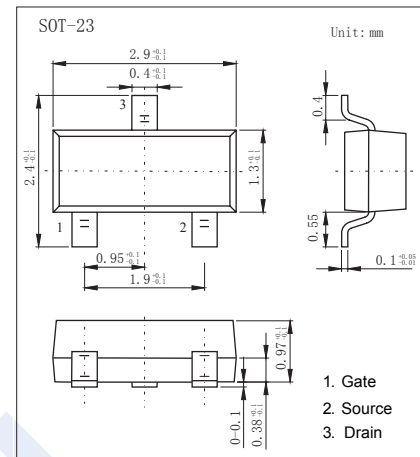
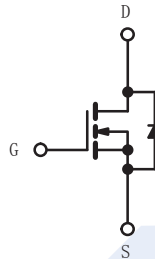


## N-Channel MOSFET

### SI2356DS (KI2356DS)

#### ■ Features

- $V_{DS} (V) = 40V$
- $I_D = 4.3 A (V_{GS} = 10V)$
- $R_{DS(ON)} < 51m\Omega (V_{GS} = 10V)$
- $R_{DS(ON)} < 54m\Omega (V_{GS} = 4.5V)$
- $R_{DS(ON)} < 70m\Omega (V_{GS} = 2.5V)$



#### ■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 12$	
Continuous Drain Current ( $T_J = 150^\circ C$ )	$T_C = 25^\circ C$	$I_D$	4.3	A
	$T_C = 70^\circ C$		3.4	
	$T_a = 25^\circ C$		3.2	
	$T_a = 70^\circ C$		2.6	
Pulsed Drain Current ( $t = 100\mu s$ )		$I_{DM}$	20	
Power Dissipation	$T_C = 25^\circ C$	$P_D$	1.7	W
	$T_C = 70^\circ C$		1.1	
	$T_a = 25^\circ C$		0.96	
	$T_a = 70^\circ C$		0.62	
Thermal Resistance.Junction- to-Ambient		$R_{thJA}$	130	$^\circ C/W$
Thermal Resistance.Junction- to-Foot		$R_{thJF}$	75	
Junction Temperature		$T_J$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	-55 to 150	

## N-Channel MOSFET

### SI2356DS (KI2356DS)

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{DSS}$	$I_D=250\ \mu\text{A}$ , $V_{GS}=0\text{V}$	40			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
		$V_{DS}=40\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=55^\circ\text{C}$			10	
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 12\text{V}$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ , $I_D=250\ \mu\text{A}$	0.6		1.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}$ , $I_D=3.2\text{A}$			51	m $\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=3.1\text{A}$			54	
		$V_{GS}=2.5\text{V}$ , $I_D=2\text{A}$			70	
On State Drain Current	$I_{D(ON)}$	$V_{GS}=10\text{V}$ , $V_{DS}\geq 5\text{V}$	10			A
Forward Transconductance	$g_{FS}$	$V_{DS}=15\text{V}$ , $I_D=3.2\text{A}$		13		S
Input Capacitance	$C_{iss}$	$V_{GS}=0\text{V}$ , $V_{DS}=20\text{V}$ , $f=1\text{MHz}$		370		pF
Output Capacitance	$C_{oss}$			50		
Reverse Transfer Capacitance	$C_{rss}$			17		
Gate Resistance	$R_g$	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$	0.2		1.4	$\Omega$
Total Gate Charge	$Q_g$	$V_{GS}=10\text{V}$ , $V_{DS}=20\text{V}$ , $I_D=3.2\text{A}$		8.1	13	nC
				3.8	5.7	
Gate Source Charge	$Q_{gs}$	$V_{GS}=4.5\text{V}$ , $V_{DS}=20\text{V}$ , $I_D=3.2\text{A}$		0.72		
Gate Drain Charge	$Q_{gd}$			0.81		
Turn-On DelayTime	$t_{d(on)}$	$V_{DD}=20\text{V}$ , $R_L=7.7\Omega$ $I_D=2.6\text{A}$ , $V_{GEN}=10\text{V}$ , $R_g = 1\Omega$		6	12	ns
Turn-On Rise Time	$t_r$			12	20	
Turn-Off DelayTime	$t_{d(off)}$			13	20	
Turn-Off Fall Time	$t_f$			6	12	
Turn-On DelayTime	$t_{d(on)}$	$V_{DD}=20\text{V}$ , $R_L=7.7\Omega$ $I_D=2.6\text{A}$ , $V_{GEN}=4.5\text{V}$ , $R_g = 1\Omega$		10	20	
Turn-On Rise Time	$t_r$			52	78	
Turn-Off DelayTime	$t_{d(off)}$			18	27	
Turn-Off Fall Time	$t_f$			53	80	
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F=2.6\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$ , $T_J=25^\circ\text{C}$		12	20	nC
Body Diode Reverse Recovery Charge	$Q_{rr}$			5	10	
Reverse Recovery Fall Time	$t_a$			8.5		ns
Reverse Recovery Rise Time	$t_b$			3.5		
Maximum Body-Diode Continuous Current	$I_S$	$T_c = 25^\circ\text{C}$			1.4	A
Pulse Diode Forward Current ( $t = 100\ \mu\text{s}$ )	$I_{SM}$				20	
Diode Forward Voltage	$V_{SD}$	$I_S=2.6\text{A}$ , $V_{GS}=0\text{V}$			1.2	V

