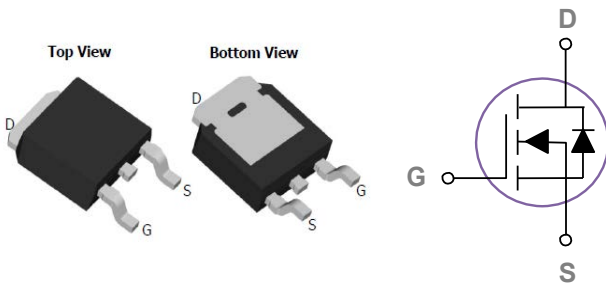


### General Description

The KSD90N10 MOSFETs are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extremely efficient device for use in a wide range of power applications.

### TO-252 Pin Configuration



### Product Summary

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
100	5 at $V_{GS} = 10$ V	90
	6 at $V_{GS} = 4.5$ V	75

### Features

- Special process technology for high ESD capability
- High density cell design for ultra low  $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation

### Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

### Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	90	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	60	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	270	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	85	W
	Power Dissipation ( $T_c=100^\circ\text{C}$ )	1.4	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	58	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4.3	$^\circ\text{C}/\text{W}$

### Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted) Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	20	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA

### On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	---	5	6.3	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	6.0	7.8	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.8	3.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	3	---	$mV/^\circ\text{C}$
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_S=10A$	---	30	---	S

### Dynamic and switching Characteristics

$Q_g$	Total Gate Charge <sup>2, 3</sup>	$V_{DS}=50V, V_{GS}=10V, I_D=20A$	---	89	---	nC
$Q_{gs}$	Gate-Source Charge <sup>2, 3</sup>		---	11	---	
$Q_{gd}$	Gate-Drain Charge <sup>2, 3</sup>		---	14.6	---	
$T_{d(on)}$	Turn-On Delay Time <sup>2, 3</sup>	$V_{DS}=50V, I_D=20A$ $V_{GS}=10V, R_G=2.5\Omega$	---	13.4	---	ns
$T_r$	Rise Time <sup>2, 3</sup>		---	45	---	
$T_{d(off)}$	Turn-Off Delay Time <sup>2, 3</sup>		---	37	---	
$T_f$	Fall Time <sup>2, 3</sup>		---	60	---	
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$	---	3950	---	pF
$C_{oss}$	Output Capacitance		---	1568	---	
$C_{riss}$	Reverse Transfer Capacitance		---	204	---	

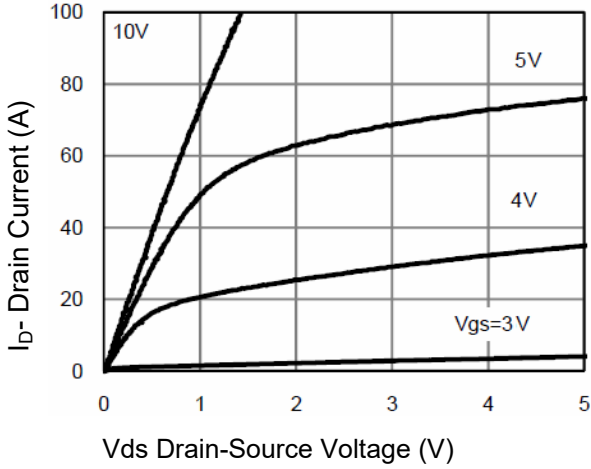
### Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	90	A
$I_{SM}$	Pulsed Source Current		---	---	160	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.2	V

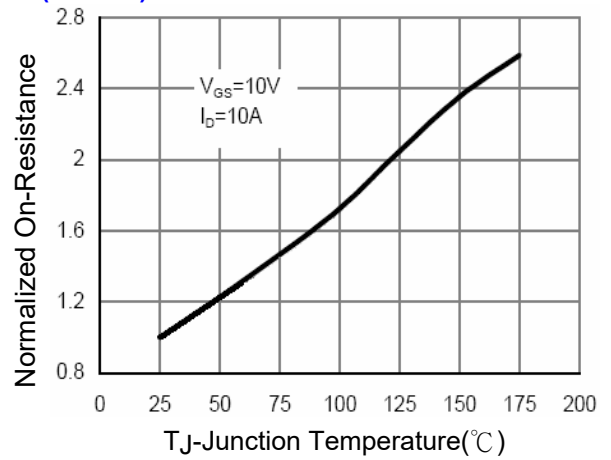
Note :

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition:  $T_J=25^\circ\text{C}, V_{DD}=50V, V_G=10V, L=0.5mH, R_G=25\Omega$

