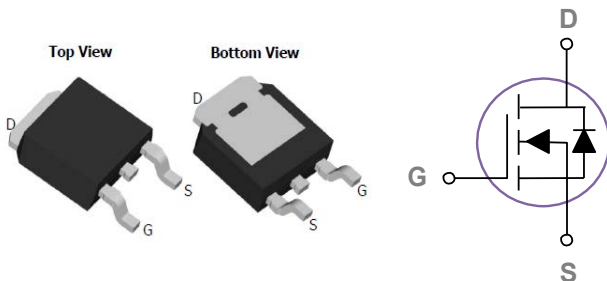


### General Description

The KSD40N10 combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

### TO-252 Pin Configuration



### Product Summary

$V_{DS}$ (V)	$R_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
100	27 at $V_{GS} = 10$ V	40
	38 at $V_{GS} = 4.5$ V	24

### 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 ( $T_c=25^\circ\text{C}$ )	40	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	21	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	86	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	36	W
	Power Dissipation ( $T_c=100^\circ\text{C}$ )	2	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	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4	$^\circ\text{C}/\text{W}$

### 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	$V_{DS}=80V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	25	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	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	$V_{GS}=10V, I_D=15A$	---	27	34	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	38	46	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.7	3	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4	---	$mV/^\circ\text{C}$
$g_{fs}$	Forward Transconductance	$V_{DS}=10V, I_S=5A$	---	20	---	S

#### Dynamic and switching Characteristics

$Q_g$	Total Gate Charge <sup>2,3</sup>	$V_{DS}=50V, V_{GS}=10V, I_D=10A$	---	67	---	nC
$Q_{gs}$	Gate-Source Charge <sup>2,3</sup>		---	9.4	---	
$Q_{gd}$	Gate-Drain Charge <sup>2,3</sup>		---	16	---	
$T_{d(on)}$	Turn-On Delay Time <sup>2,3</sup>	$V_{DS}=50V, R_L=5\Omega$ $V_{GS}=10V, R_G=3\Omega$	---	9	---	ns
$T_r$	Rise Time <sup>2,3</sup>		---	9	---	
$T_{d(off)}$	Turn-Off Delay Time <sup>2,3</sup>		---	32	---	
$T_f$	Fall Time <sup>2,3</sup>		---	8	---	
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$	---	2460	---	pF
$C_{oss}$	Output Capacitance		---	105	---	
$C_{riss}$	Reverse Transfer Capacitance		---	80	---	

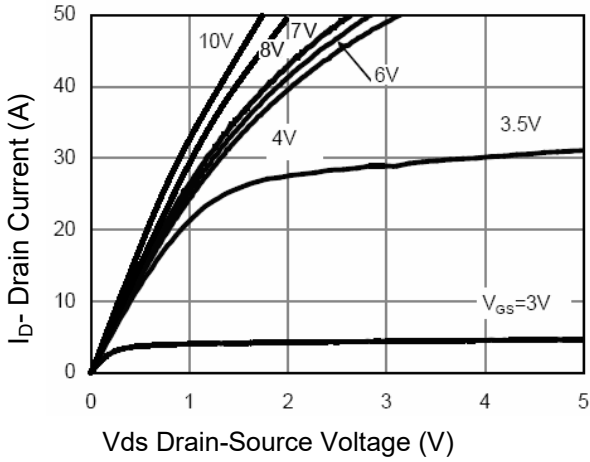
#### Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	40	A
$I_{SM}$	Pulsed Source Current		---	---	60	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.2	V

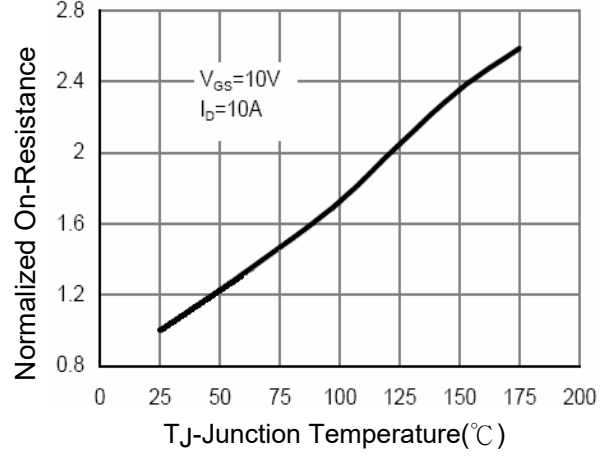
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

