$I_{DM}$	36	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	220	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	21	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	44	W
Power Dissipation – Derate above 25°C		0.35	W/°C
Storage Temperature Range	$T_{STG}$	-55 to +150	°C
Operating Junction Temperature Range	$T_J$	-55 to +150	°C

### Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction to ambient	$R_{\theta JA}$	---	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	2.87	°C/W



## MOSFETELECTRICALCHARACTERISTICS<sub>T<sub>A</sub>= 25c unless otherwise specified</sub>

### Off Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	200	---	---	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =200V , V <sub>GS</sub> =0V , T <sub>J</sub> =25 °C	---	---	1	uA
		V <sub>DS</sub> =160V , V <sub>GS</sub> =0V , T <sub>J</sub> =125 °C	---	---	10	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =± 20V , V <sub>DS</sub> =0V	---	---	± 100	nA

### On Characteristics

Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V , I <sub>D</sub> =4A	---	0.2	0.24	Ω
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1	2	3	V
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =30V , I <sub>D</sub> =3A	---	4	---	S

### Dynamic and switching Characteristics

Total Gate Charge <sup>3, 4</sup>	Q <sub>g</sub>	V <sub>DS</sub> =100V , V <sub>GS</sub> =10V , I <sub>D</sub> =5A	---	12	18	nC
Gate-Source Charge <sup>3, 4</sup>	Q <sub>gs</sub>		---	1	3	
Gate-Drain Charge <sup>3, 4</sup>	Q <sub>gd</sub>		---	5	8	
Turn-On Delay Time <sup>3, 4</sup>	T <sub>d(on)</sub>	V <sub>DD</sub> =100V , V <sub>GS</sub> =10V , R <sub>G</sub> =60 I <sub>D</sub> =5A	---	5	9	ns
Rise Time <sup>3, 4</sup>	T <sub>r</sub>		---	17.4	33	
Turn-Off Delay Time <sup>3, 4</sup>	T <sub>d(off)</sub>		---	40.7	80	
Fall Time <sup>3, 4</sup>	T <sub>f</sub>		---	11.4	23	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =100V , V <sub>GS</sub> =0V , F=1MHz	---	540	810	pF
Output Capacitance	C <sub>oss</sub>		---	48	72	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	11	17	
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V , V <sub>DS</sub> =0V , F=1MHz	---	2.6	---	Ω

### Drain-Source Diode Characteristics and Maximum Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I <sub>S</sub>	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	9	A
Pulsed Source Current	I <sub>SM</sub>		---	---	18	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25 °C	---	---	1	V
Reverse Recovery Time	t <sub>rr</sub>	V <sub>R</sub> =200V, I <sub>S</sub> =5A	---	130	---	ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt=100A/μs , T <sub>J</sub> =25 °C	---	520	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=1mH, I<sub>AS</sub>=21A., R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