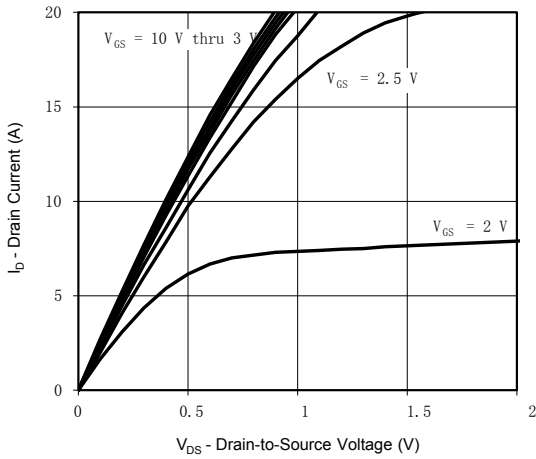
Note. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

#### Marking

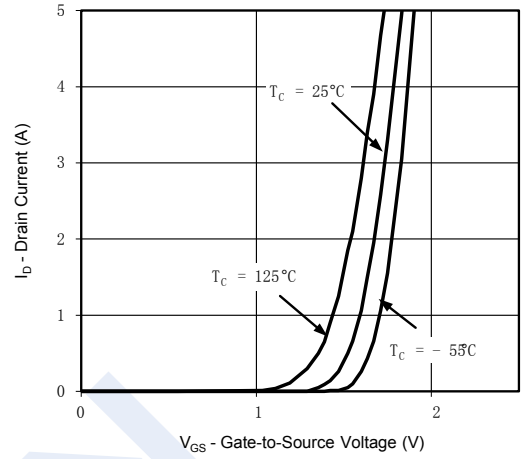
Marking	E9*
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## N-Channel MOSFET SI2356DS (KI2356DS)

