Description

This 10A,100V N-Channel MOSFET in a TO-252 Plastic Package.

Applications

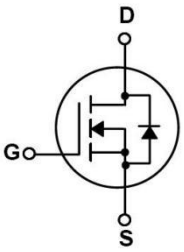
Suited for low voltage applications such as automotive, DC/DC Converters, and high efficiency switching for power management in portable and battery operated products.

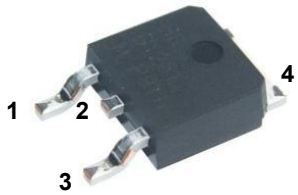
Features

- Low $R_{DS(on)}$
- Low gate charge
- Low C rss
- Fast switching
- Halogen-free Product

V_{DSS}	$R_{DS(on)}$ Typ	I_D
100V	140mΩ	10A

Equivalent Circuit & Pinning





PIN1：Gate PIN 2：Drain PIN 3：Source PIN 4：Drain

Absolute Maximum Ratings(Ta=25℃)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	100	V
Drain Current	I_D(Tc=25℃)	10	A
Drain Current	I_D(Tc=100℃)	8	A
Drain Current - Pulsed [C]	I_{DM}	24	A
Gate-Source Voltage	V_{GS}	±20	V
Avalanche Current [C]	I_{AS}	7.9	A
Avalanche energy L=0.5mH [C]	E_{AS}	25	mJ
Power Dissipation [B]	P_D(Tc=25℃)	23	W
	P_D(Tc=100℃)	2.3	W
Power Dissipation [A]	P_{DSM}(T_A=25℃)	2.1	W
	P_{DSM}(T_A=70℃)	1.3	W
Junction and Storage Temperature Range	T_j, T_{stg}	-55～150	℃

Electrical Characteristics(Ta=25℃)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V V_{GS}=0V			1.0	μA
		V_{DS}=100V V_{GS}=0V T_J=55°C			5.0	μA
Gate-Body Leakage Current Forward	I_{GSS}	V_{GS}=±20V V_{DS}=0V			100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=250μA	1	2.3	3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V I_D=4A		140	160	mΩ
Diode Forward Voltage	V_{SD}	I_S=10A V_{GS}=0V		0.8	1.0	V
Input Capacitance	C_{iss}	V_{DS}=25V V_{GS}=0V f=1.0MHz		550		pF
Output Capacitance	C_{oss}			83		
Reverse Transfer Capacitance	C_{rss}			11		
Gate resistance	R_g	V_{GS}=0V V_{DS}=0V f=1MHz		2		Ω

Electrical Characteristics(Ta=25℃)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Total Gate Charge	Q_g(10V)	V_{GS}=10V V_{DS}=50V I_D=4.5A	8	10.3	13	nC
Total Gate Charge	Q_g(4.5V)		4	5.1	6.5	
Gate Source Charge	Q_{gs}			1.6		
Gate Drain Charge	Q_{gd}			2.4		
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=10V V_{DS}=50V R_L=8.6Ω R_{GEN}=3Ω		8		ns
Turn-On Rise Time	t_r			3		
Turn-Off Delay Time	$t_{d(off)}$			17		
Turn-Off Fall Time	t_f			4.5		
Body Diode Reverse Recovery Time	t_{rr}	I_F=4.5A dI/dt=500A/ms	14.5	21	27.5	ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=4.5A dI/dt=500A/ms	68	97	126	nC
Maximum Junction-to-Ambient A	$R_{\theta JA}$	t≤10s		17	25	℃/W
Maximum Junction-to-Ambient AD		teady-State		55	60	℃/W
Maximum Junction-to-Case	$R_{\theta JC}$	teady-State		2.7	3.3	℃/W

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150°C may be used if the PCB allows it.
B. The power dissipation PD is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J =25°C.
D. The RqJA is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
E. The static characteristics in Figures 1to6 are obtained using <300ms pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.
G. The maximum current rating is package limited.
H. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.

