

N-channel Enhancement Mode Power MOSFET

Features

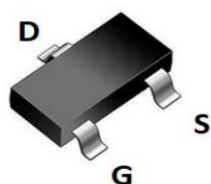
- Ultra-low $R_{DS(ON)}$
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant
- ESD Enhanced to HBM Rating up to 1.0kV
- 100% UIS TESTED!, 100% R_g TESTED!

Product Summary

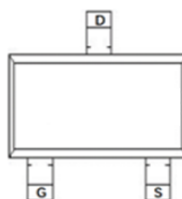
Parameters	Value	Unit
V_{DSS}	20	V
$V_{GS(th_Typ)}$	0.75	V
$I_D(@V_{GS}=10V)$	6	A
$R_{DS(ON_Typ)}(@V_{GS}=4.5V)$	22	$m\Omega$
$R_{DS(ON_Typ)}(@V_{GS}=2.5V)$	27	$m\Omega$

Applications

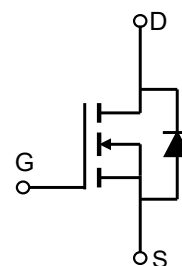
- Load Switch
- PWM Application
- Power Management



SOT23-3 Top View



Marking



Schematic Diagram

Ordering Information

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK2300	2300	SOT23	Reel	N/A	N/A	3000

MAXIMUM RATINGS ($T_a=25^{\circ}C$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	$T_C = 25^{\circ}C$	I_D	6	A
	$T_C = 100^{\circ}C$		3.5	
Pulsed Drain Current		I_{DM}	16	A
Power Dissipation		P_D	1.2	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	106	$^{\circ}C/W$
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS

$T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	V _{(BR) DSS}	V _{GS} = 0V, I _D = 250uA	20			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 20V, V _{GS} =0V			1.0	μA
Gate-body leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} =±12V			±100	nA
On characteristics ④						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	0.5	0.75	1.0	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =3A		22	29	mΩ
		V _{GS} =2.5V, I _D =2A		27	35	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =10V,V _{GS} =0V f =1MHz		455		pF
Output capacitance	C _{oss}			64		
Reverse transfer capacitance	C _{rss}			55		
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to 4.5V V _{DS} =10V, I _D =2A		6		nC
Gate-source charge	Q _{gs}			1		
Gate-drain charge	Q _{gd}			1.5		
Turn-on delay time	t _{d(on)}	V _{Dd} =10V,I _d =2A V _{GS} =4.5V,R _{GEN} =3Ω		4		ns
Turn-on rise time	t _r			13		
Turn-off delay time	t _{d(off)}			65		
Turn-off fall time	t _f			33		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V _{SD} ④	V _{GS} =0V, I _S =3A			1.2	V
Continuous drain-source diode forward current	I _S ①	T _C =25℃			6	A
Reverse recovery time	trr	di/dt = 100A/μs, I _F = 2A		6		ns
Reverse recovery charge	Qrr			0.8		nC

Notes:

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
- 2.R θ JA is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
- 3.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

