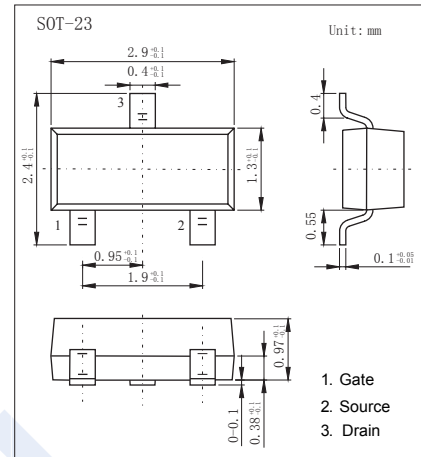
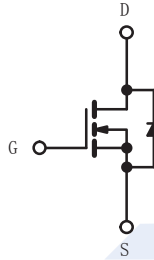


## N-Channel MOSFET

### SI2356DS-HF (KI2356DS-HF)

#### ■ Features

- $V_{DS} (V) = 40V$
- $I_D = 4.3 A (V_{GS} = 10V)$
- $R_{DS(ON)} < 51m\Omega (V_{GS} = 10V)$
- $R_{DS(ON)} < 54m\Omega (V_{GS} = 4.5V)$
- $R_{DS(ON)} < 70m\Omega (V_{GS} = 2.5V)$
- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish



#### ■ 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-HF (KI2356DS-HF)

#### ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>DSS</sub>	I <sub>D</sub> =250 μA, V <sub>GS</sub> =0V	40			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V			1	μA
		V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C			10	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 μA	0.6		1.5	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =3.2A			51	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.1A			54	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A			70	
On State Drain Current	I <sub>D(ON)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> ≥5V	10			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =3.2A		13		S
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, f=1MHz		370		pF
Output Capacitance	C <sub>oss</sub>			50		
Reverse Transfer Capacitance	C <sub>rss</sub>			17		
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	0.2		1.4	Ω
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, I <sub>D</sub> =3.2A		8.1	13	nC
				3.8	5.7	
Gate Source Charge	Q <sub>gs</sub>	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =20V, I <sub>D</sub> =3.2A		0.72		
Gate Drain Charge	Q <sub>gd</sub>			0.81		
Turn-On DelayTime	t <sub>d(on)</sub>	V <sub>DD</sub> =20V, R <sub>L</sub> =7.7Ω I <sub>D</sub> =2.6A, V <sub>GEN</sub> =10V, R <sub>g</sub> =1Ω		6	12	ns
Turn-On Rise Time	t <sub>r</sub>			12	20	
Turn-Off DelayTime	t <sub>d(off)</sub>			13	20	
Turn-Off Fall Time	t <sub>f</sub>			6	12	
Turn-On DelayTime	t <sub>d(on)</sub>	V <sub>DD</sub> =20V, R <sub>L</sub> =7.7Ω I <sub>D</sub> =2.6A, V <sub>GEN</sub> =4.5V, R <sub>g</sub> =1Ω		10	20	ns
Turn-On Rise Time	t <sub>r</sub>			52	78	
Turn-Off DelayTime	t <sub>d(off)</sub>			18	27	
Turn-Off Fall Time	t <sub>f</sub>			53	80	
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =2.6A, di/dt=100A/μs, T <sub>J</sub> =25°C		12	20	nC
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			5	10	
Reverse Recovery Fall Time	t <sub>a</sub>			8.5		
Reverse Recovery Rise Time	t <sub>b</sub>			3.5		
Maximum Body-Diode Continuous Current	I <sub>S</sub>	T <sub>c</sub> =25°C			1.4	A
Pulse Diode Forward Current (t = 100 μs)	I <sub>SM</sub>				20	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =2.6A, V <sub>GS</sub> =0V			1.2	V