Electrical Characteristic Curve

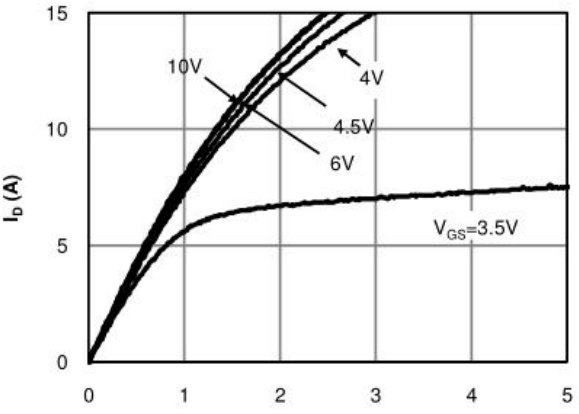


Fig 1: On-Region Characteristics

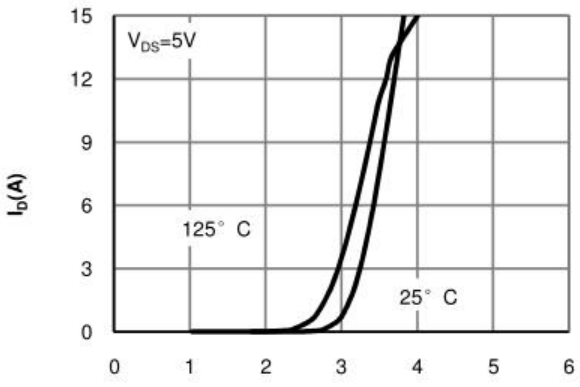


Figure 2: Transfer Characteristics

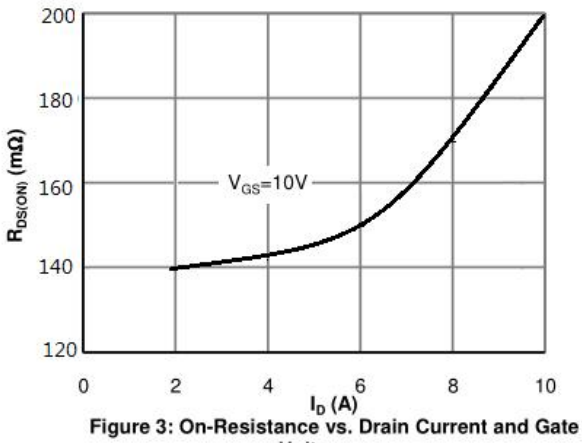


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

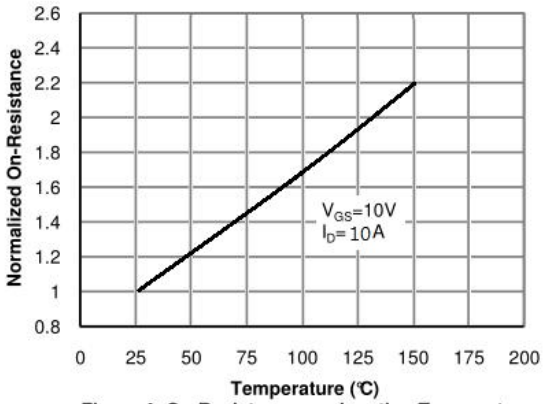


Figure 4: On-Resistance vs. Junction Temperature

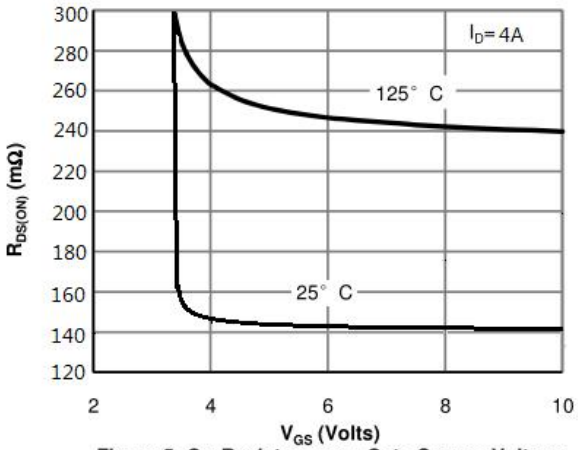


Figure 5: On-Resistance vs. Gate-Source Voltage

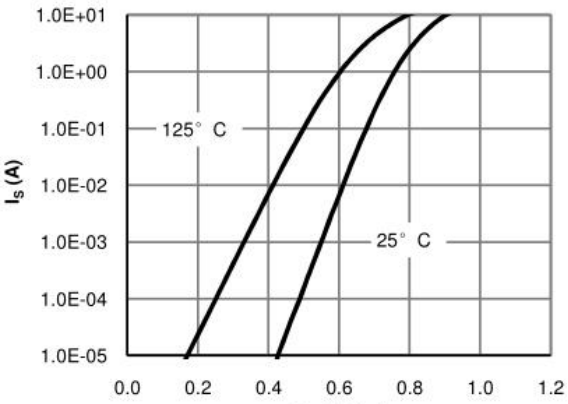


Figure 6: Body-Diode Characteristics

Electrical Characteristic Curve

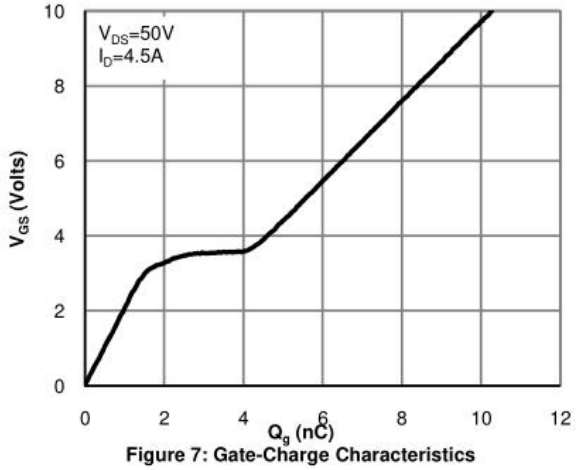


Figure 7: Gate-Charge Characteristics

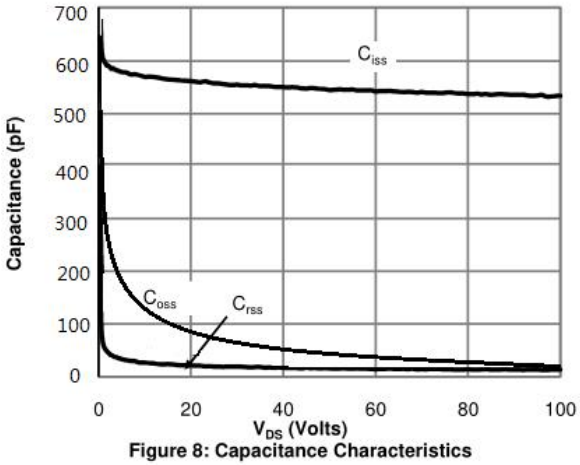


Figure 8: Capacitance Characteristics

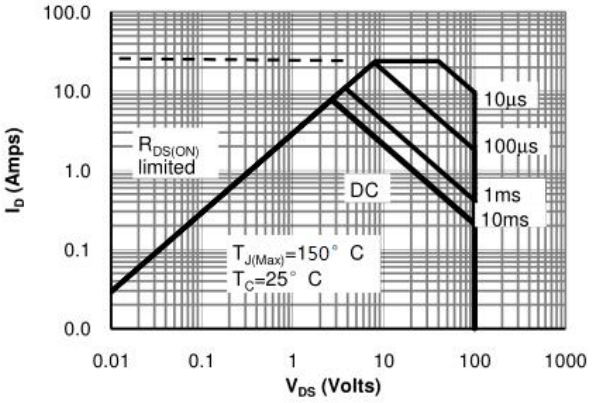


Figure 9: Maximum Forward Biased Safe Operating Area

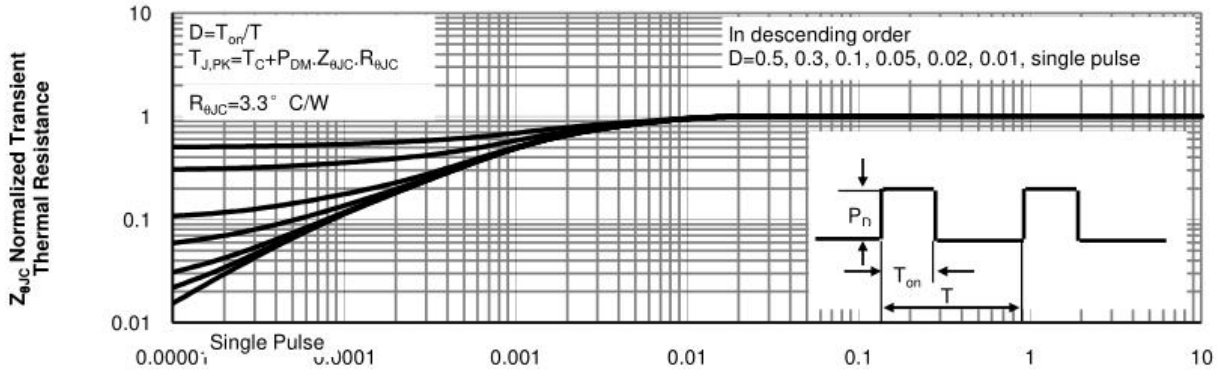
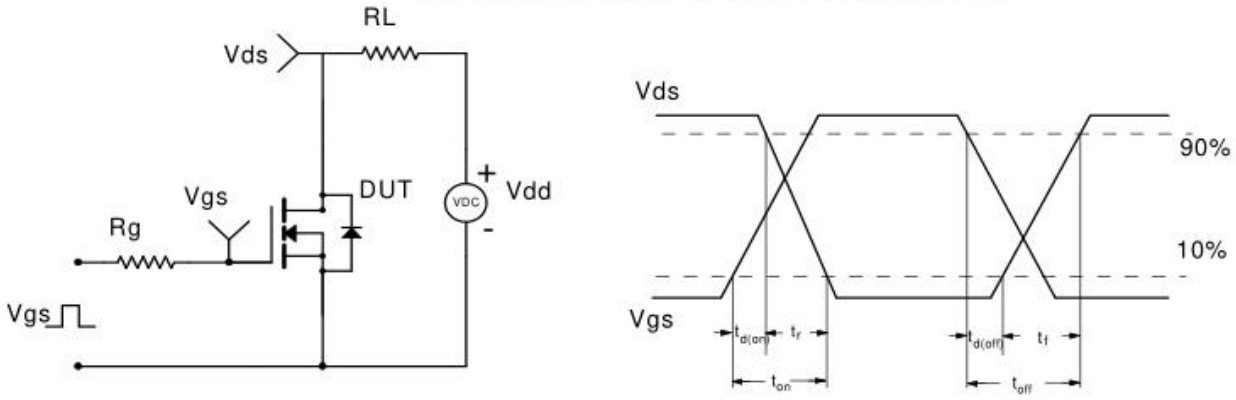


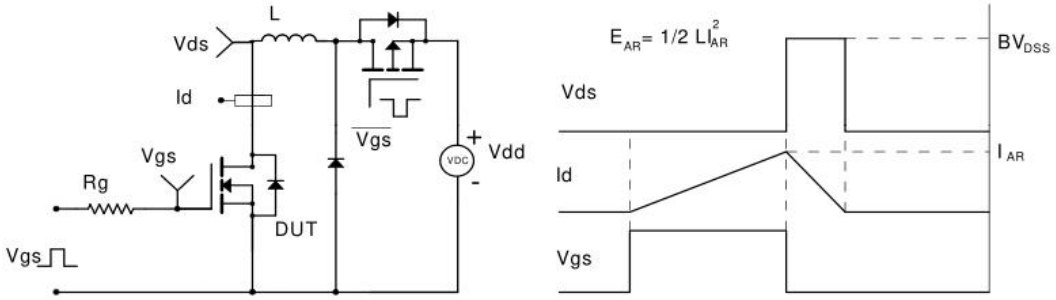
Figure 10: Normalized Maximum Transient Thermal Impedance

Test circuits & Typical Application

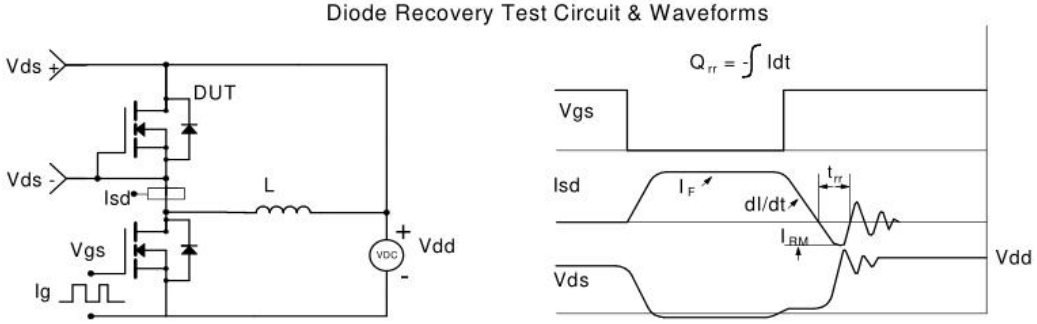
Resistive Switching Test Circuit & Waveforms