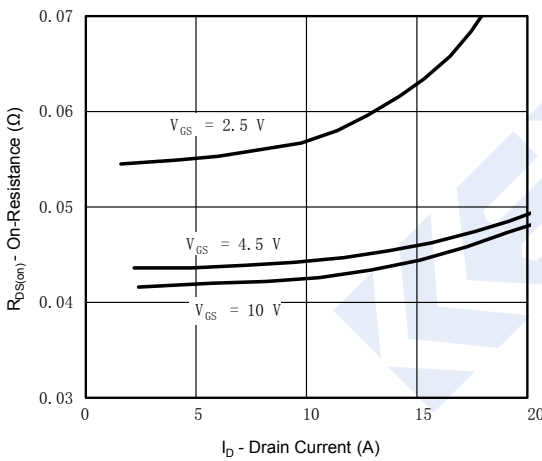
### Typical Characteristics



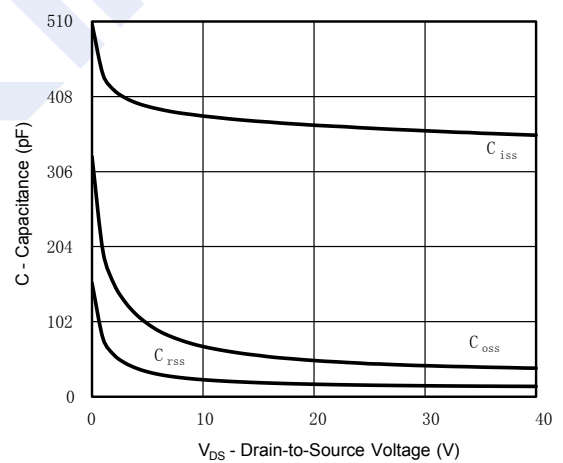
Output Characteristics



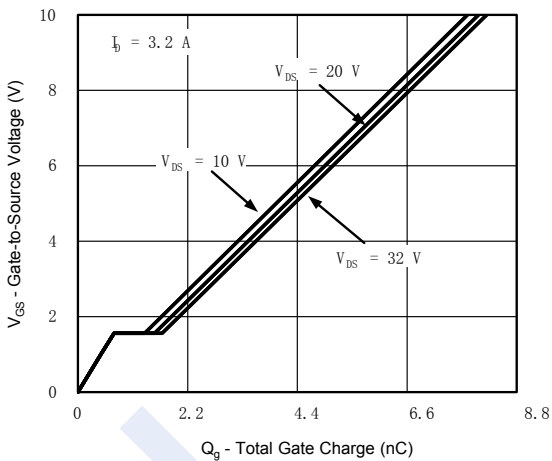
Transfer Characteristics



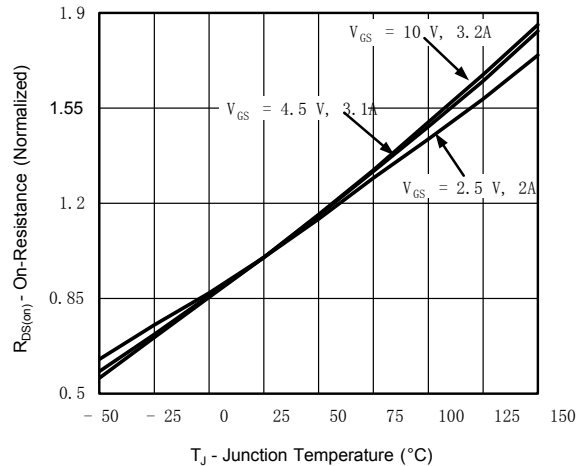
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