Figure 1: Output Characteristics

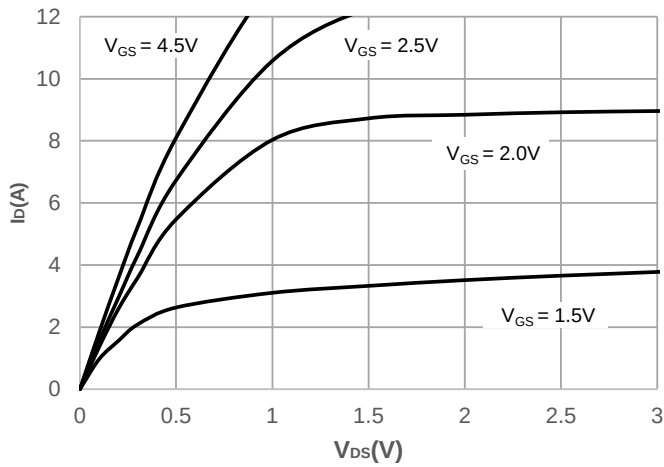


Figure 2: Typical Transfer Characteristics

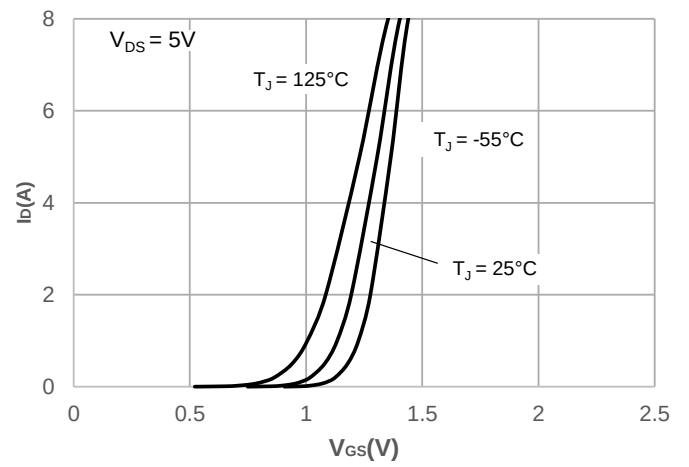


Figure 3: On-resistance vs. Drain Current

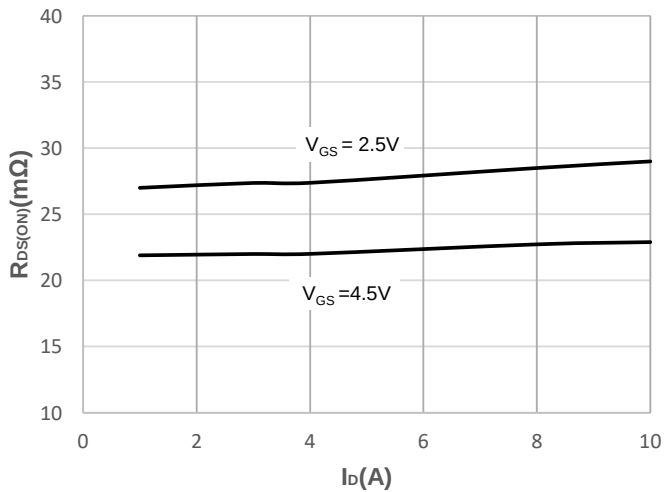


Figure 4: Body Diode Characteristics

