

SE2305Q

P-Channel Enhancement-Mode MOSFET

Revision: A

General Description

Advanced trench technology to provide excellent RDS(ON), low gate charge and low operation voltage. This device is suitable for using as a load switch or in PWM applications.

- Simple Drive Requirement
- Small Package Outline
- Surface Mount Device
- Automotive application qualified

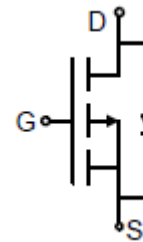
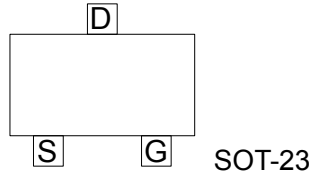
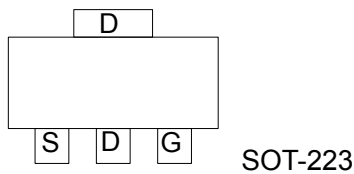
Features

For a single MOSFET

- $V_{DS} = -20V$
- $R_{DS(ON)} = 30m\Omega @ V_{GS}=-4.5V$
- $R_{DS(ON)} = 35m\Omega @ V_{GS}=-2.5V$

Pin configurations

See Diagram below



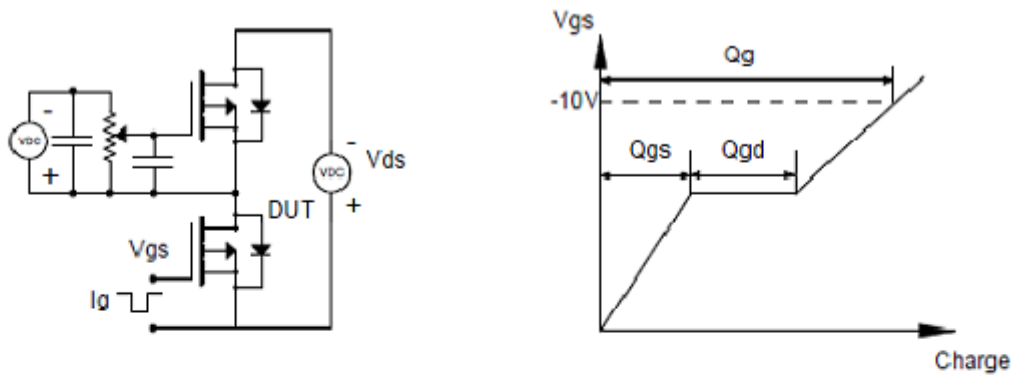
Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current	I_D	Continuous	-4.7
		Pulsed	-20
Total Power Dissipation	P_D	1.25	W
Operating Junction Temperature Range	T_J	-40 to 150	$^{\circ}C$

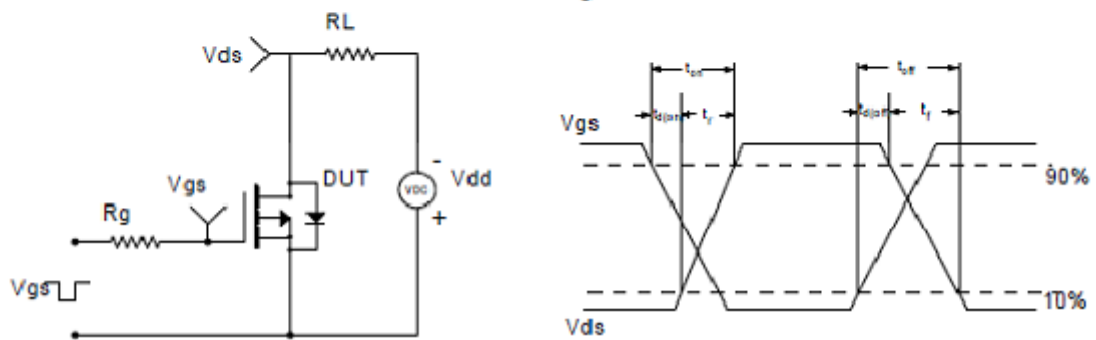
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Electrical Characteristics (T _J =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS (Note 2)						
B _V DSS	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0 V	-20			V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = -16V, V _{GS} =0V			-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = 8V			100	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	-0.4		-1	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-4A		30	35	mΩ
		V _{GS} =-2.5V, I _D =-3A		35	40	mΩ
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-10V, f=1MHz		1020		pF
C _{oss}	Output Capacitance			191		pF
C _{rss}	Reverse Transfer Capacitance			140		pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge ²	V _{GS} =-4.5V, V _{DS} =-10V, I _D =4A	7.4	9.3	11	nC
Q _{gs}	Gate Source Charge		0.8	1	12	nC
Q _{gd}	Gate Drain Charge		1.3	2.2	3.1	nC
t _{d(on)}	Turn-On Delay Time	V _{GS} =-4.5V, V _{DS} =-10V, R _{GEN} =6Ω, R _L =10Ω		25		ns
t _{d(off)}	Turn-Off Delay Time			71		ns
t _{d(r)}	Turn-On Rise Time			9		ns
t _{d(f)}	Turn-Off Fall Time			29		ns
Thermal Resistance						
Symbol	Parameter		Typ	Max		Units
R _{θJC}	Junction to Case		-	43		°C/W
R _{θJA}	Junction to Ambient (t ≤ 10s)		-	65		°C/W

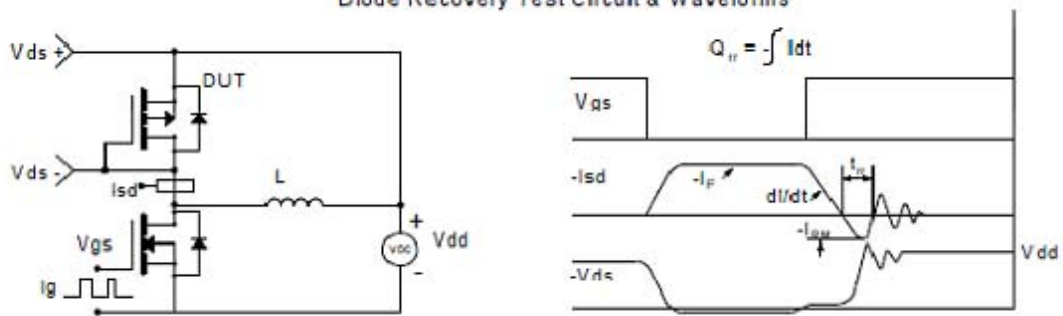
Test Circuits and Waveform



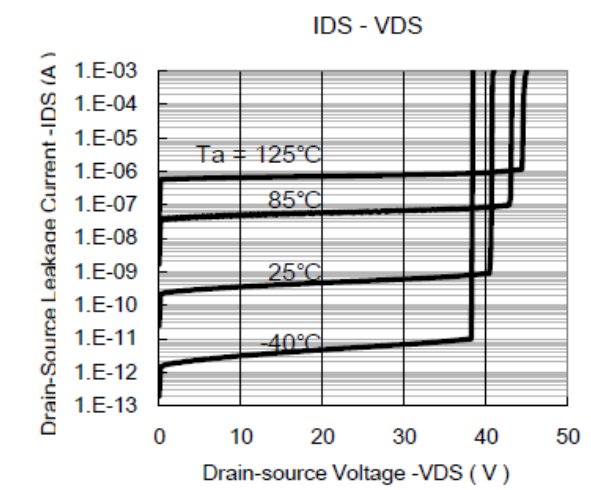
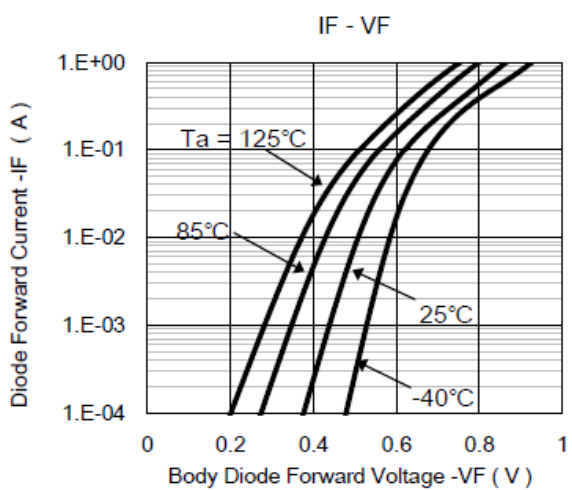
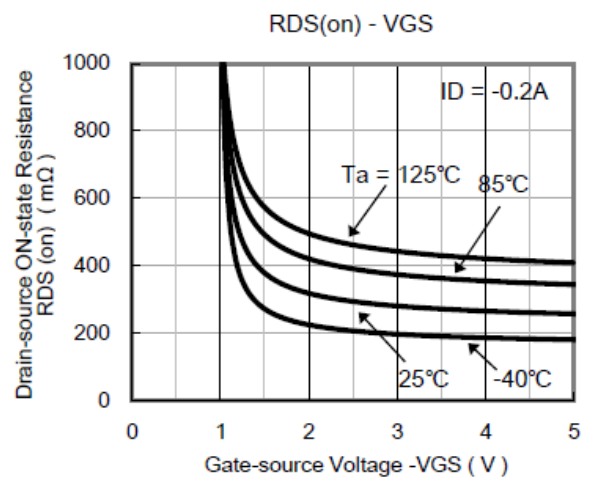
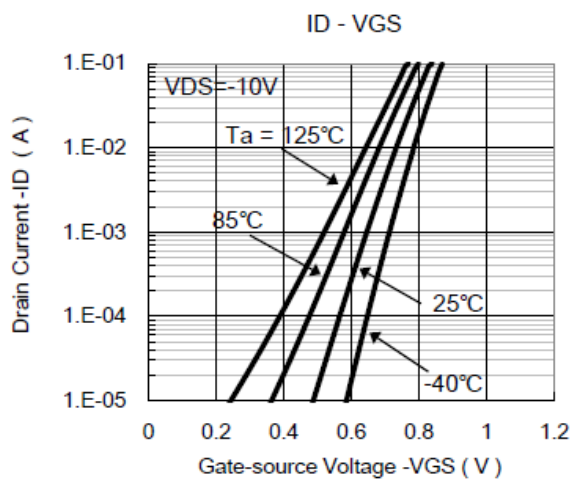
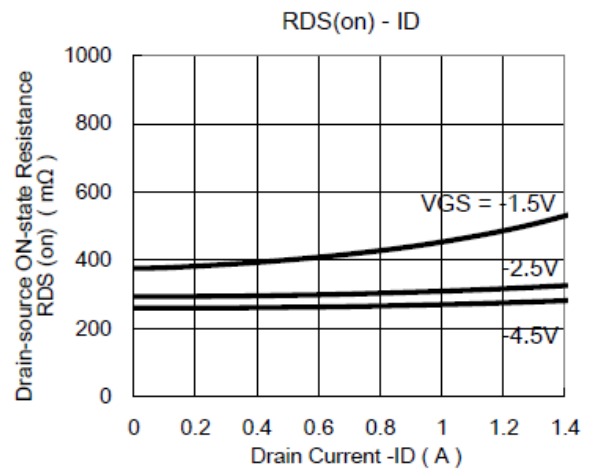
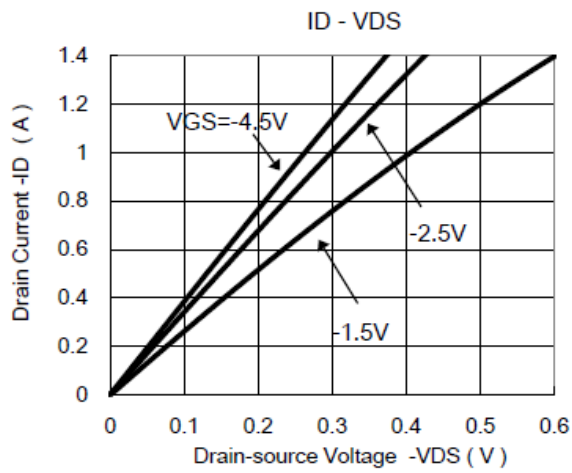
Resistive Switching Test Circuit & Waveforms



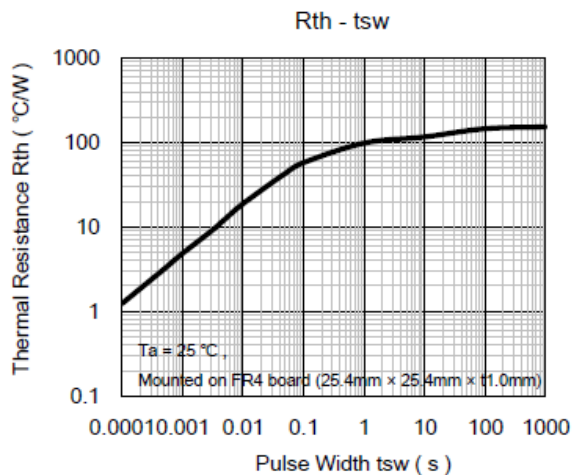
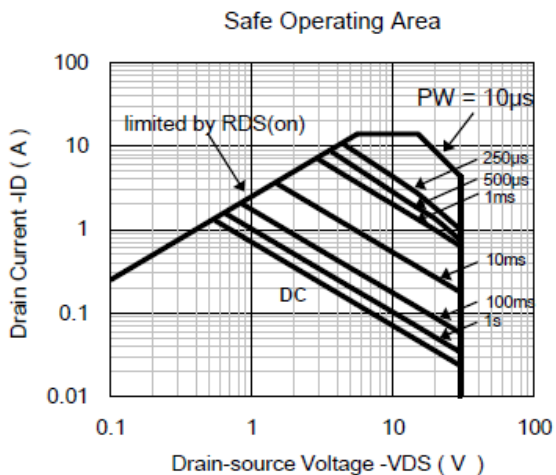
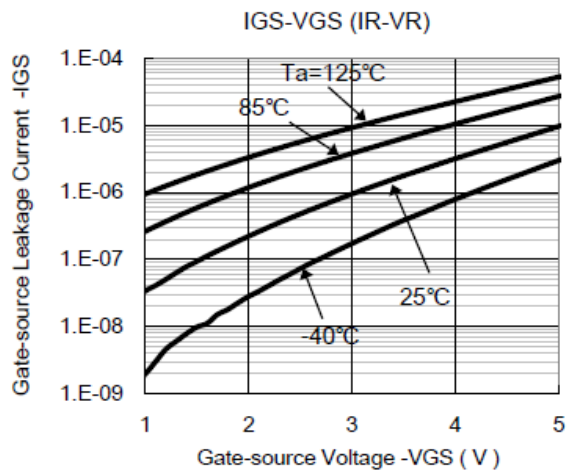
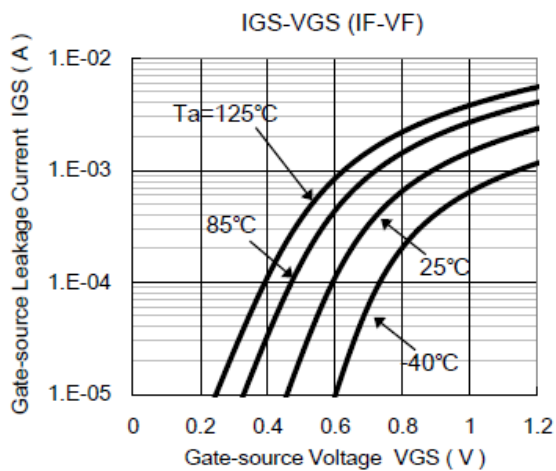
Diode Recovery Test Circuit & Waveforms