## RATINGS AND CHARACTERISTIC CURVES

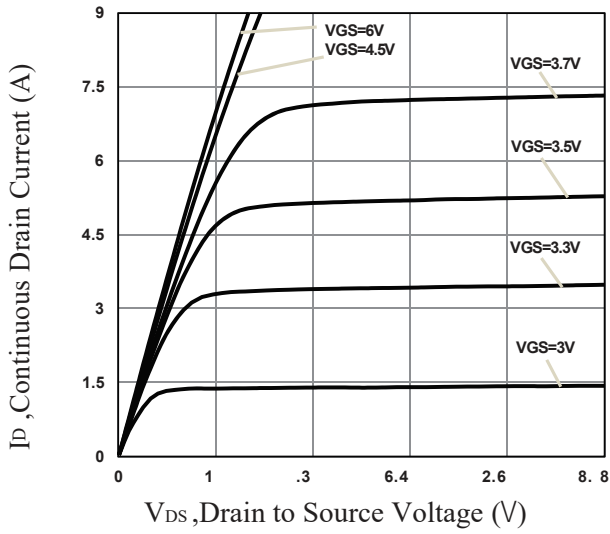


Fig.1 Typical Output Characteristics

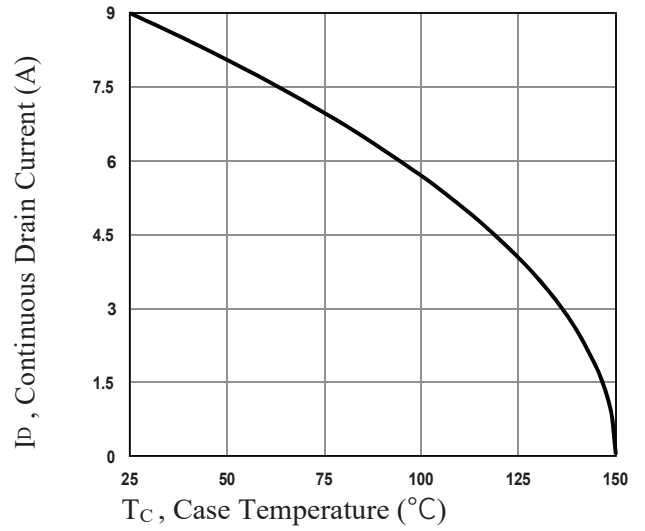


Fig.2 Continuous Drain Current vs.  $T_C$

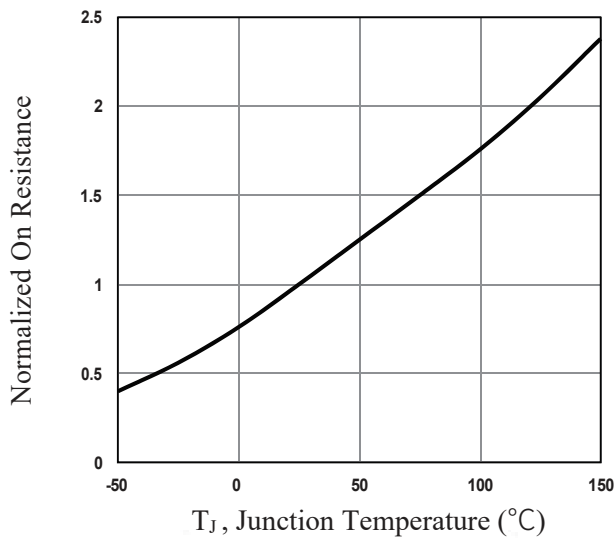


Fig.3 Normalized  $R_{DS(ON)}$  vs.  $T_J$

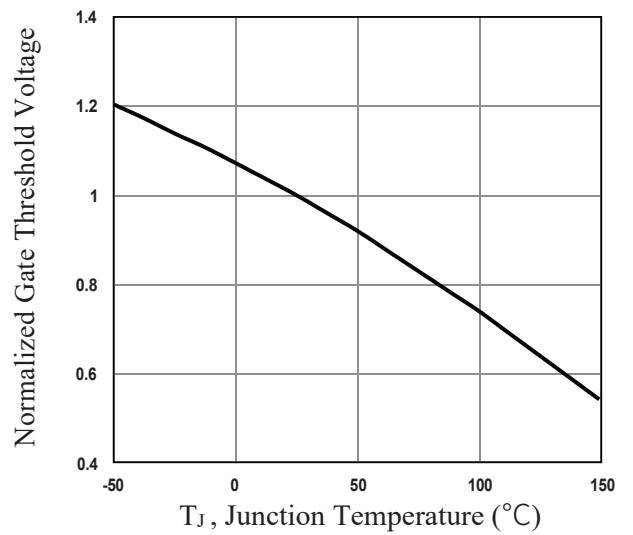