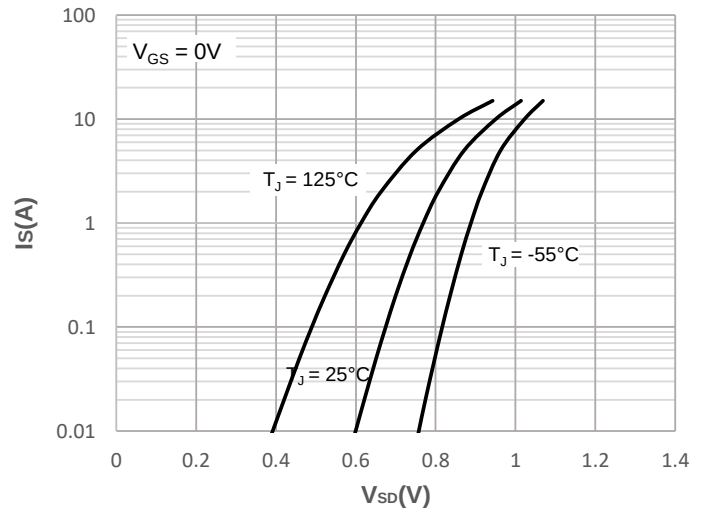


Figure 5: Gate Charge Characteristics

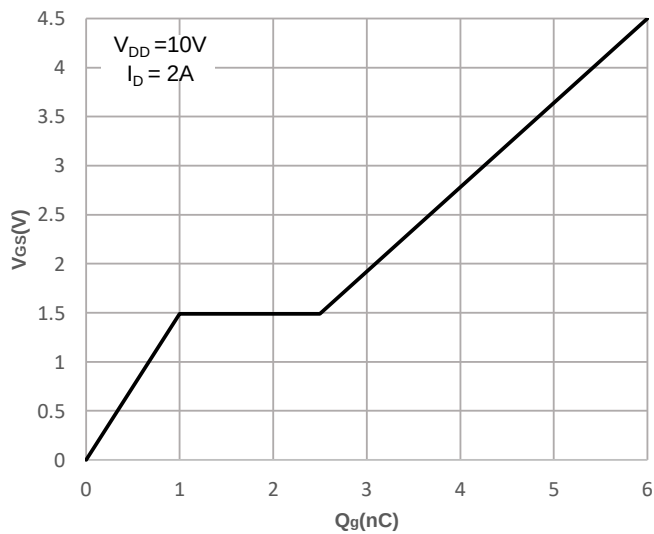
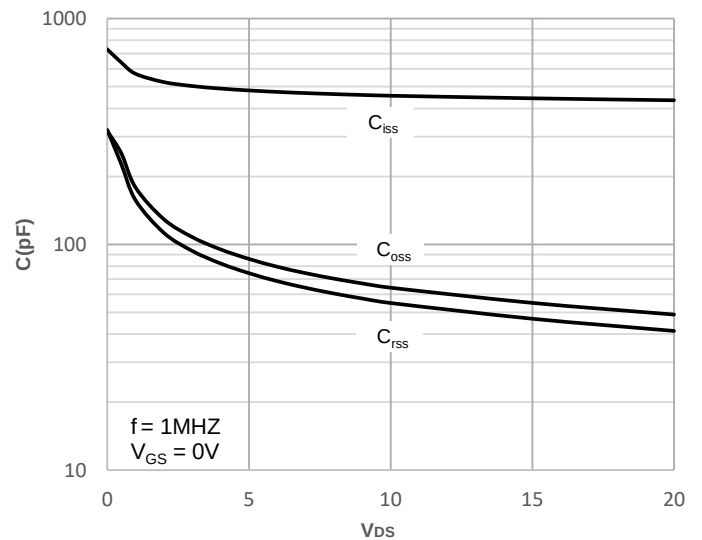


Figure 6: Capacitance Characteristics



Typical Electrical & Thermal Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