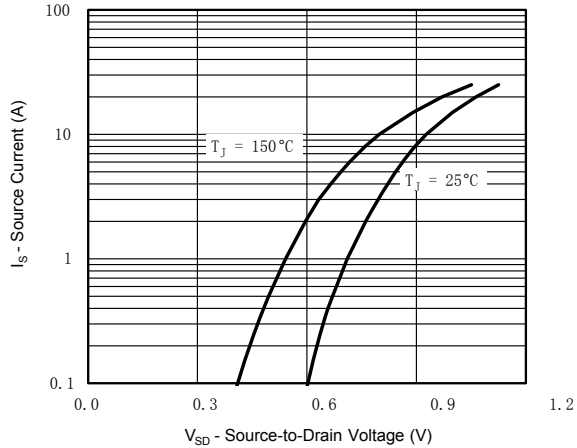
Gate Charge



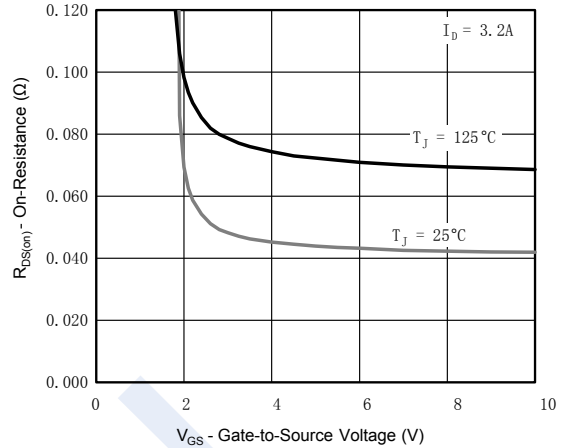
On-Resistance vs. Junction Temperature

## N-Channel MOSFET SI2356DS (KI2356DS)

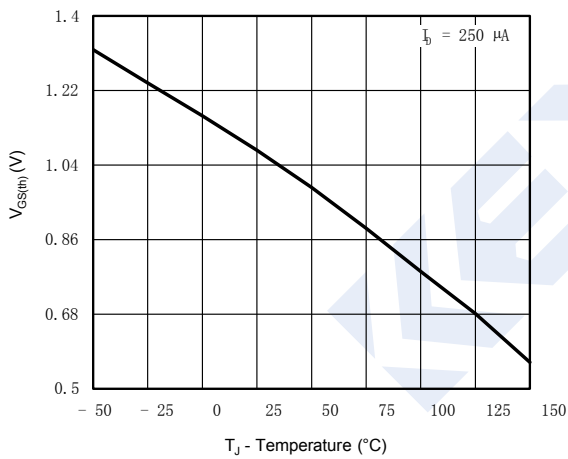
### Typical Characteristics



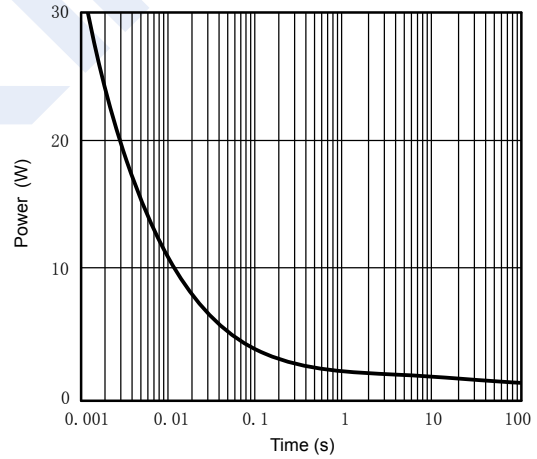
Source-Drain Diode Forward Voltage



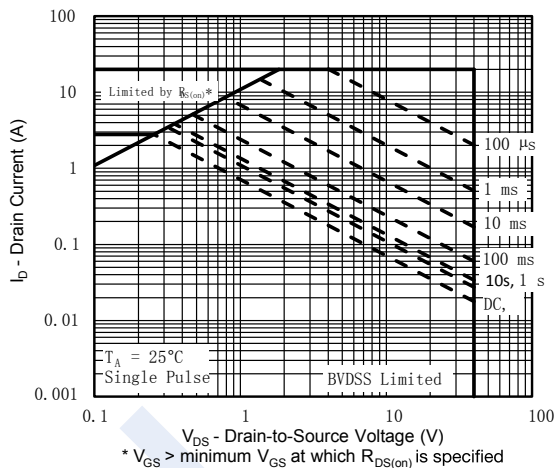
On-Resistance vs. Gate-to-Source Voltage



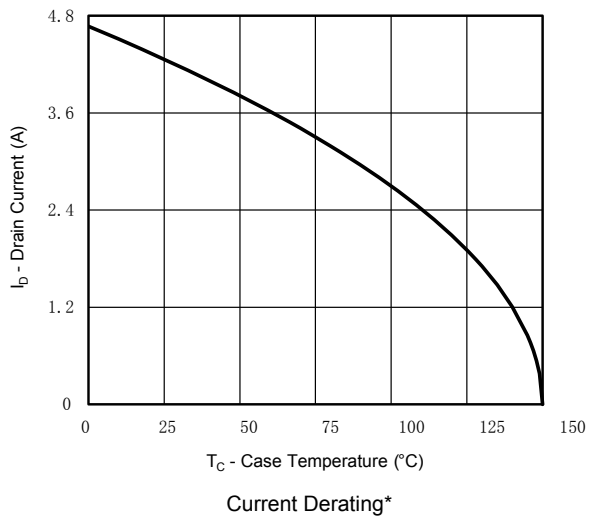
Threshold Voltage



Single Pulse Power (Junction-to-Ambient)



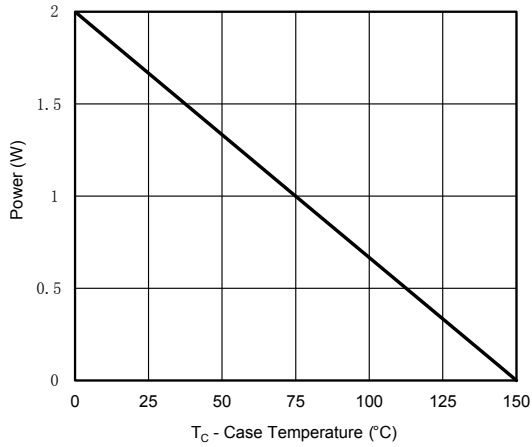
Safe Operating Area, Junction-to-Ambient