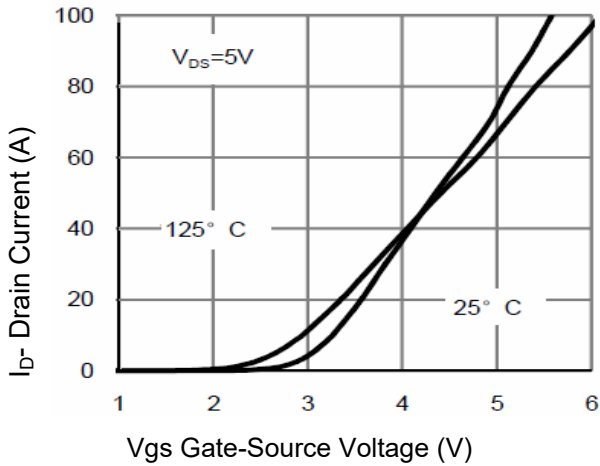
**Typical Electrical and Thermal Characteristics (Curves)**



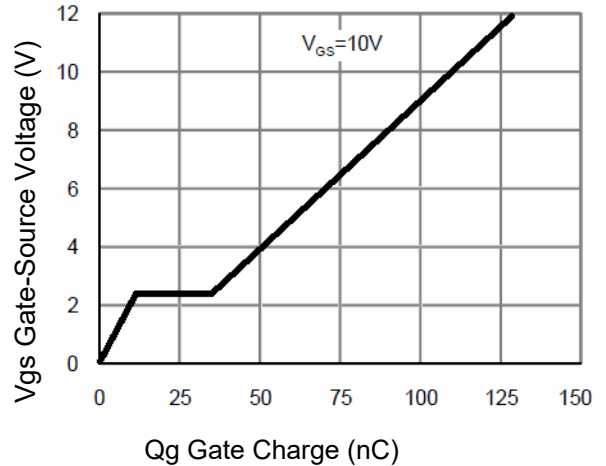
**Fig.1 Output Characteristics**



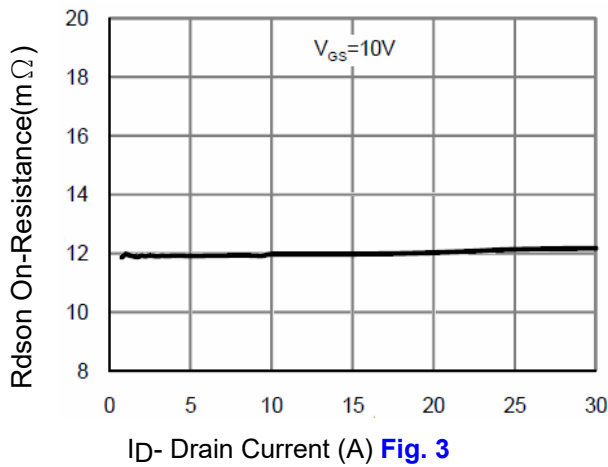
**Fig. 4 Rds(on)-Junction Temperature**



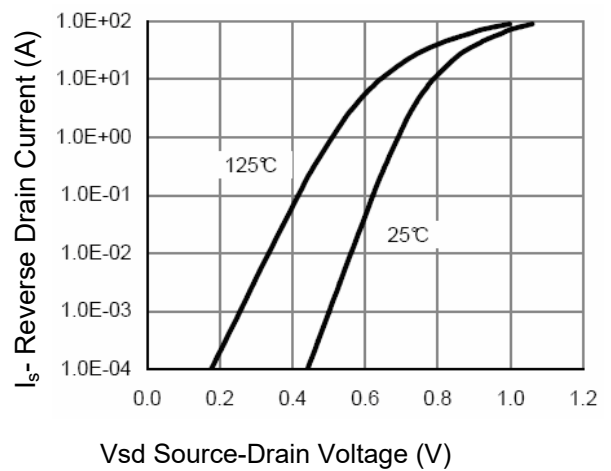
**Fig. 2 Transfer Characteristics**



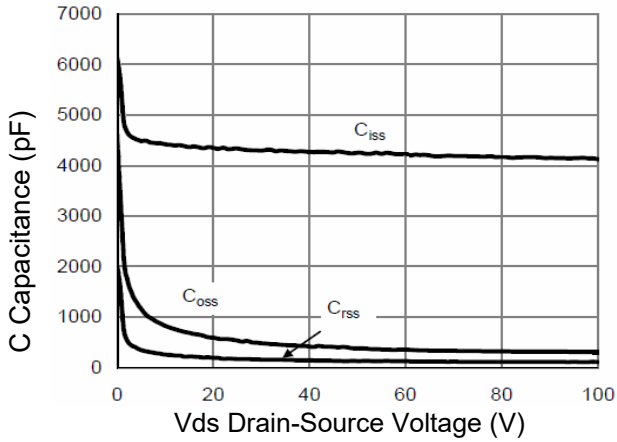
**Fig. 5 Gate Charge**



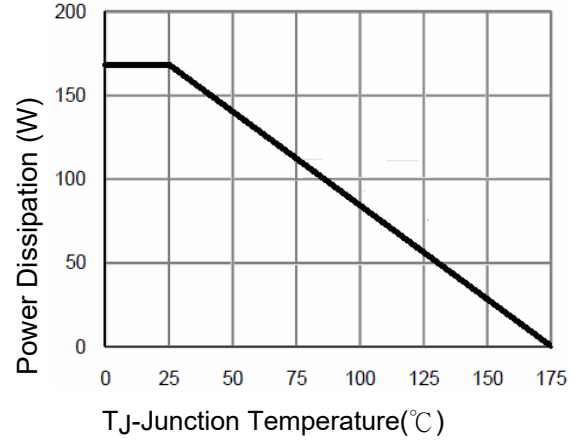