Typical Characteristics



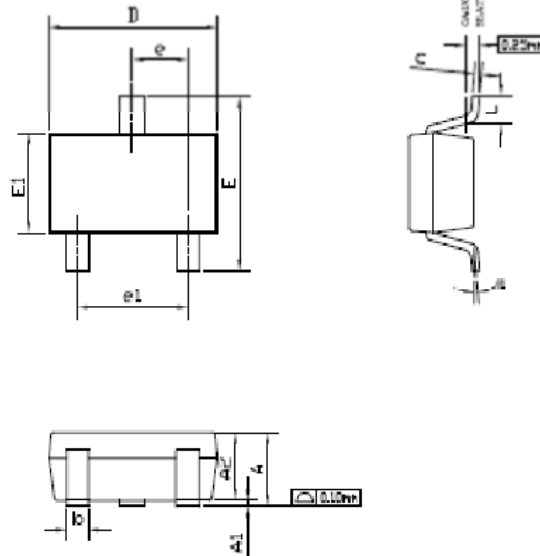
Typical Characteristics



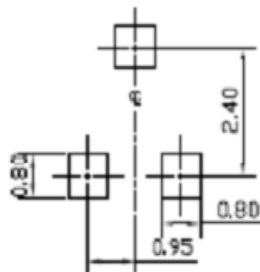
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Package Outline Dimension

SOT-23



RECOMMENDED LAND PATTERN



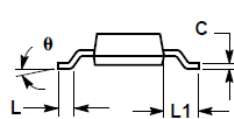
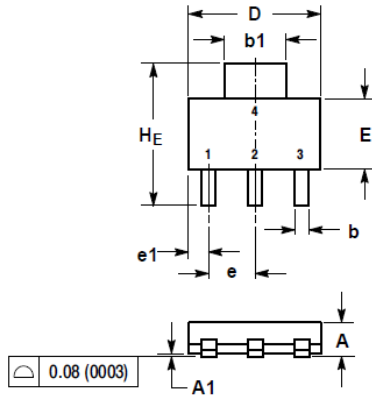
UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	—	1.25	0.033	—	0.049
A1	0.00	—	0.13	0.000	—	0.005
A2	0.70	1.00	1.15	0.028	0.039	0.045
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.08	0.13	0.20	0.003	0.005	0.008
D	2.80	2.90	3.10	0.110	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.40	1.60	1.80	0.055	0.063	0.071
e	1.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
L	0.30	—	0.60	0.012	—	0.024
Bl	0"	3"	8"	0"	3"	8"

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Package Outline Dimension

SOT-223



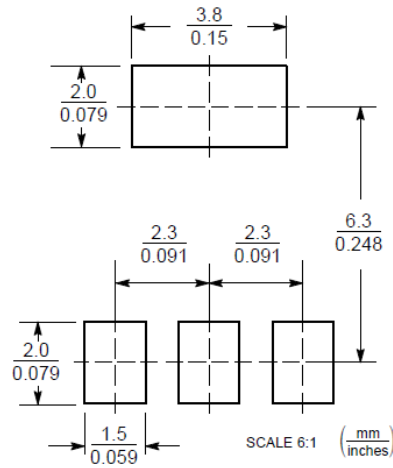
NOTES:
 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.63	1.75	0.060	0.064	0.068
A1	0.02	0.06	0.10	0.001	0.002	0.004
b	0.60	0.75	0.89	0.024	0.030	0.035
b1	2.90	3.06	3.20	0.115	0.121	0.126
c	0.24	0.29	0.35	0.009	0.012	0.014
D	6.30	6.50	6.70	0.249	0.256	0.263
E	3.30	3.50	3.70	0.130	0.138	0.145
e	2.20	2.30	2.40	0.087	0.091	0.094
e1	0.85	0.94	1.05	0.033	0.037	0.041
L	0.20	---	---	0.008	---	---
L1	1.50	1.75	2.00	0.060	0.069	0.078
HE	6.70	7.00	7.30	0.264	0.276	0.287
θ	---	---	---	---	---	---

STYLE 3:
 PIN 1: GATE
 PIN 2: DRAIN
 PIN 3: SOURCE
 PIN 4: DRAIN

10° 0° 10°

SOLDERING FOOTPRINT*



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