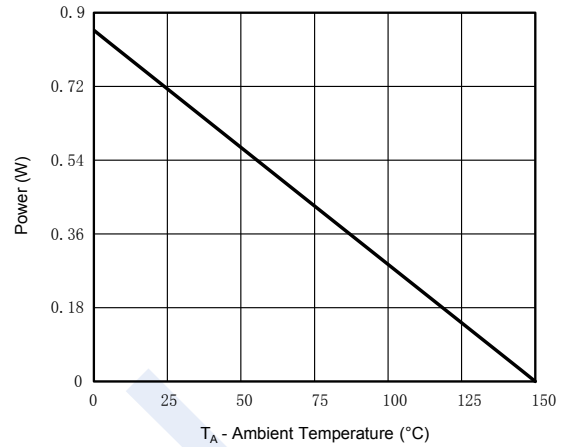
Current Derating\*

## N-Channel MOSFET SI2356DS (KI2356DS)

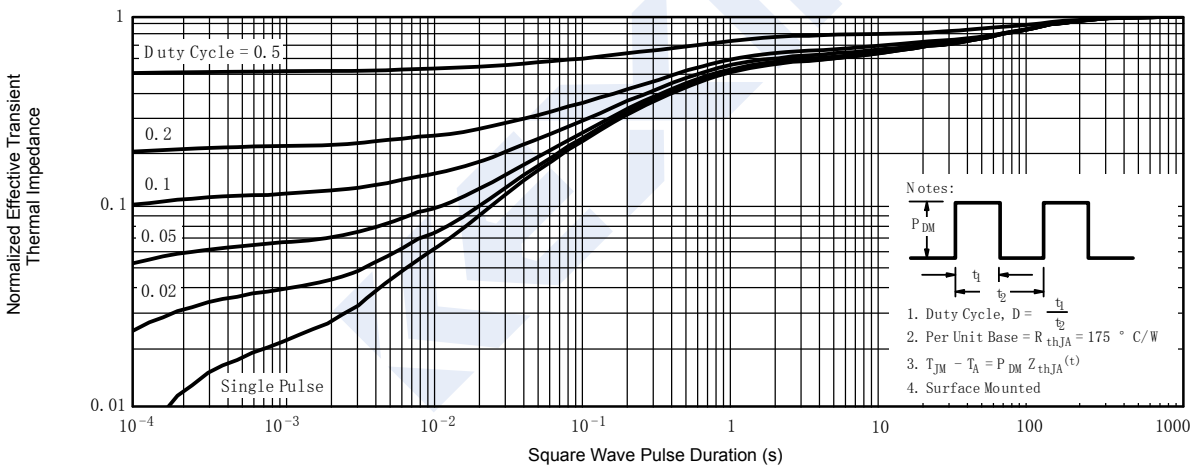
### Typical Characteristics



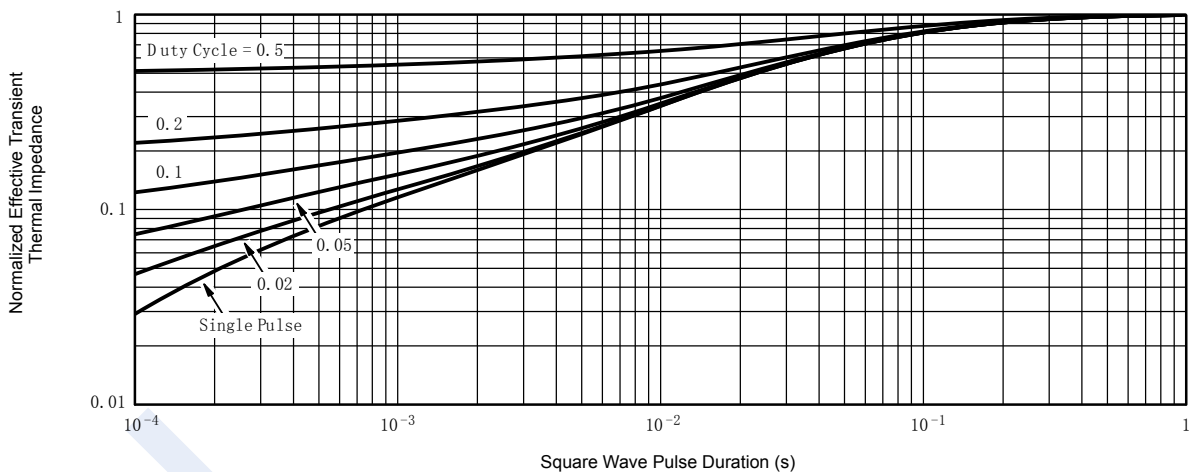
Power Junction-to-Foot



Power Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot