

N-Channel 40V(D-S) MOSFET

Product summary		
V_{DS}	40	V
$R_{DS(ON)}$ (at $V_{GS}=10V$) Typ.	28	m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$) Typ.	40	m Ω
I_D ($T_C=25^{\circ}C$)	5	A

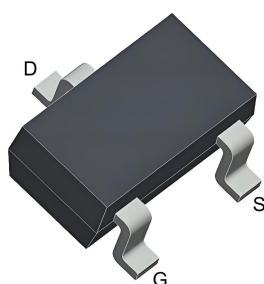
Features

- Small package SOT-23
- Low Gate Charge
- RoHS Compliant

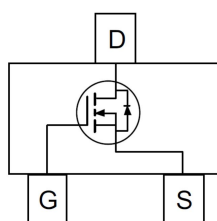
Applications

- Load Switch
- PWM application

Pin Configuration



SOT-23



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECDA05N04	SOT-23	7"	3000pcs

Absolute Maximum Ratings (at $T_A=25^{\circ}C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current at $V_{GS}=10V$	$T_C=25^{\circ}C$	5
		$T_C=70^{\circ}C$	4
I_{DM}	Pulse Drain Current Tested ^A	18	A
P_D	Power Dissipation	$T_C=25^{\circ}C$	1.3
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JA}$	Thermal Resistance-Junction to ambient ^B	97	$^{\circ}C/W$

Electrical Characteristics (at T_J =25°C Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	40	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V	--	--	1	uA
I _{GSS}	Gate-Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1.0	1.5	2.2	V
R _{DS(ON)}	Drain-Source On-State Resistance ^C	V _{GS} =10V, I _D =5A	--	28	40	mΩ
		V _{GS} =4.5V, I _D =3A	--	40	56	mΩ
V _{SD}	Forward Voltage	I _{SD} =5A, V _{GS} =0V	--	--	1.2	V
Dynamic Parameters ^D						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V f=1MHZ	--	430	--	pF
C _{oss}	Output Capacitance		--	42	--	pF
C _{rss}	Reverse Transfer Capacitance		--	31	--	pF
Q _g	Total Gate Charge	V _{DS} =20V, I _D =3.5A V _{GS} =10V	--	5.1	--	nC
Q _{gs}	Gate-Source Charge		--	0.8	--	nC
Q _{gd}	Gate-Drain Charge		--	1.4	--	nC
t _{D(on)}	Turn-on Delay Time	V _{DS} =20V I _D =1A, R _G =10Ω, V _{GS} =4.5V	--	9	--	nS
t _r	Turn-on Rise Time		--	5	--	nS
t _{D(off)}	Turn-off Delay Time		--	19	--	nS
t _f	Turn-off Fall Time		--	4	--	nS

A. Repetitive rating: pulse width limited by maximum junction temperature.

B. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 2OZ copper.

C. Pulse Test: Pulse Width≤300us, Duty cycle ≤2%.

D. Guaranteed by design, not subject to production testing.

Typical Characteristics

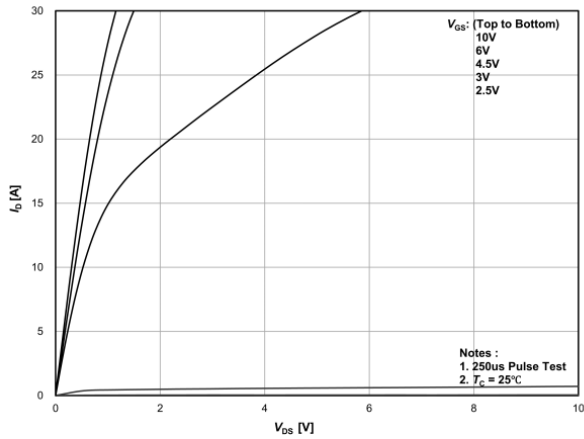


Figure 1. On-Region Characteristics

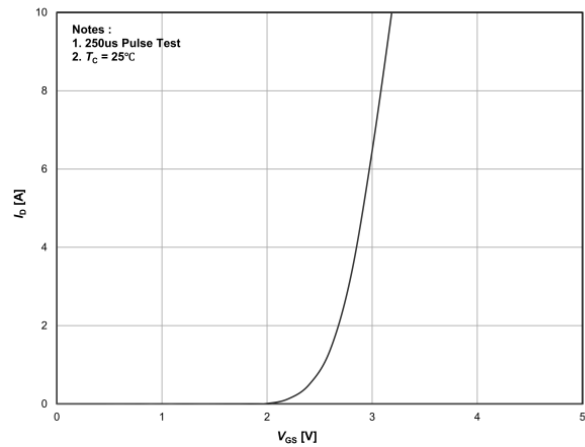


Figure 2. Transfer Characteristics

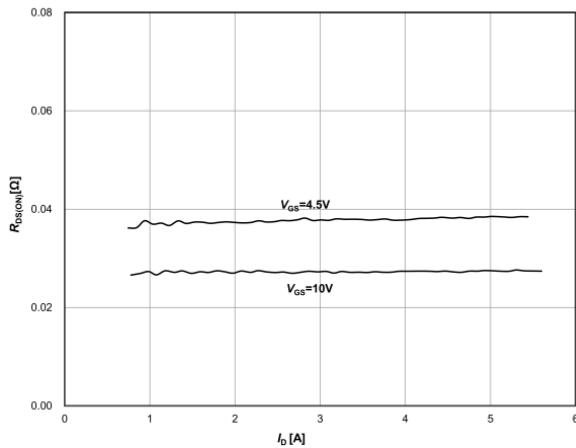


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

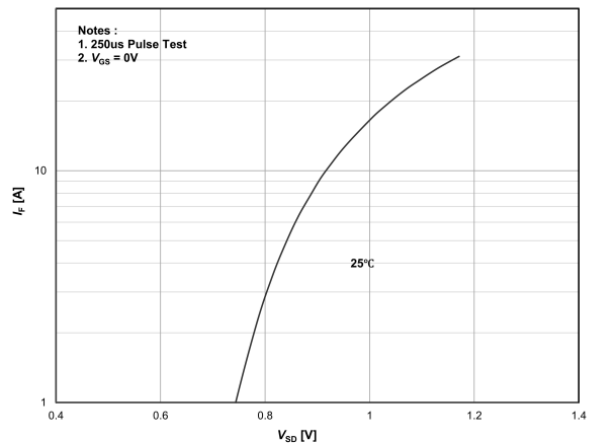


Figure 4. Body Diode Forward Voltage Variation with Current

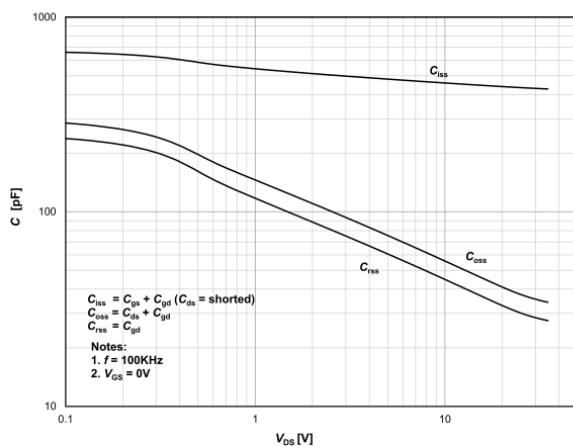


Figure 5. Capacitance Characteristics

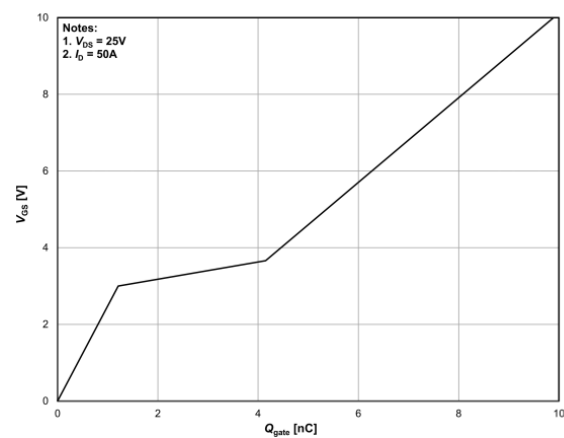


Figure 6. Gate Charge Characteristics

Typical Characteristics

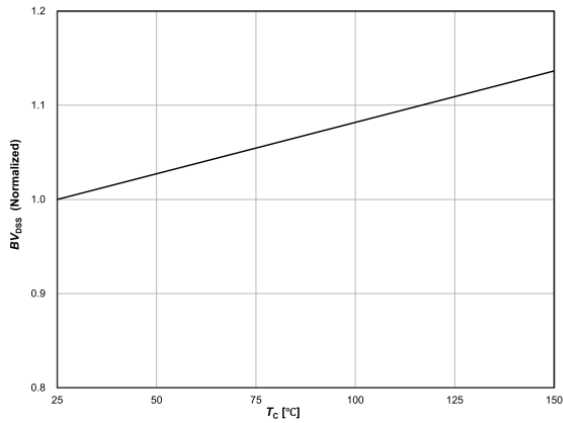


Figure 7. Breakdown Voltage Variation vs Temperature

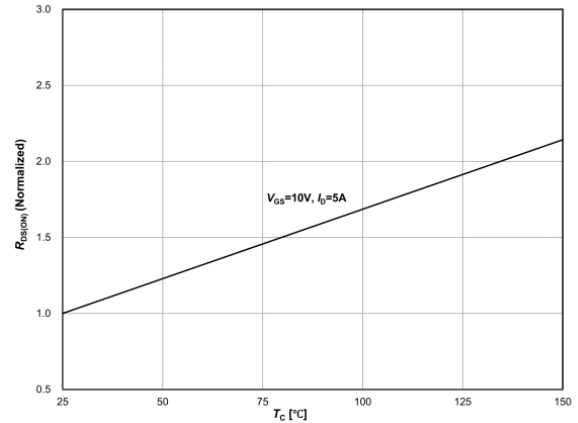


Figure 8. On-Resistance Variation vs Temperature

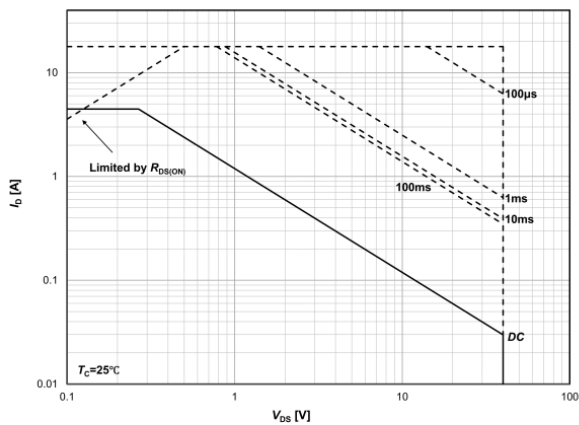


Figure 9. Maximum Safe Operating Area³⁾

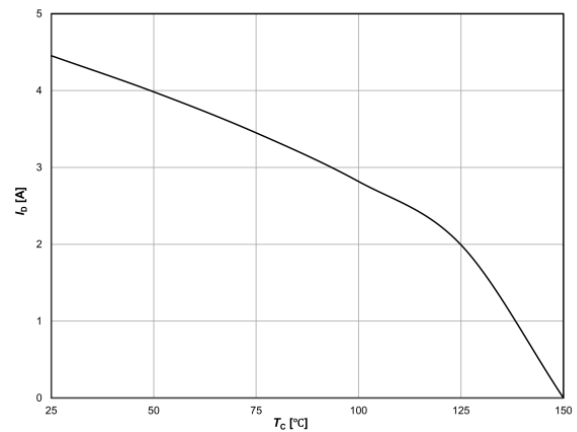


Figure 10. Maximum Drain Current vs Case Temperature

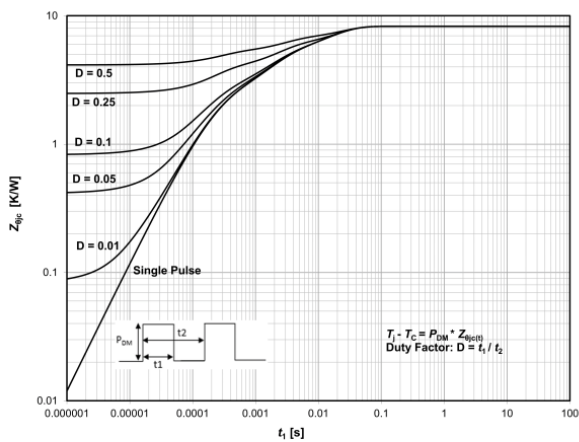
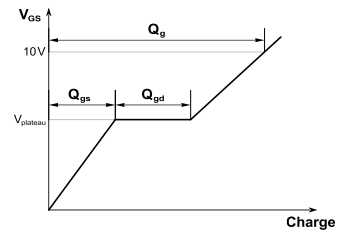
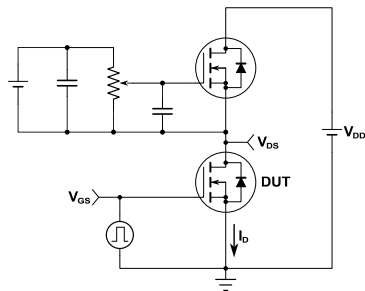
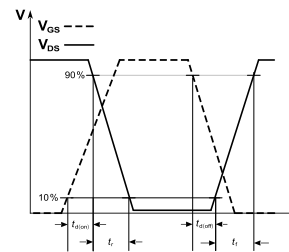
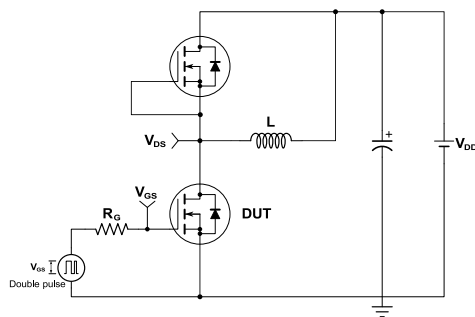


Figure 11. Transient Thermal Response Curve

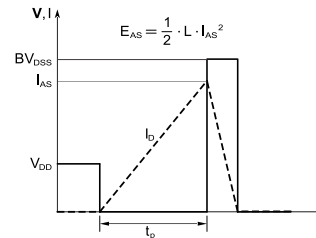
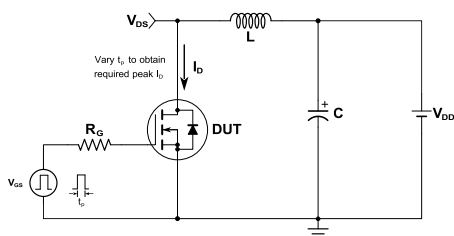
Test Circuits and waveforms



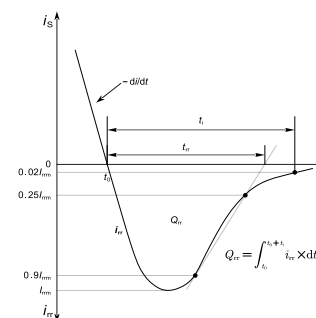
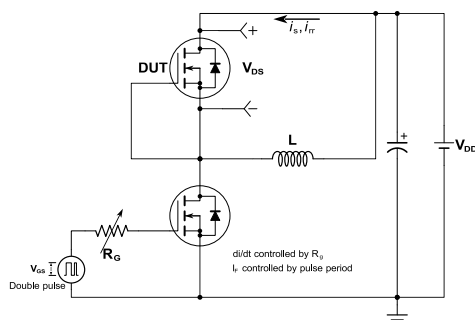
Gate charge test circuit & waveform



Switching times for inductive load test circuit & waveform

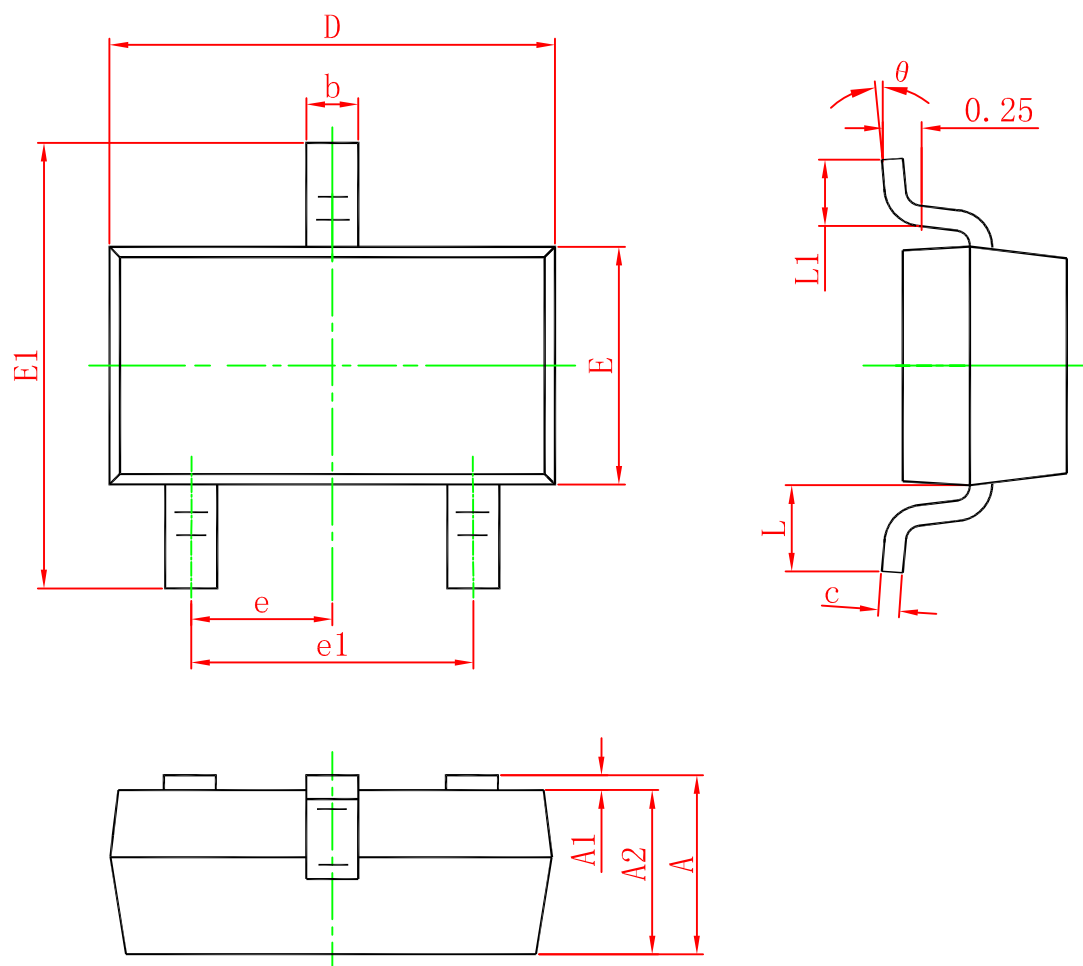


Unclamped inductive load test circuit & waveform



Diode characteristics test circuit & waveform

SOT-23 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°