Fig.4 Normalized  $V_{th}$  vs.  $T_J$

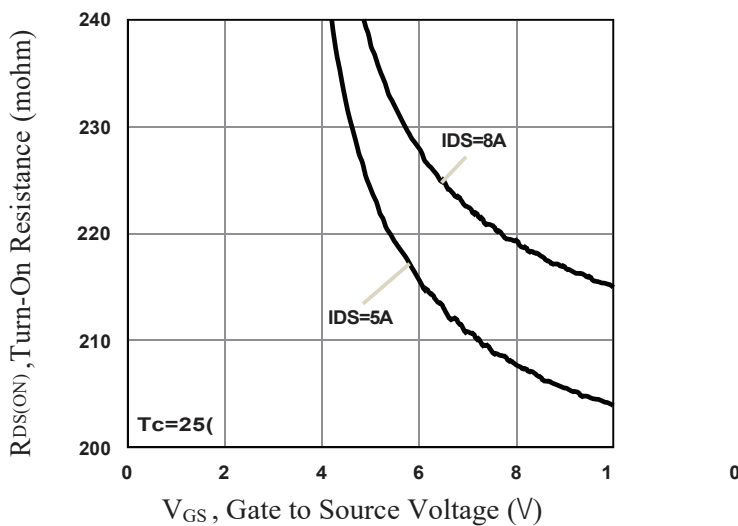


Fig.5 Turn-On Resistance vs.  $V_{GS}$

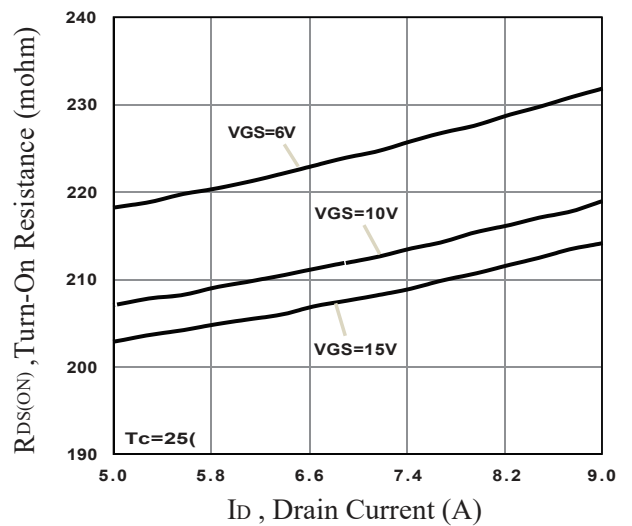


Fig.6 Turn-On Resistance vs.  $I_D$

## RATINGS AND CHARACTERISTIC CURVES

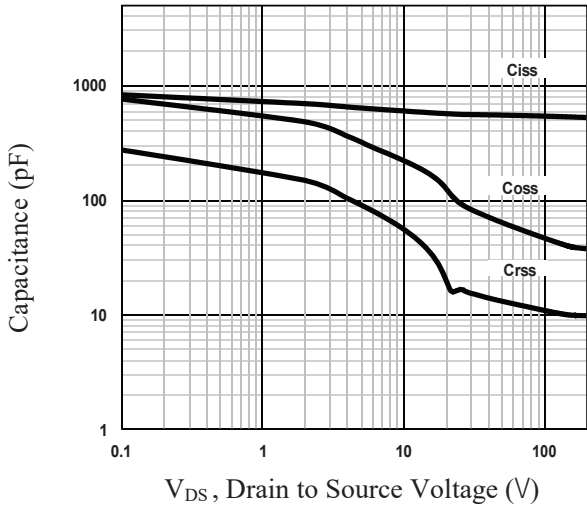


Fig.7 Capacitance Characteristics

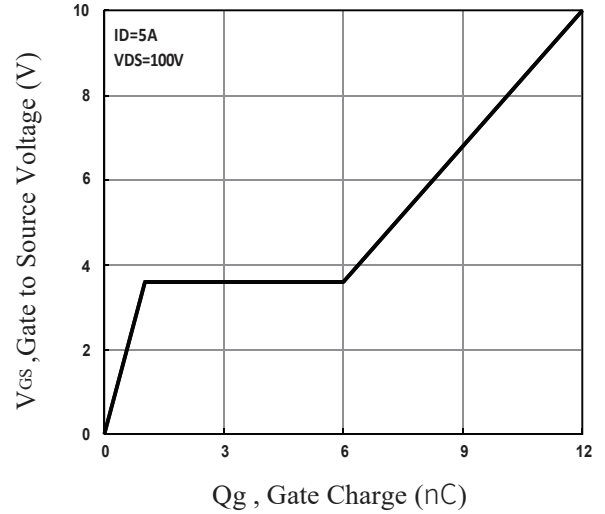