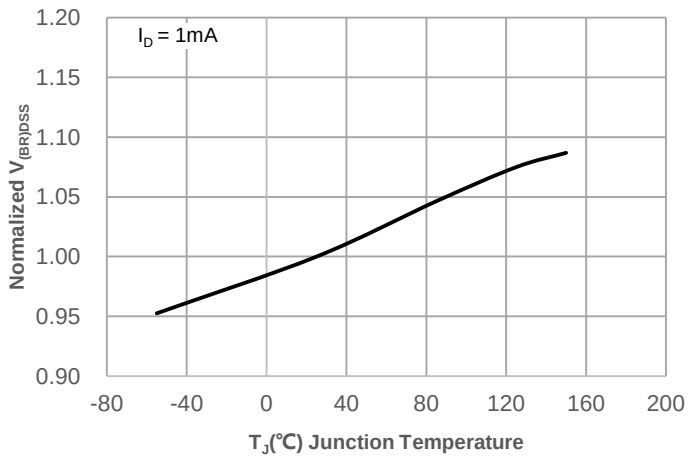


Figure 8: Normalized on Resistance vs. Junction Temperature

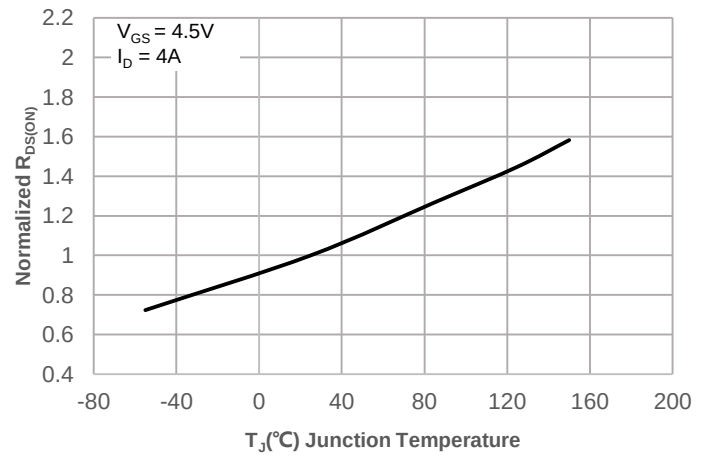


Figure 9: Maximum Safe Operating Area

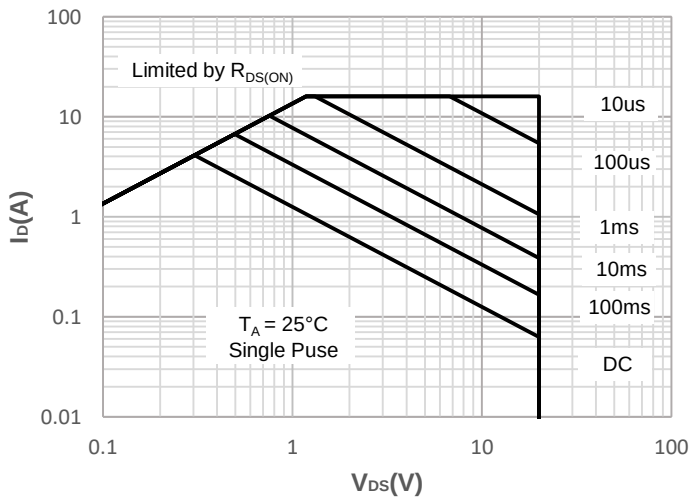


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

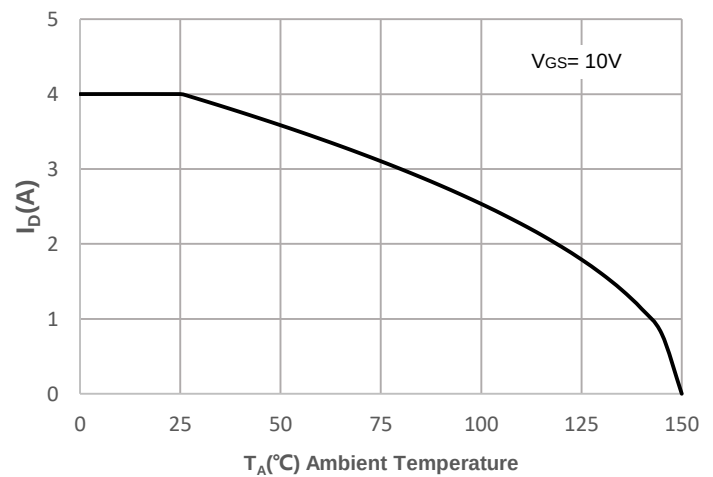


Figure 11: Normalized Maximum Transient Thermal Impedance