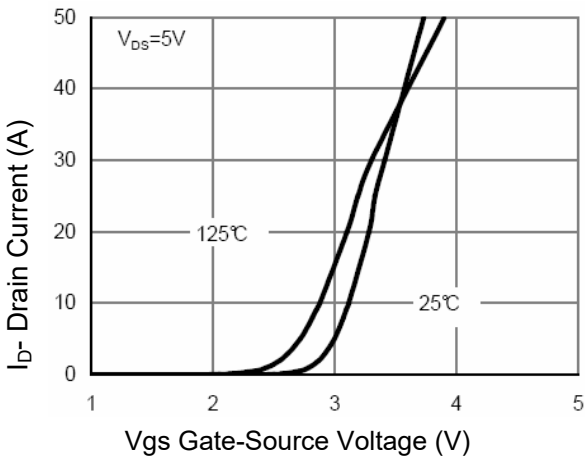
**Typical Electrical and Thermal Characteristics (Curves)**



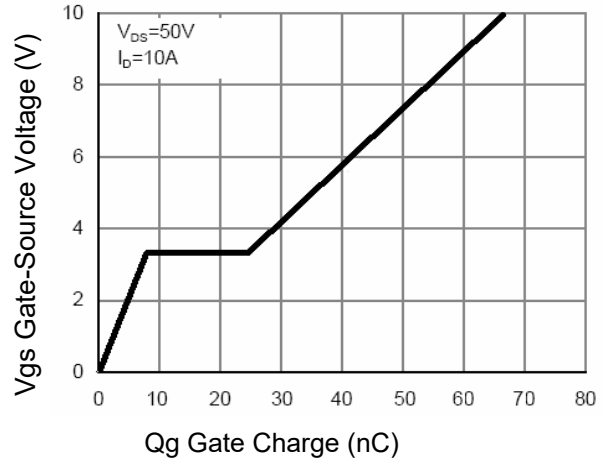
**Fig.1 Output Characteristics**



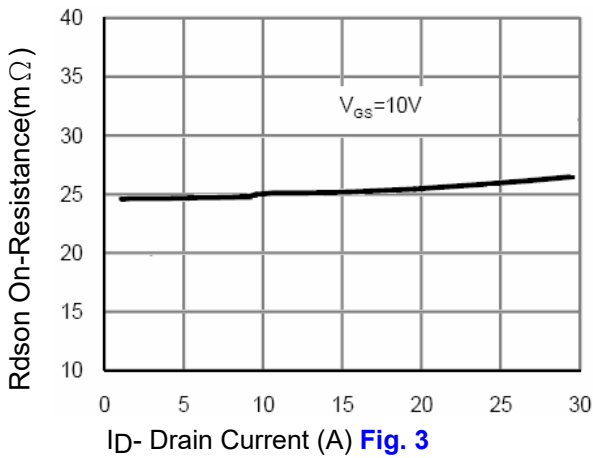
**Fig. 4 Rds(on)-Junction Temperature**



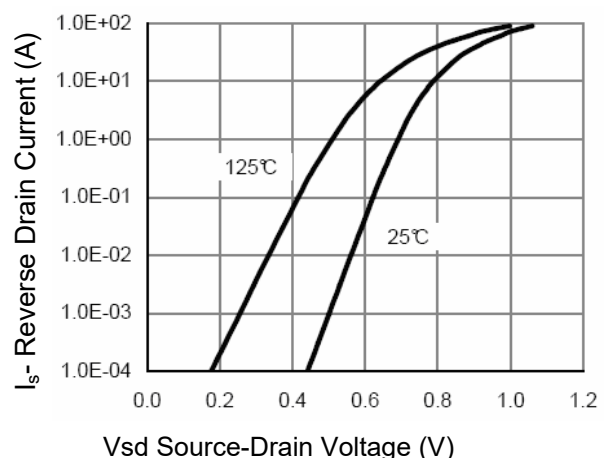
**Fig. 2 Transfer Characteristics**



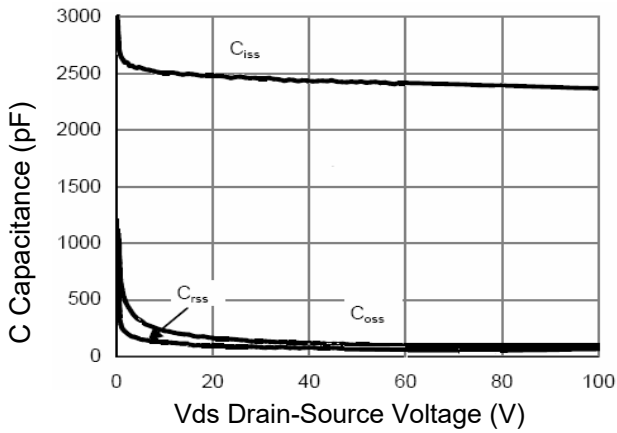
**Fig. 5 Gate Charge**



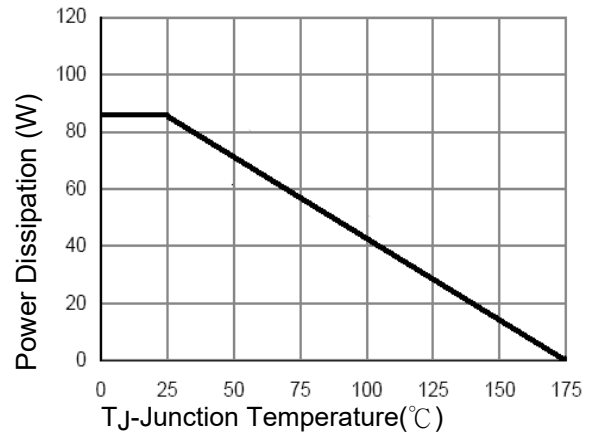