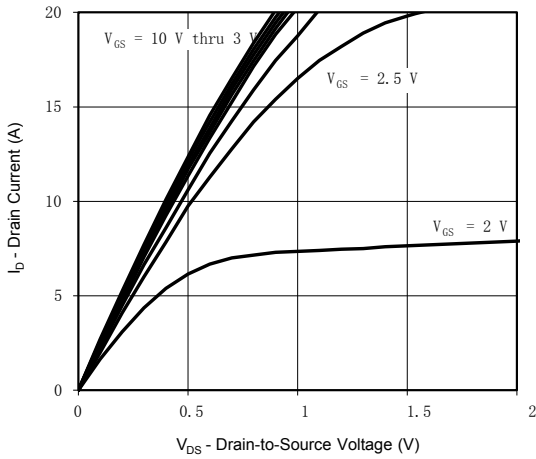
Note. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

#### ■ Marking

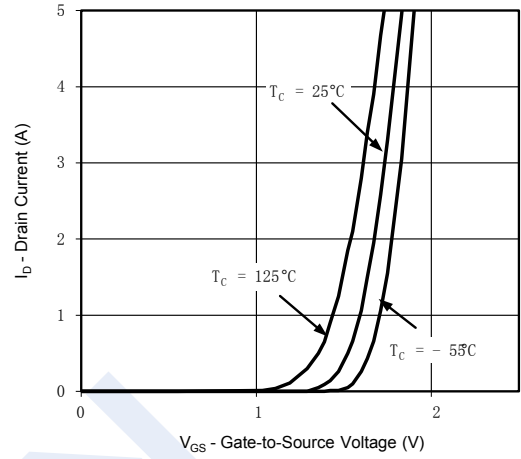
Marking	E9* F
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## N-Channel MOSFET SI2356DS-HF (KI2356DS-HF)

