

MOSFETs Silicon 250V N-Channel MOS
■ Applications

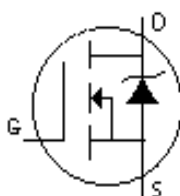
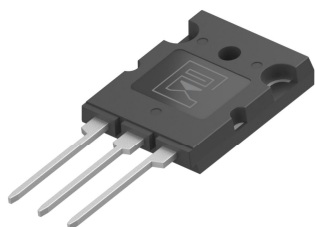
- High Efficiency Synchronous Rectification in SMPS
- Uninterruptible Power Supply
- High Speed Power Switching
- Hard Switched and High Frequency Circuits

■ Features

- Improved Gate and Dynamic dV/dt Ruggedness
- Enhanced Avalanche Ruggedness
- RoHS and Halogen-Free Compliant
- 100% UIS and RG Tested

■ Product Summary

V_{DS}	250	V
I_D	193	A
$R_{DS(ON)}, Typ @ 10V$	8	mΩ
Q_g	400	nC



Gate: 1
Drain: 2
Source: 3

TO-264

Marking	Package	Packaging	Min. package quantity
MQ010R250TH	TO-264	Tube	375



■ Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	250	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current Tc=25°C (Note 1)	I_D	193	A
Continuous Drain Current Tc=100°C (Note 1)		136	A
Drain Current-Pulsed (Note 1)	I_{DM}	760	A
Total Dissipation	P_D	833	W
Junction Temperature	T_j	175	°C
Storage Temperature	T_{stg}	-55-175	°C
Single Pulse Avalanche Energy (Note 2)	E_{AS}	3063	mJ

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

■ Thermal Characteristics

Parameter	Symbol	Max	Unit
Maximum Junction-to-Case	$R_{\theta JC}$	0.18	°C/W
Maximum Junction-to-Ambient	$R_{\theta JA}$	30	°C/W

Note 1: Ensure that the channel temperature does not exceed 175°C.

Note 2: $V_{DD}=50V$, $T_{ch}=25^{\circ}C$ (initial), $L=5mH$, $R_g=25\Omega$.

Note: This transistor is sensitive to electrostatic discharge and should be handled with care.



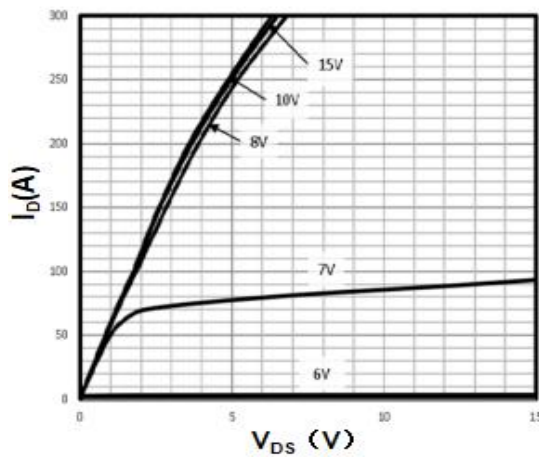
■ Electrical Characteristics (Tc=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V,I _D =250uA	250	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =250V,V _{GS} =0V	-	-	1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} ,I _D =250uA	3	4	5	V
Drain-Source On Resistance	R _{DS(ON)}	V _{GS} =10V,I _D =20A	-	8	10	mΩ
		Tj=125℃	-	14	-	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V, f=1.0MHz	-	27700	-	pF
Output Capacitance	C _{oss}		-	1700	-	pF
Reverse Transfer Capacitance	C _{rss}		-	590	-	pF
Gate Resistance	R _g	V _{DS} =0V,V _{GS} =0V, f=1.0MHz	-	0.6	-	Ω
Switching Paramters						
Turn-On Delay Time	t _{d(on)}	V _{DS} =100V,I _D =80A, V _{GS} =10V,R _G =5Ω	-	70	-	ns
Turn-On Rise Time	t _r		-	330	-	ns
Turn-Off Delay Time	t _{d(off)}		-	134	-	ns
Turn-Off Fall Time	t _f		-	210	-	ns
Total Gate Charge	Q _g	V _{DS} =100V,I _D =20A, V _{GS} =10V	-	400	-	nC
Gate-Source Charge	Q _{gs}		-	146	-	nC
Gate-Drain Charge	Q _{gd}		-	106	-	nC
Source-Drain Characteristics						
Diode Forward Voltage	V _{sd}	V _{GS} =0V,I _S =10A	-	0.74	1.4	V
Reverse Recovery Time	t _{rr}	V _R =200V,I _F =10A, di/dt=100A/us	-	165	-	ns
Reverse Recovery Charge	Q _{rr}		-	1.2	-	uC