**Fig. 3 Rds(on)- Drain Current**



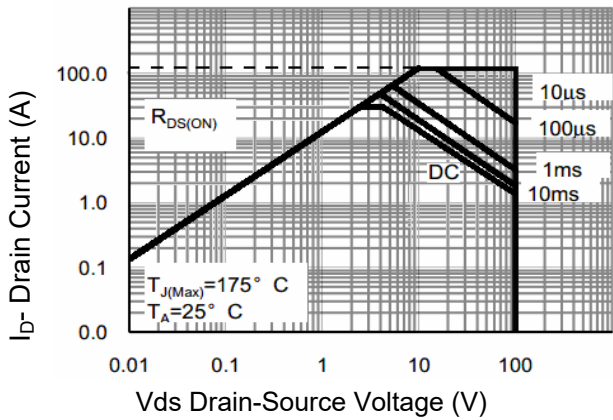
**Fig. 6 Source- Drain Diode Forward**



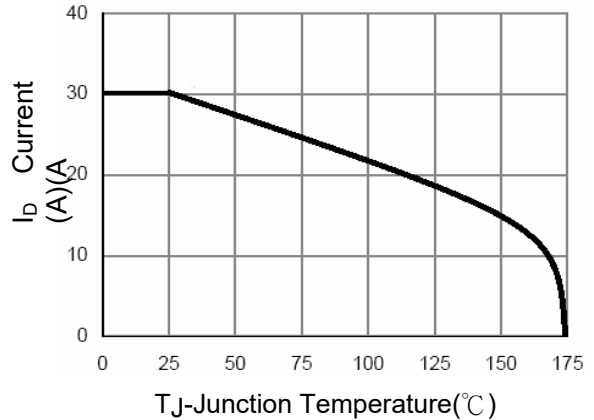
**Fig.7 Capacitance vs Vds**



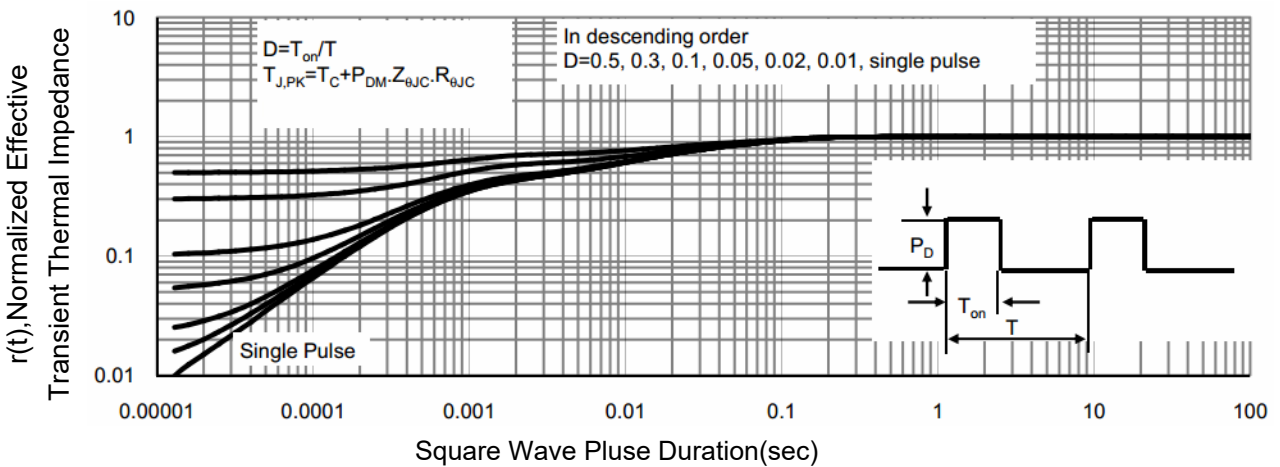
**Fig. 8 Power De-rating**



**Fig.9 Safe Operation Area**



**Fig. 110ID Current- Junction Temperature**



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

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