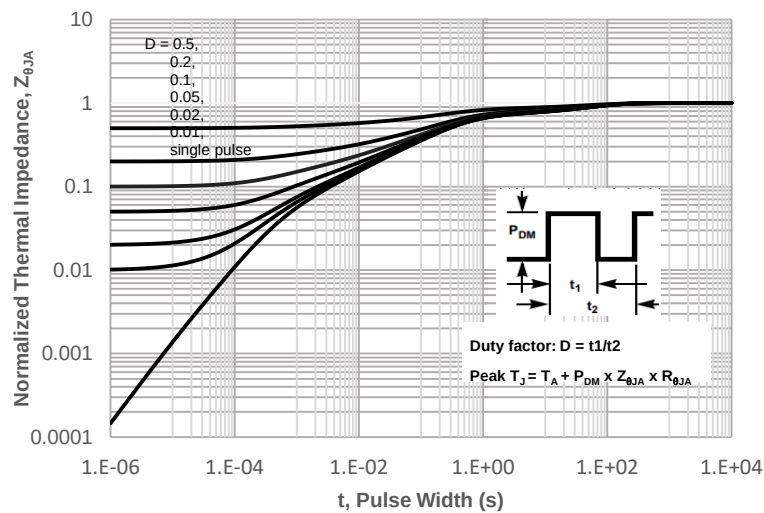
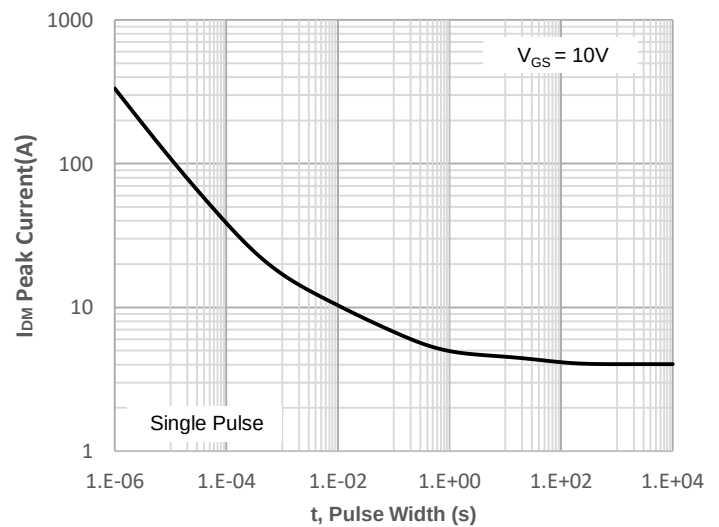


Figure 12: Peak Current Capacity



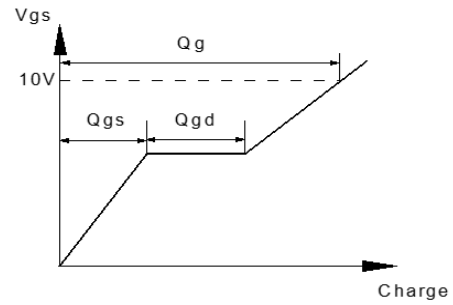
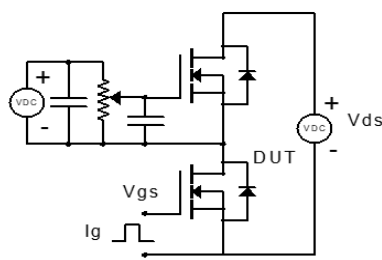


Figure 1: Gate Charge Test Circuit & Waveform

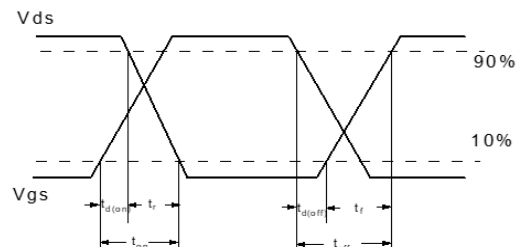
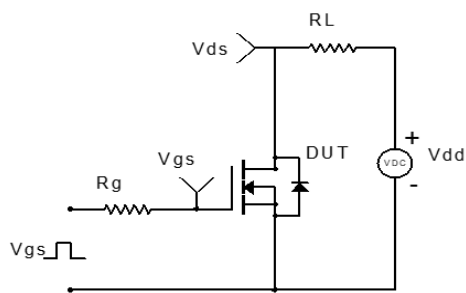