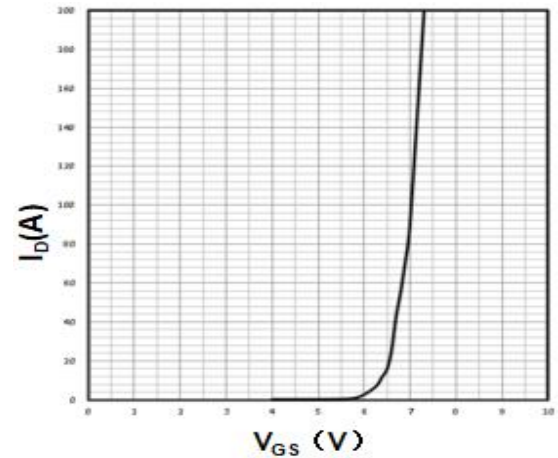




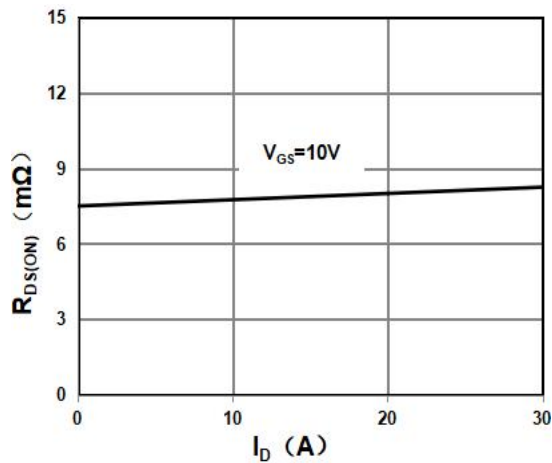
■ Characteristics Curves



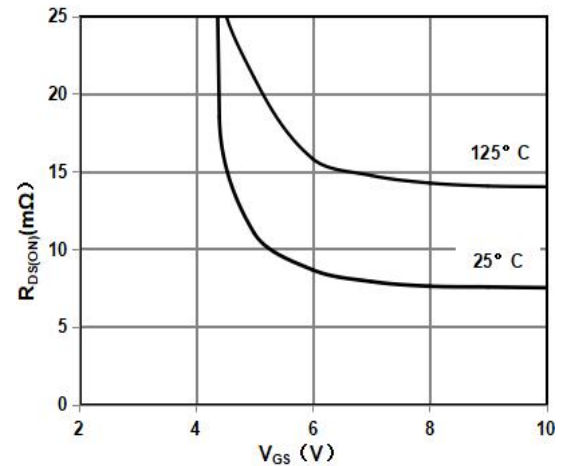
Output Characteristcs



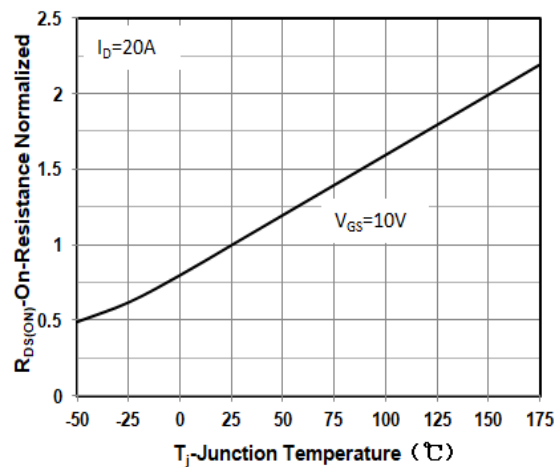
Transfer Characteristcs



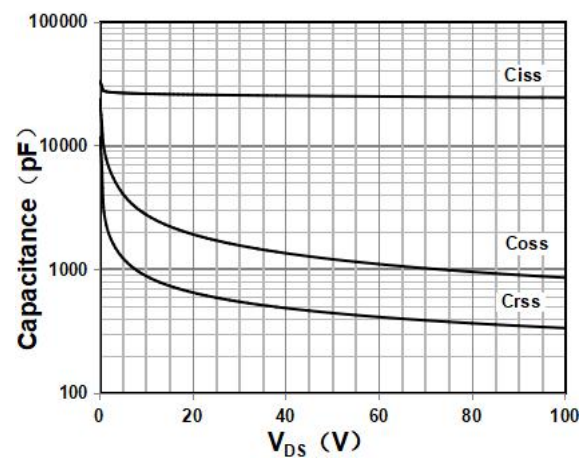
On Resistance Vs Drain Current



On Resistance Vs Gate Source Voltage

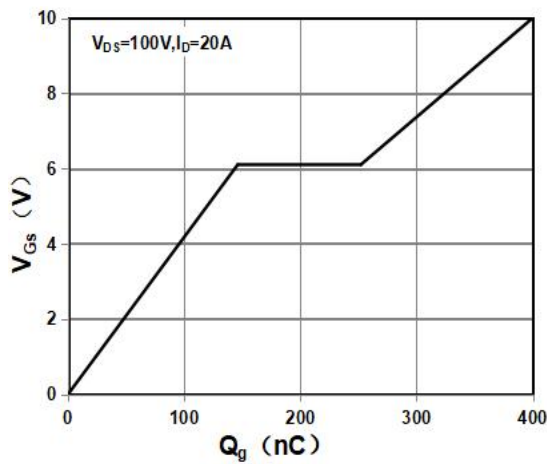


Rdson-JunctionTemperature

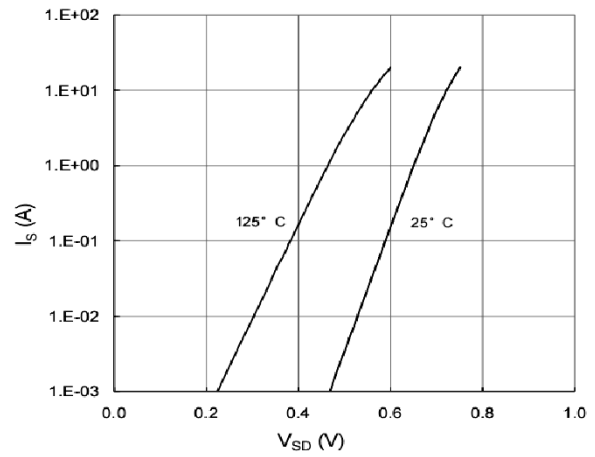