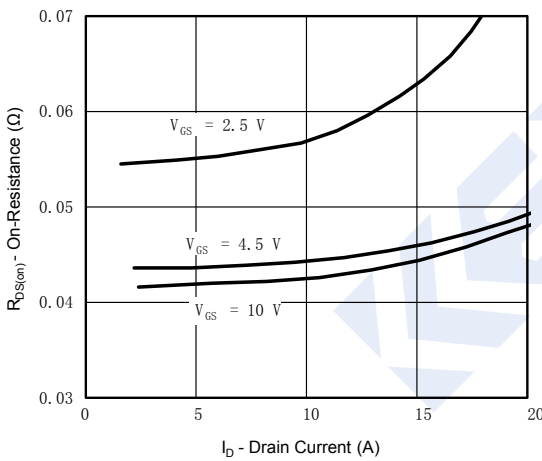
■ Typical Characteristics



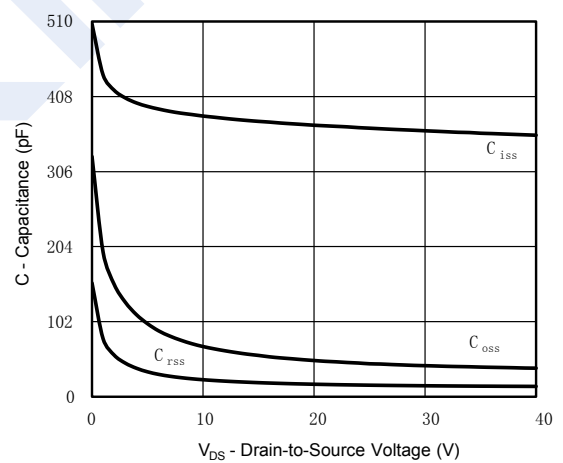
Output Characteristics



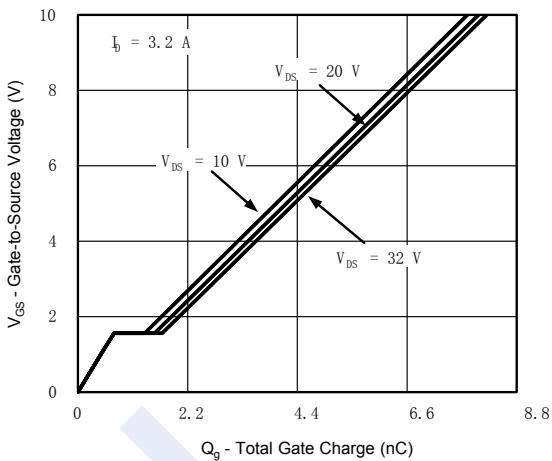
Transfer Characteristics



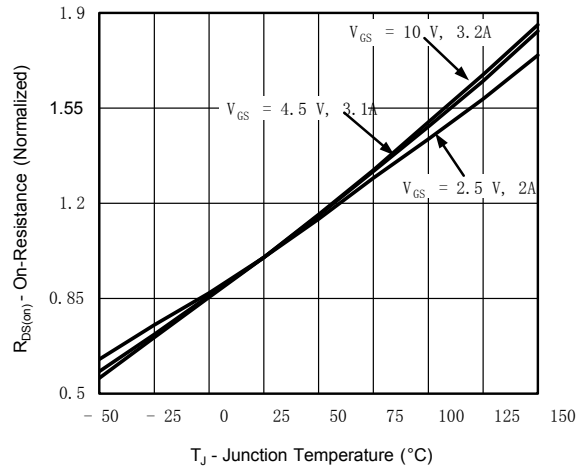
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge

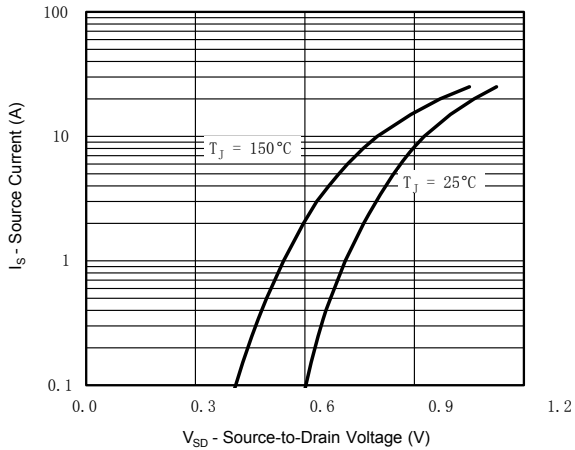


On-Resistance vs. Junction Temperature

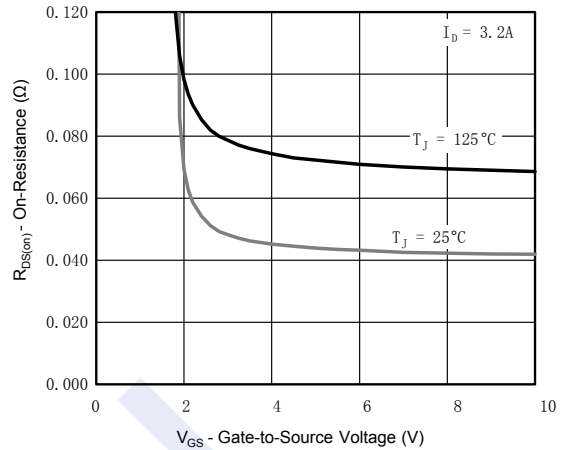
## N-Channel MOSFET

### SI2356DS-HF (KI2356DS-HF)

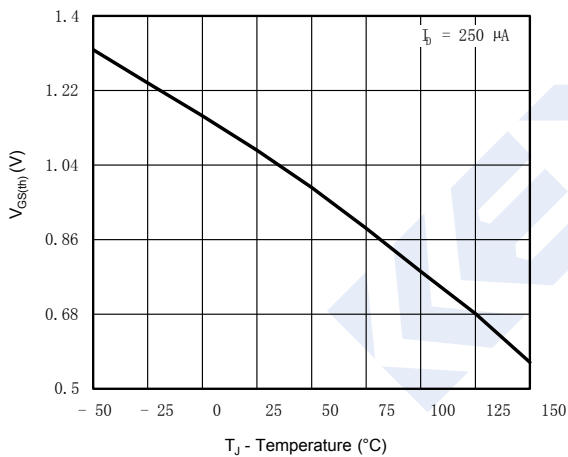
■ Typical Characteristics



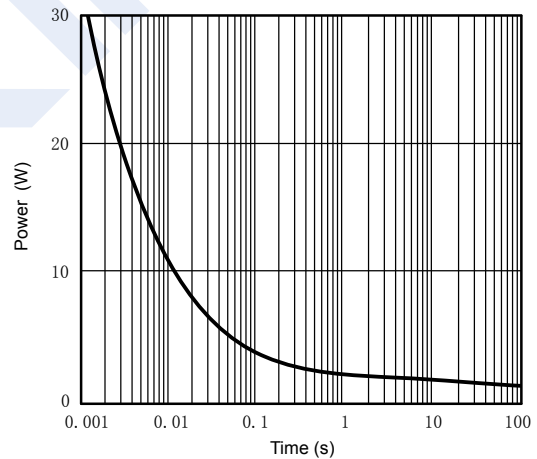
Source-Drain Diode Forward Voltage



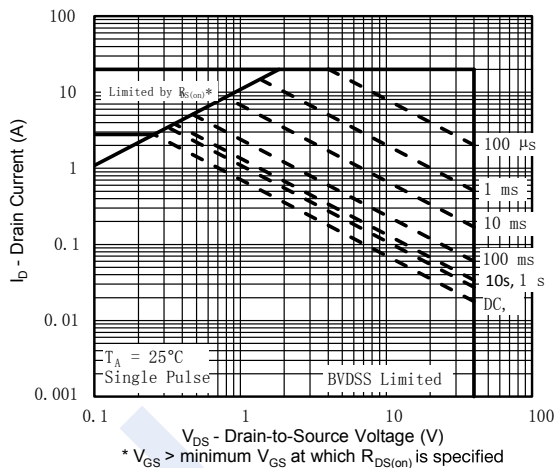
On-Resistance vs. Gate-to-Source Voltage



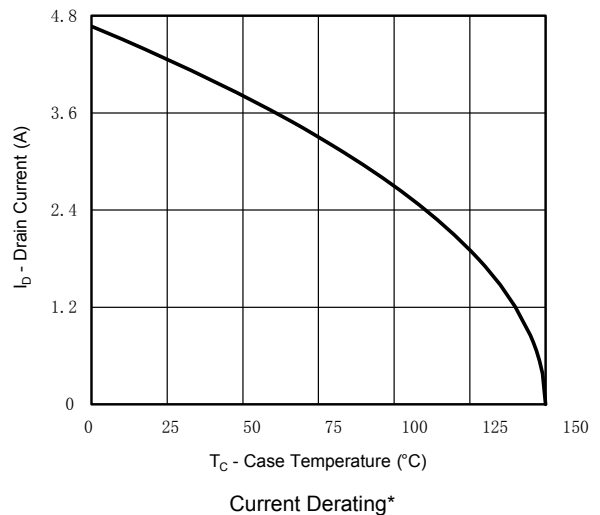
Threshold Voltage



Single Pulse Power (Junction-to-Ambient)



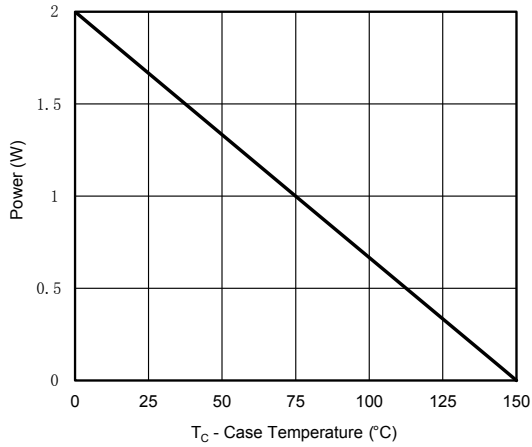
Safe Operating Area, Junction-to-Ambient