Fig.8 Gate Charge Characteristics

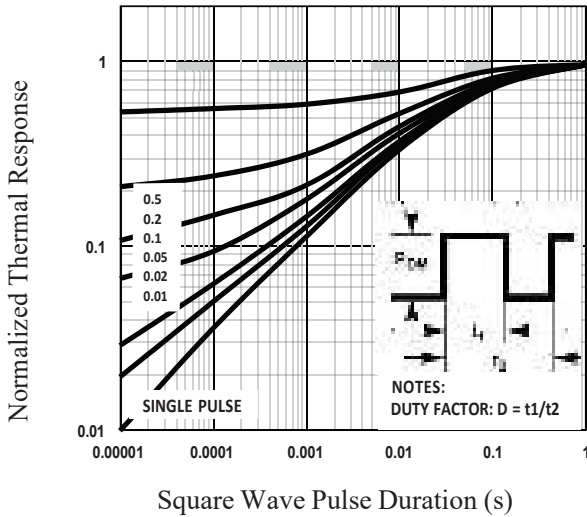


Fig.9 Normalized Transient Impedance

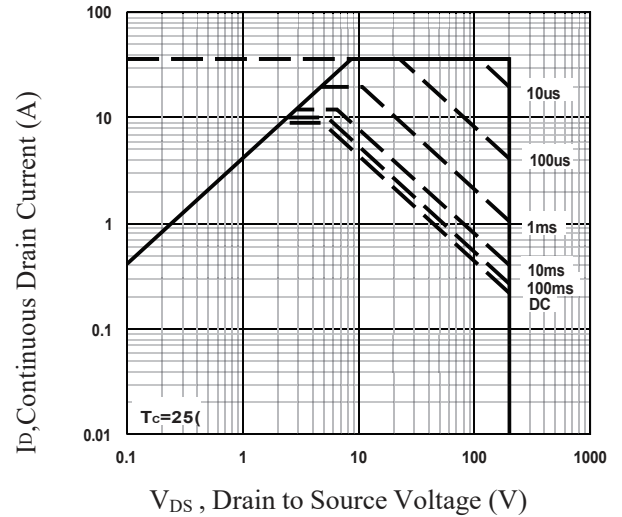


Fig.10 Maximum Safe Operation Area

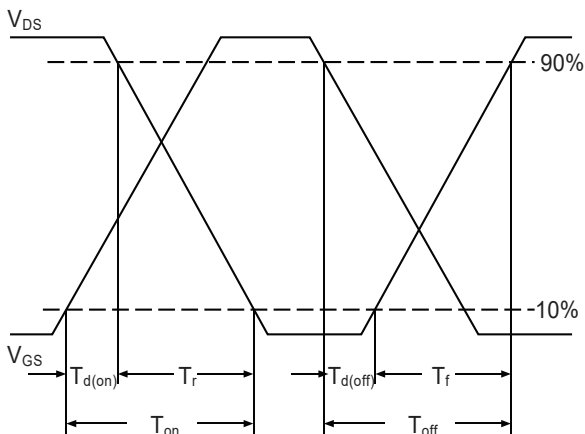


Fig.11 Switching Time Waveform

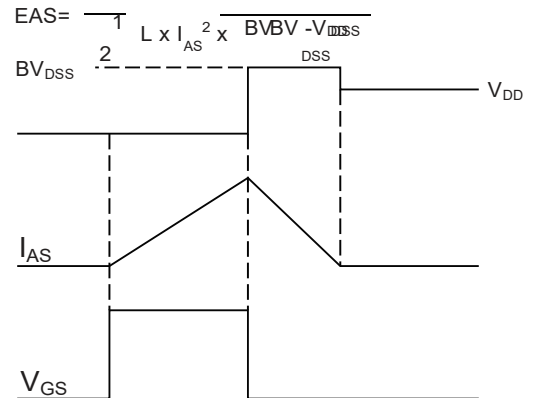


Fig.12 EAS Waveform