Capacitance

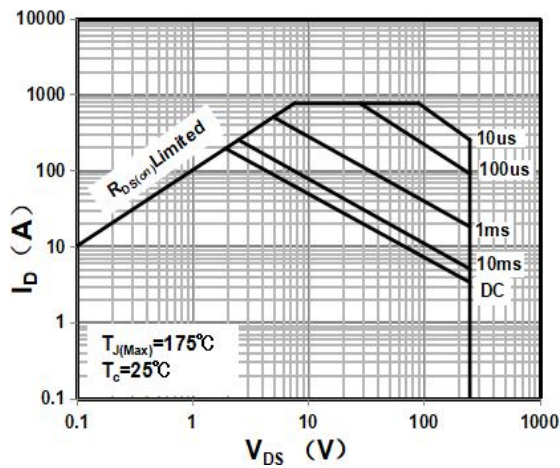




Gate Charge Waveform



Source-Drain Diode Forward Voltage



Maximum Safe Operating Area

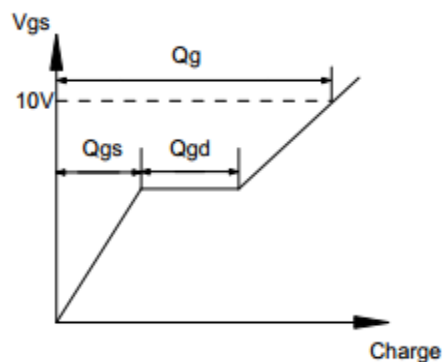
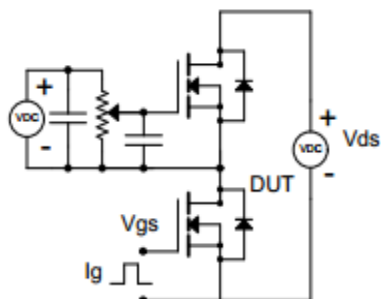
Note : The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



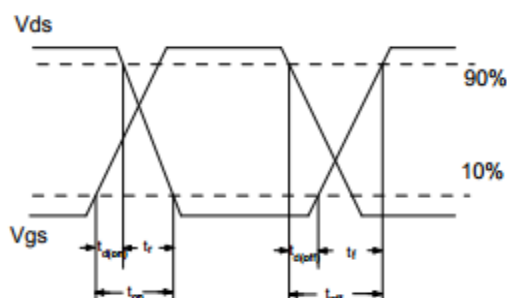
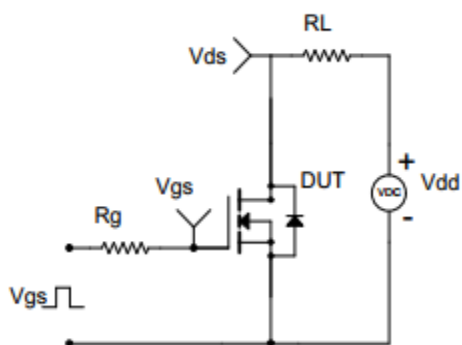


■ Test Circuit & Waveform

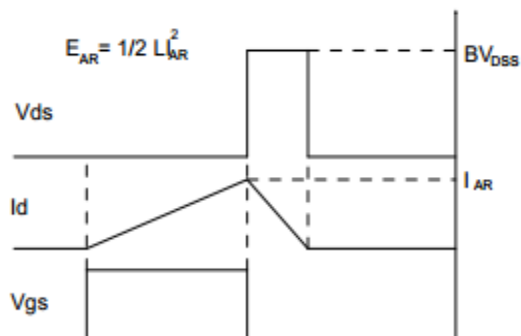
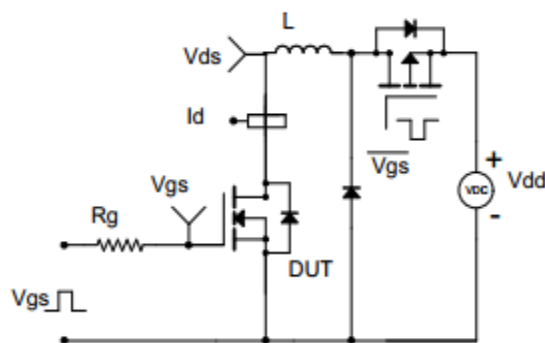
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform



**■ TO-264 Package Dimensions**

Unit: mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	4.80	5.00	5.20	E	19.80	20.00	20.20
A1	2.60	2.80	3.00	E1	17.80		18.20
B	2.95	3.15	3.35	e		5.45	
B1	2.50	2.65	2.80	L	19.80	20.10	20.40
b	0.90	1.00	1.10	L1	2.95		3.55
c	0.50	0.60	0.70	ΦP	3.05	3.20	3.35
D	25.80	26.00	26.20	S	5.80		6.20
D1	20.50		21.10				