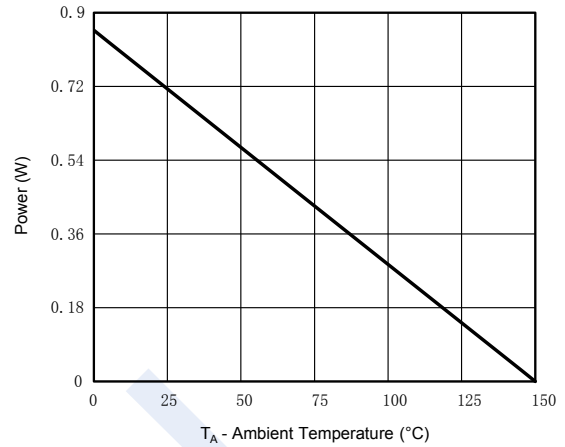
Current Derating\*

## N-Channel MOSFET SI2356DS-HF (KI2356DS-HF)

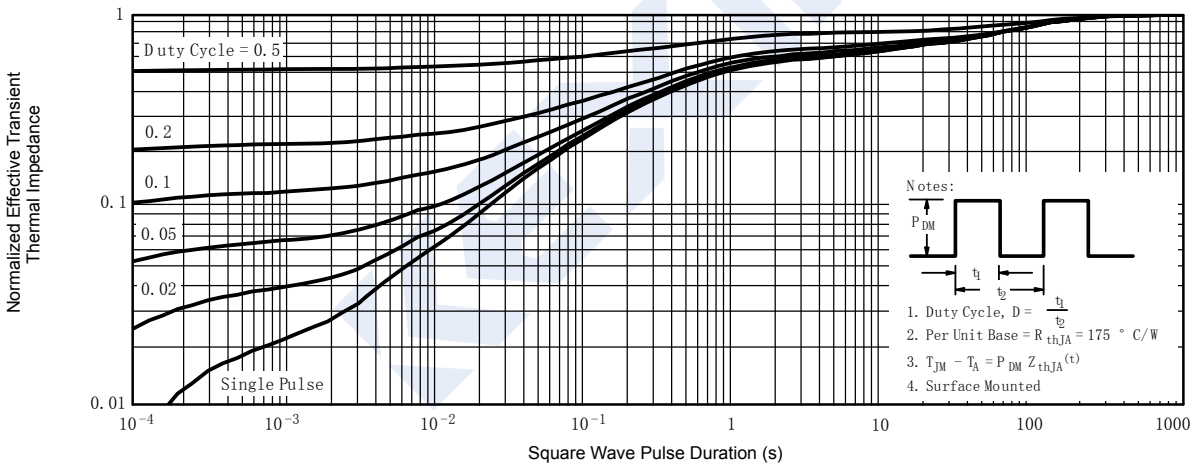
■ Typical Characteristics



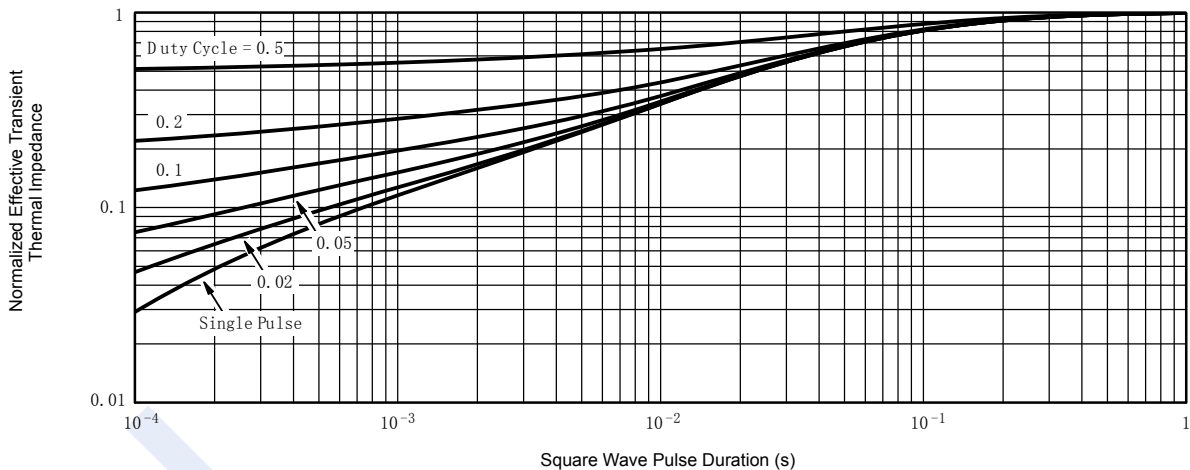
Power Junction-to-Foot



Power Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot