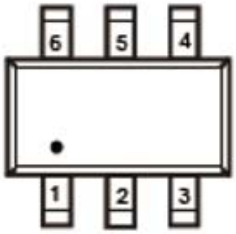
N-Channel Enhancement Mode Field Effect Transistor



Dot denotes Pin1

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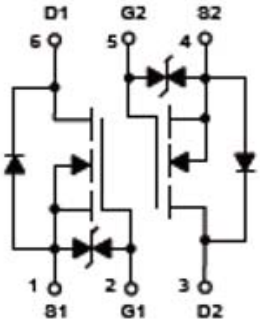


Product Summary

- V_{DS} 60V
- I_D 300mA
- $R_{DS(ON)}$(at V_{GS}=10V) 2.5ohm
- $R_{DS(ON)}$(at V_{GS}=4.5V) 3.0ohm
- ESD Protected Up to 2.0KV (HBM)

General Description

- Trench Power MV MOSFET technology
- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage
- Part no. with suffix “Q” means AEC-Q101 qualified

Applications

- Battery operated systems
- Solid-state relays
- Direct logic-level interface TTL/CMOS

■ Absolute Maximum Ratings (T_A=25 unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	60	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current	T_A=25℃ @ Steady State	I_D	300	mA
	T_A=70℃ @ Steady State		240	
Pulsed Drain Current [A]		I_{DM}	1.5	A
Total Power Dissipation @ T_A=25℃		P_D	300	mW
Thermal Resistance Junction-to-Ambient @ Steady State [B]		$R_{\theta JA}$	416	℃/ W
Junction and Storage Temperature Range		T_J ,T_{STG}	-55 +150	℃

■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
2N7002KCDWQ	F2	72KC	3000	30000	120000	7“ reel

■ Electrical Characteristics (T_J=25 unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ± 20V, V_{DS}=0V			± 10	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA	1	1.5	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D=300mA		1.9	2.5	Ω
		V_{GS}= 4.5V, I_D=200mA		2.0	3.0	
Diode Forward Voltage	V_{SD}	I_S=300mA,V_{GS}=0V			1.2	V
Maximum Body-Diode Continuous Current	I_S				300	mA
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=30V,V_{GS}=0V,f=1MHZ		27		pF
Output Capacitance	C_{oss}			3		
Reverse Transfer Capacitance	C_{rss}			2		
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=30V,I_D=0.3A		1.65	2.4	nC
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=30V, I_D=300mA, R_{GEN}=6Ω		6.5		ns
Turn-off Delay Time	$t_{D(off)}$			9.6		
Reverse recovery Time	t_{rr}	V_{GS}=0V,I_S=300mA,V_R=25V, di/dt=-100A/μs		24		ns

A. Pulse Test: Pulse Width ≤ 300us,Duty cycle ≤ 2%.
B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

y Typical Performance Characteristics

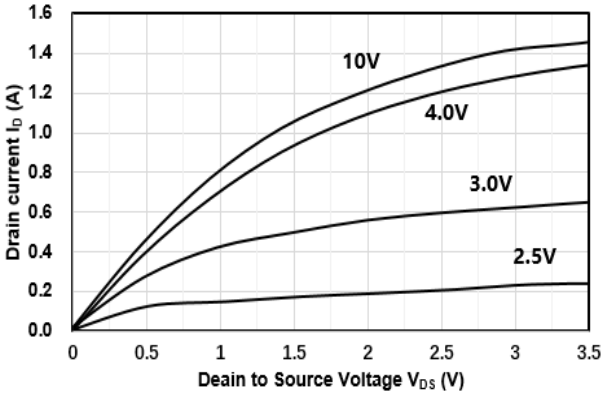


Figure1. Output Characteristics

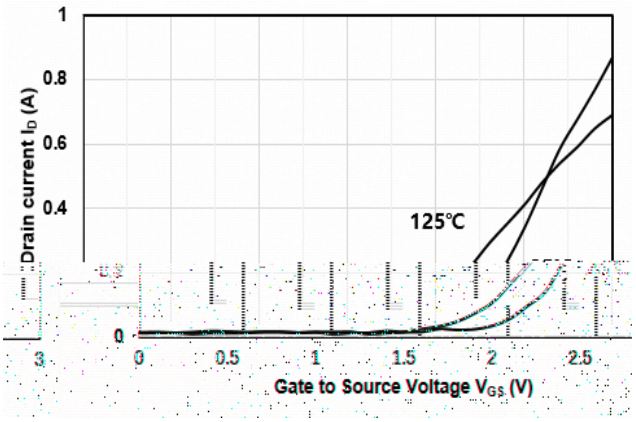


Figure2. Transfer Characteristics

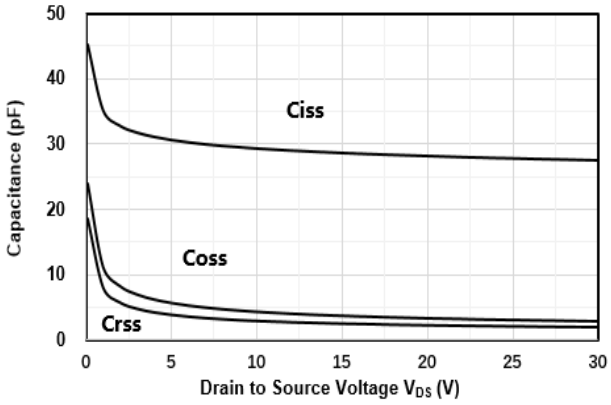


Figure3. Capacitance Characteristics

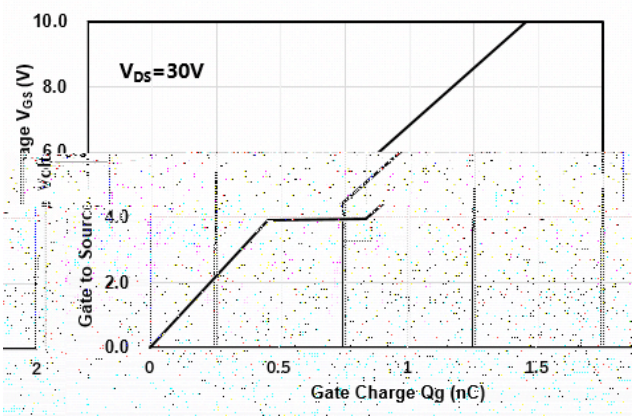


Figure4. Gate Charge

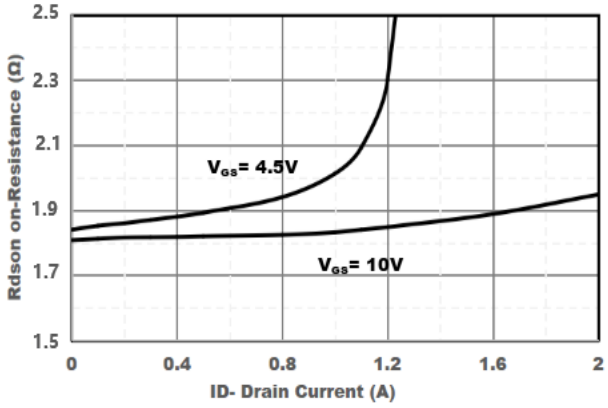


Figure5. Drain-Source on Resistance

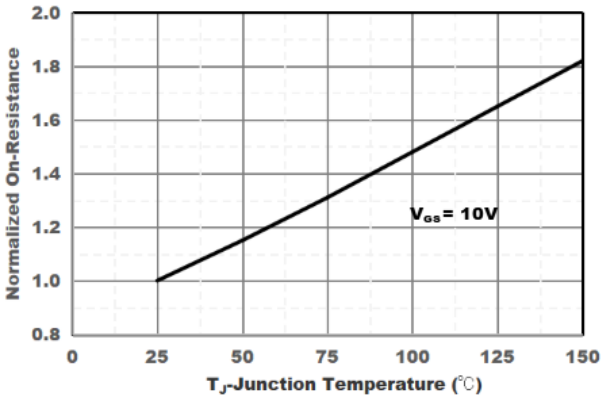


Figure6. Drain-Source on Resistance

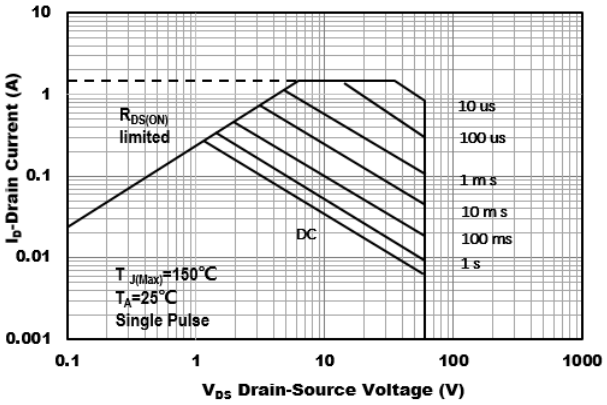


Figure7. Safe Operation Area

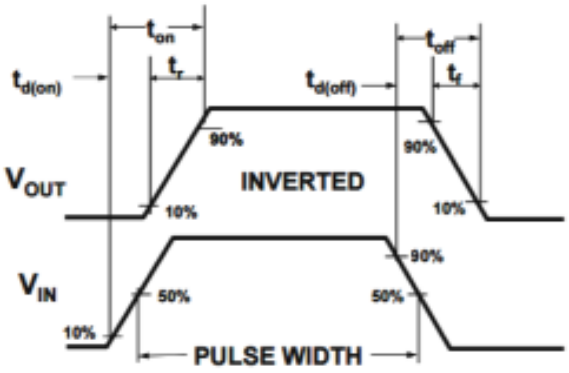
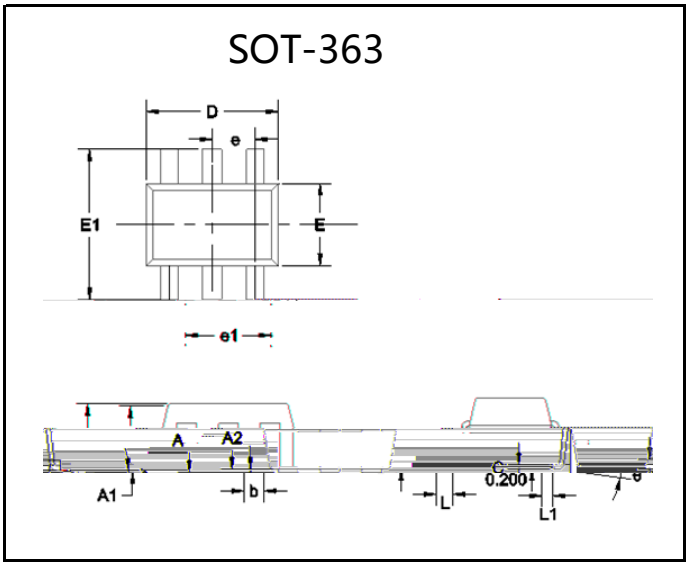


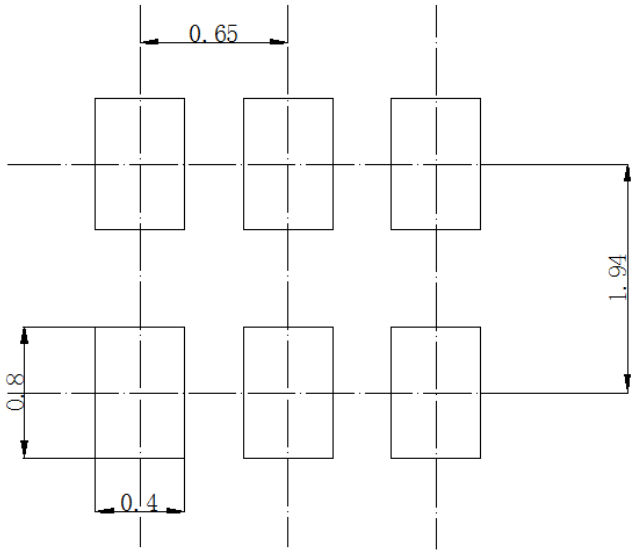
Figure8. Switching wave

■SOT-363 Package Outline Dimensions



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.035	0.043	0.90	1.10	
A1	0.000	0.004	0.00	0.10	
A2	0.035	0.039	0.90	1.00	
b	0.006	0.014	0.15	0.35	
c	0.002	0.010	0.05	0.25	
D	0.071	0.087	1.80	2.20	
E	0.045	0.053	1.15	1.35	
E1	0.085	0.096	2.15	2.45	
e	0.026Typ		0.65Typ		
e1	0.047	0.055	1.20	1.40	
L	0.021Typ		0.525Typ		
L1	0.010	0.018	0.26	0.46	
θ	0°	8°	0°	8°	

■SOT-363 Soldering Footprint



Unit mm

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REV.	EFFECTIVE DATE	REVISION HISTORY	PREPARED
1.0	2021.06.11	New release	Zhenzhong Zhao