Figure 2: Resistive Switching Test Circuit & Waveform

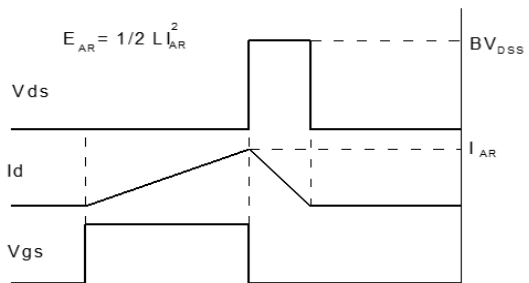
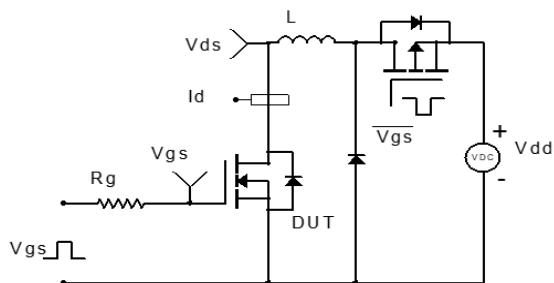
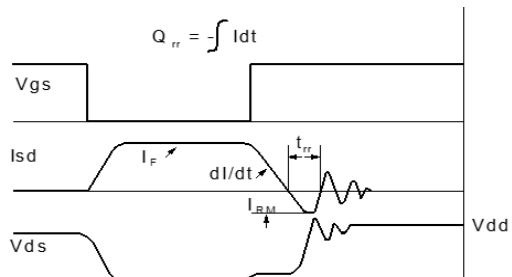
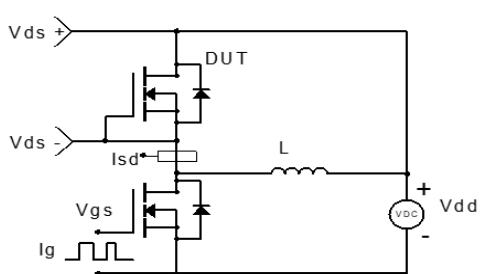
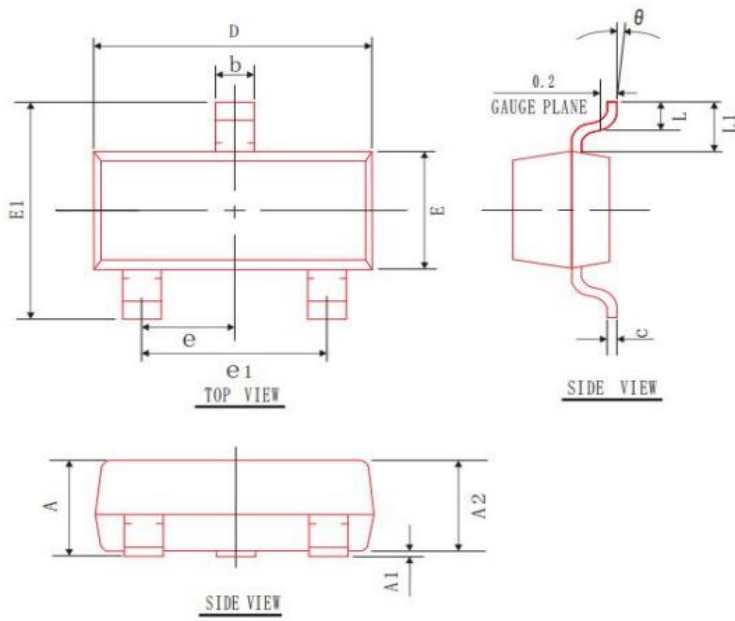


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform



SOT-23-3L Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	0.90	1.05	1.20
A1	0.00	0.05	0.10
A2	0.90	1.00	1.10
b	0.30	0.40	0.50
c	0.08	0.10	0.15
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.30	2.40	2.50
L	0.30	0.40	0.50
θ	0°	5°	10°
L1	0.55 REF		
e	0.95 BSC		
e1	1.90 REF		