

N-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω) (Typ.)	I_D (A) ^a	Q_g (Typ.)
40	40 at $V_{GS} = 10$ V	3.6	12 nC
	50 at $V_{GS} = 4.5$ V		

FEATURES

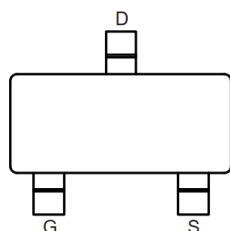
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Fast switching



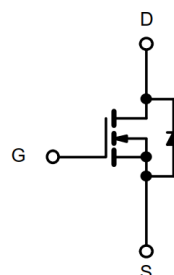
APPLICATIONS

- DC/DC Converters
- Load Switch
- Portable and Consumer Applications

SOT-23 Pin Configuration



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current	I_{DM}	20	
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C	W
		$T_C = 100$ °C	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^{b,d}	R_{thJA}	60	°C/W

Notes:

- $T_C = 25$ °C.
- Surface mounted on 1" x 1" FR4 board.
- $t = 5$ s.
- Maximum under steady state conditions is 125C/W.

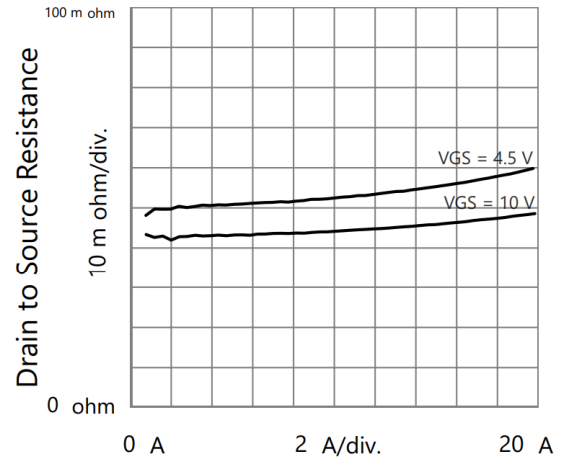
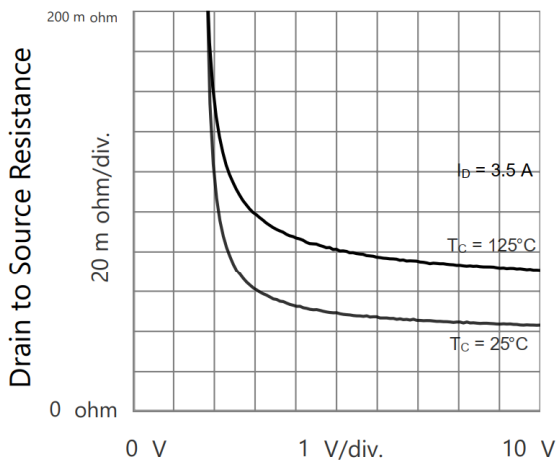
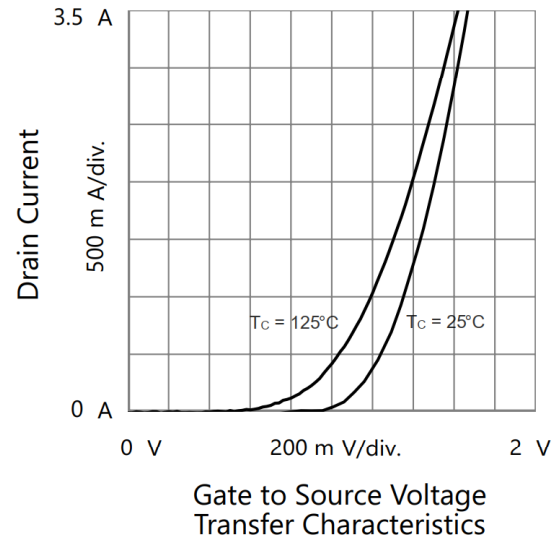
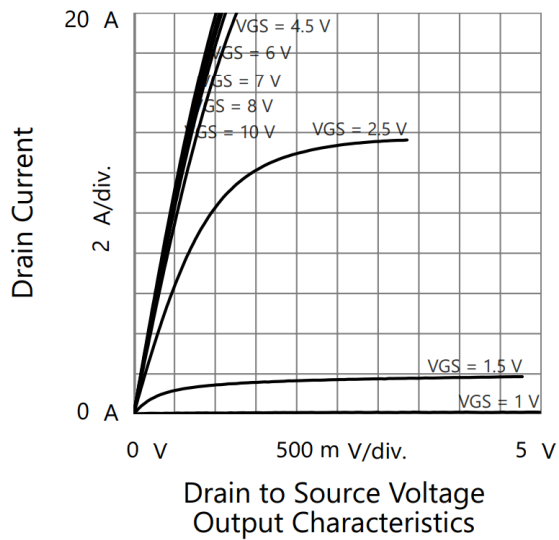
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	40	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.5	-	1.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V	-	-	1	μA
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	3.6	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 3.5 A	-	40	46	mΩ
		V _{GS} = 4.5 V, I _D = 3 A	-	50	60	
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 3.5 A	-	12	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 10 V, f = 1MHz	-	298	-	pF
Output Capacitance	C _{oss}		-	39	-	
Reverse Transfer Capacitance	C _{rss}		-	37	-	
Total Gate Charge ^c	Q _g	V _{DS} = 10 V, V _{GS} = 10 V, I _D = 3.5 A	-	12	-	nC
Gate-Source Charge ^c	Q _{gs}		-	0.33	-	
Gate-Drain Charge ^c	Q _{gd}		-	2.3	-	
Gate Resistance	R _g	f = 1 MHz	-	6.5	-	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, I _D = 3.5 A, V _{GS} = 10 V, R _g = 10Ω	-	10	-	ns
Rise Time	t _r		-	9	-	
Turn-Off DelayTime	t _{d(off)}		-	22	-	
Fall Time	t _f		-	8	-	
Drain-Source Body Diode Ratings and Characteristics ^b (T _C = 25 °C)						
Continuous Source Current	I _S	T _C = 25 °C	-	-	3.6	A
Pulsed Source Current	I _{SM}		-	-	20	A
Forward Voltage ^a	V _{SD}	I _S = 3.5 A, V _{GS} = 0 V	-	-	1.2	V
Reverse Recovery Time	t _{rr}	I _S = 3.5 A, di/dt = 20 A/μs	-	16	-	ns
Reverse Recovery Charge	Q _{rr}		-	8	-	nC

Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.
 c. Independent of operating temperature.

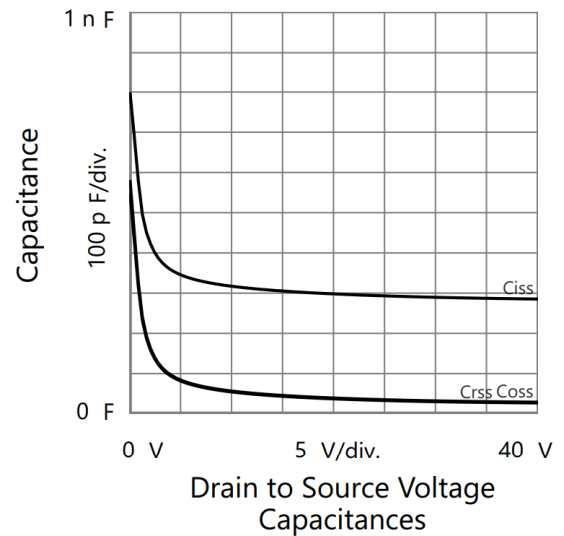
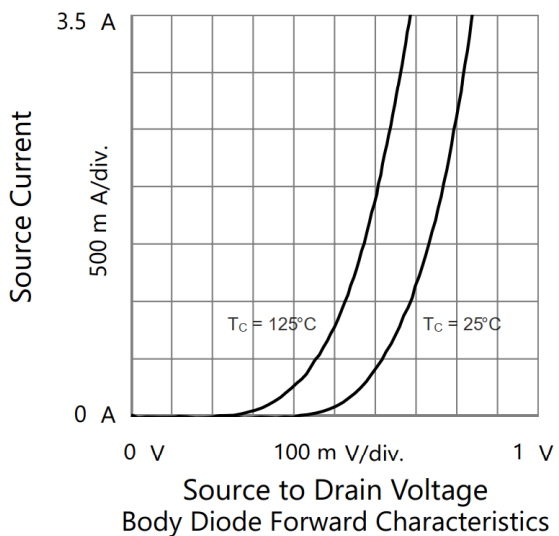
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

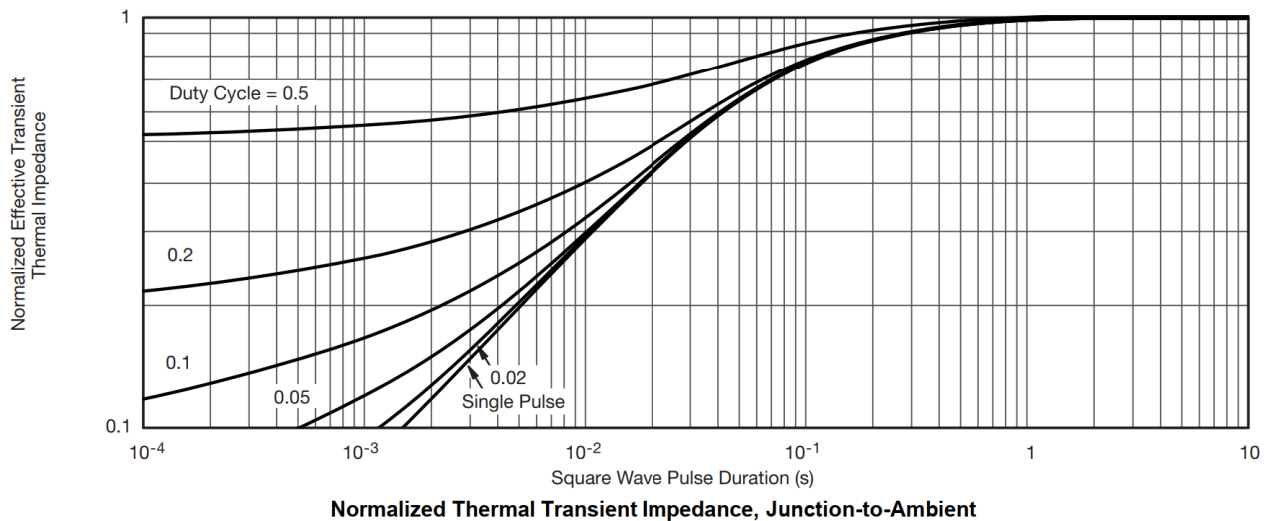
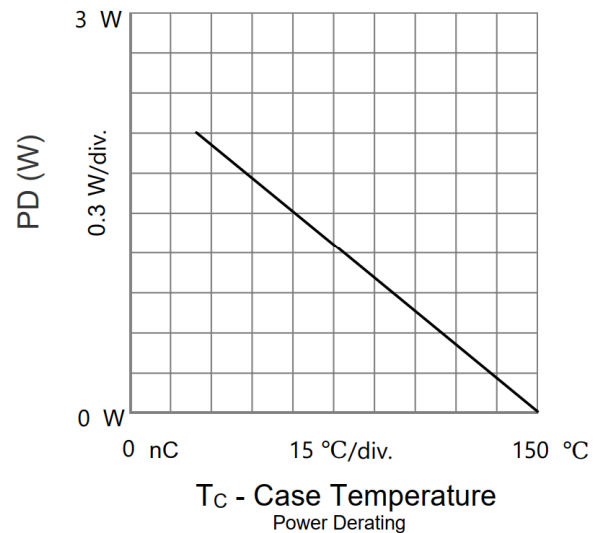
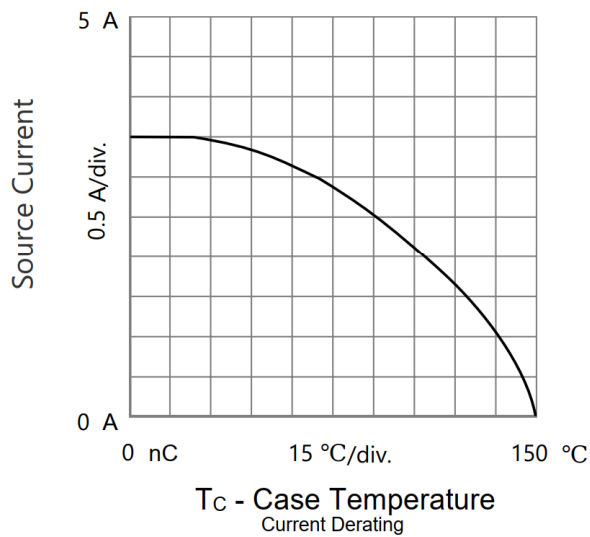
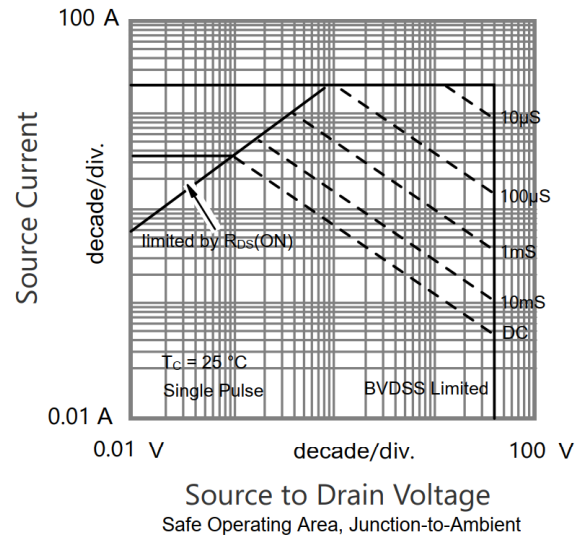
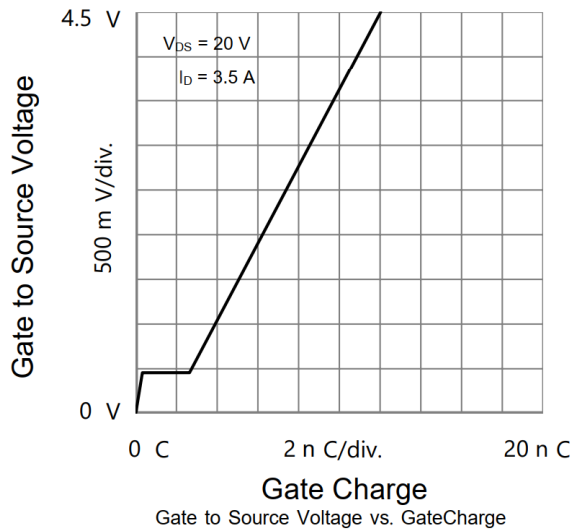


Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage

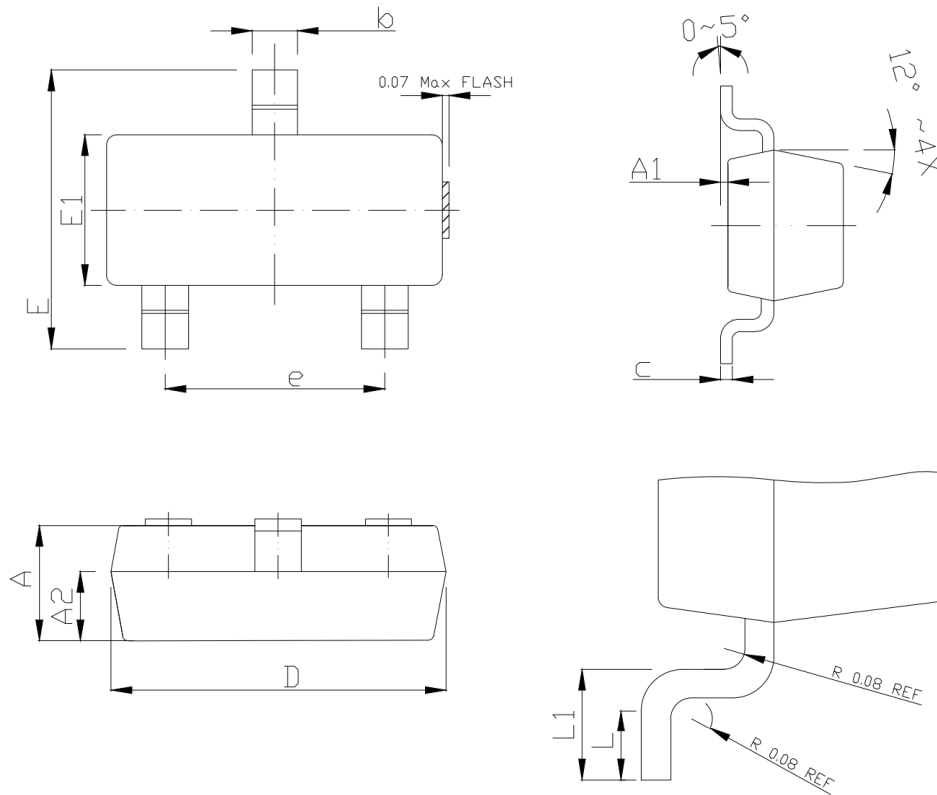
Drain Current
Drain to Source Resistance vs. Drain Current



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



SOT-23 PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.80	1.00	1.30
A1	0.00	0.05	0.15
b	0.25	0.40	0.55
c	0.11 BSC		
D	2.60	2.90	3.20
E	2.10	2.40	2.70
E1	1.10	1.30	1.48
e	1.90 BSC		
L	0.17	—	—
L1	0.28	0.40	0.53
A2	0.60 REF		

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