**Fig. 3 Rds(on)- Drain Current**



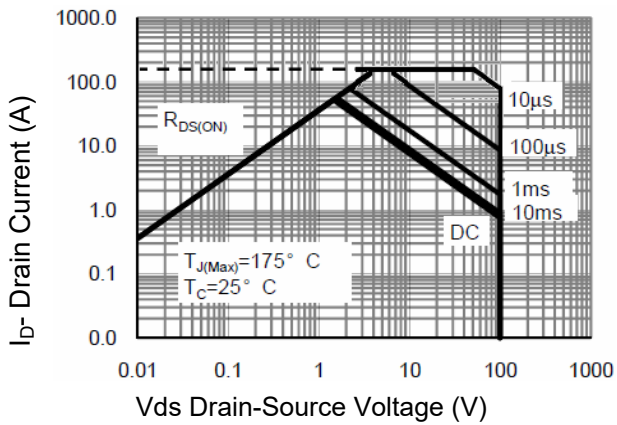
**Fig. 6 Source- Drain Diode Forward**



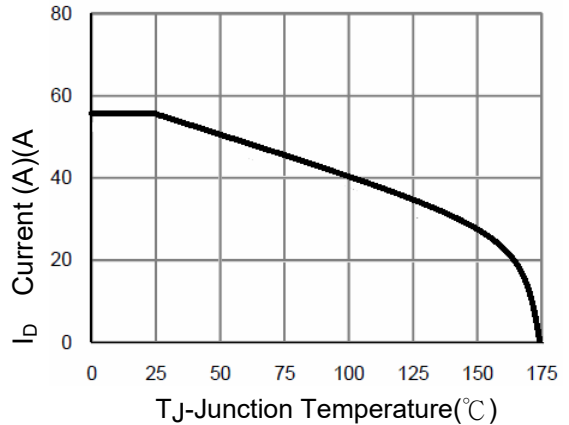
**Fig.7 Capacitance vs Vds**



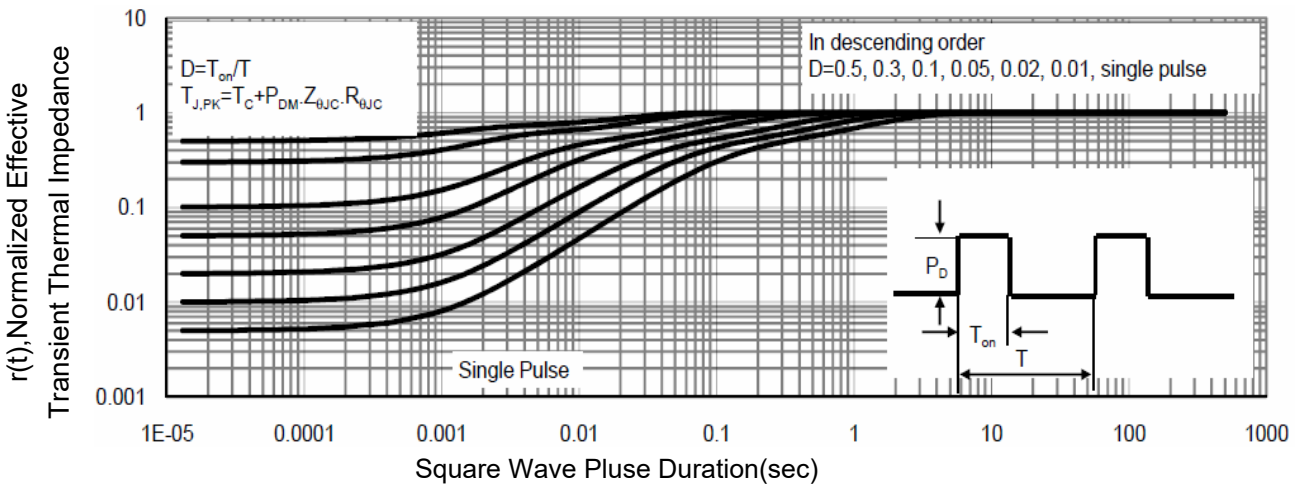
**Fig. 8 Power De-rating**



**Fig.9 Safe Operation Area**



**Fig. 10 ID Current- Junction Temperature**



**Fig.11 Normalized Maximum Transient Thermal Impedance**

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