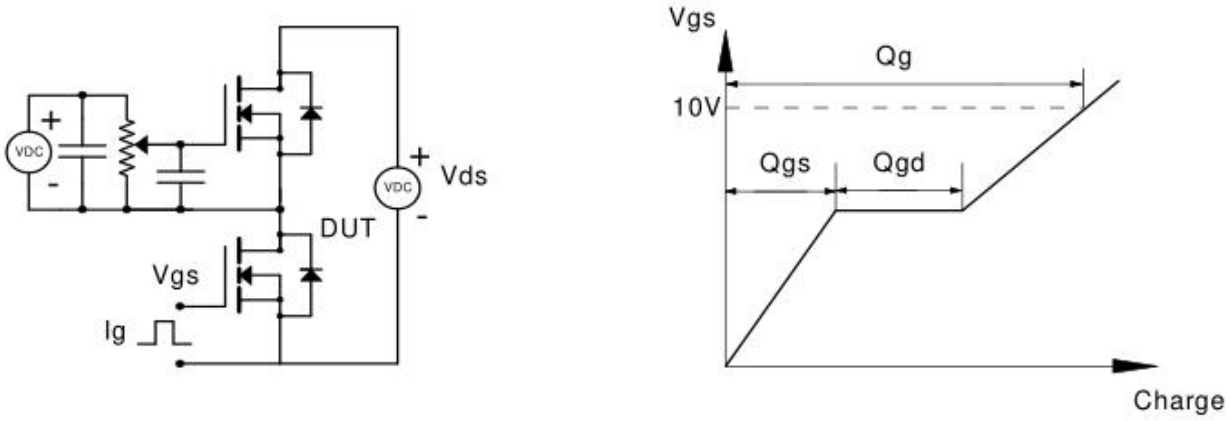
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



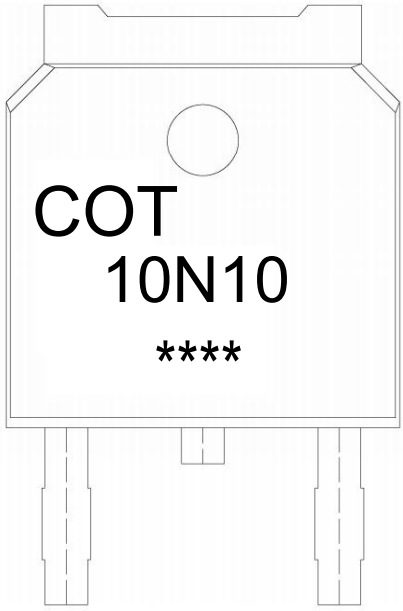
Diode Recovery Test Circuit & Waveforms



Gate Charge Test Circuit & Waveform



Marking Instructions



Note:

COT: Company Logo

10N10: Product Type.

****: Lot No. Code, code change with Lot No.

Packaging SPEC.

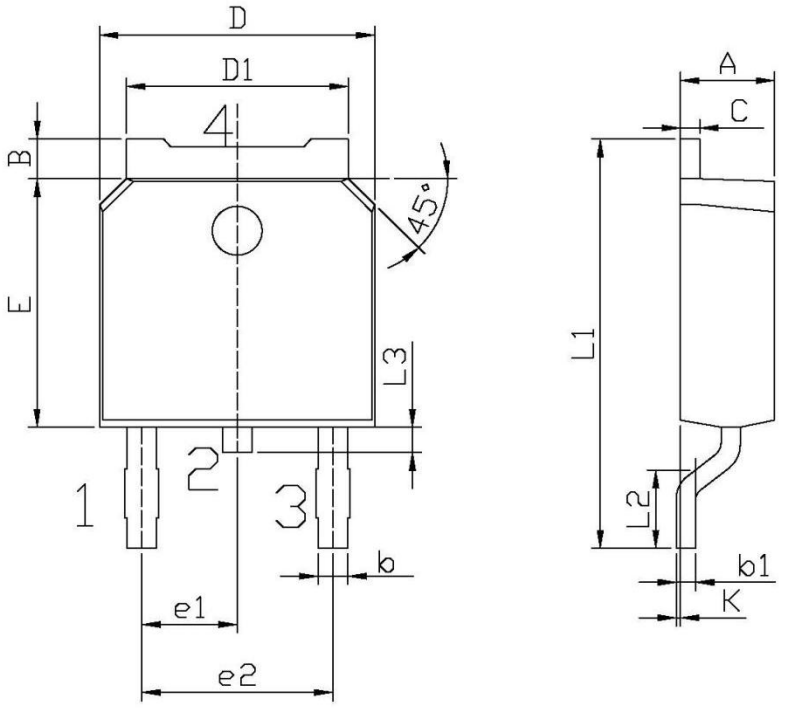
REEL INFORMATION

Package Type	Units					Dimension (unit: mm³)		
	Units/Reel	Reels/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Reel	Inner Box	Outer Box
TO-252	2,500	2	5,000	6	30,000	13″ ×16	360×360×50	380×335×366

TUBE INFORMATION

Package Type	Units					Dimension (unit: mm³)		
	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Tube	Inner Box	Outer Box
TO-251/252	75	48	3,600	5	18,000	526×20.5×5.25	555×164×50	575×290×180

Package Outline Dimensions



单位：mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.70	2.00
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	K	0.00	0.10

TO-252