

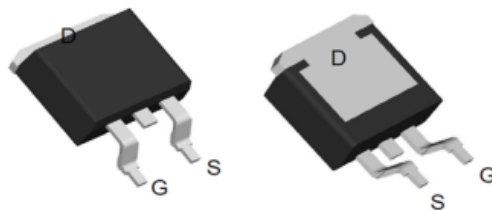
Description

The IRF37007ZS uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

VDSS	$R_{DS(ON)}$ @10V (typ)	ID
30V	5.5 m Ω	70A

TO-263



- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	70	A
Drain Current-Pulsed (Note 1)	I_{DM}	245	A
Maximum Power Dissipation	P_D	46	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	2.1	$^{\circ}\text{C/W}$
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Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	30	32	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=28\text{V}, V_{GS}=0\text{V}$	-	-	500	nA

Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.5	2.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30 A$		5.5	6.0	mΩ
		$V_{GS}=4.5V, I_D=20A$		8.0	9.8	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=30A$	10			S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C_{ISS}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	1614	-	PF
Output Capacitance	C_{OSS}		-	245	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	215	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=30A$ $V_{GS}=10V, R_G=3.0\Omega$	-	7.5	-	nS
Turn-on Rise Time	t_r		-	14.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35.2	-	nS
Turn-Off Fall Time	t_f		-	9.6	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=30A,$ $V_{GS}=10V$	-	33.7	-	nC
Gate-Source Charge	Q_{gs}		-	8.5	-	nC
Gate-Drain Charge	Q_{gd}		-	7.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=30A$	-	0.95	12	V
Diode Forward Current ^(Note 2)	I_S		-	-	70	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Performance Characteristics

Figure1: Output Characteristics

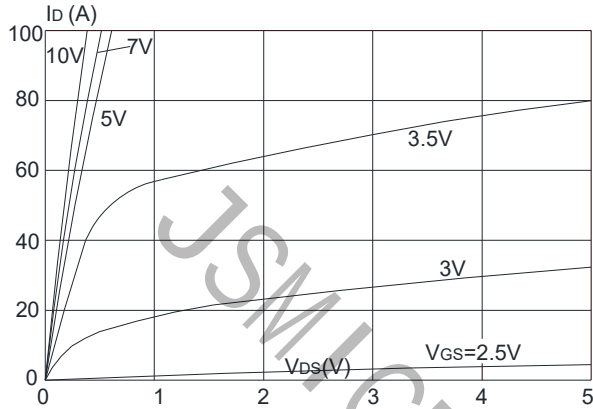


Figure 2: Typical Transfer Characteristics

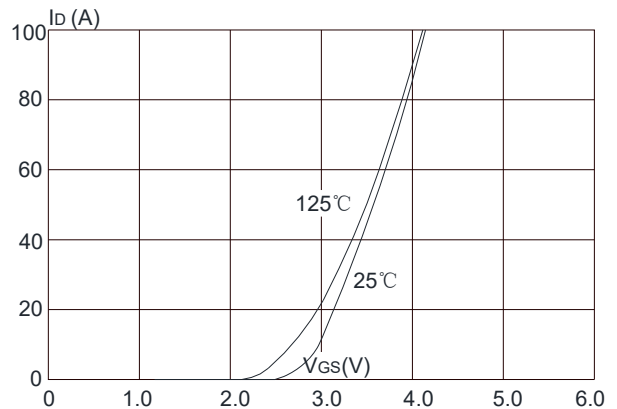


Figure 3: On-resistance vs. Drain Current

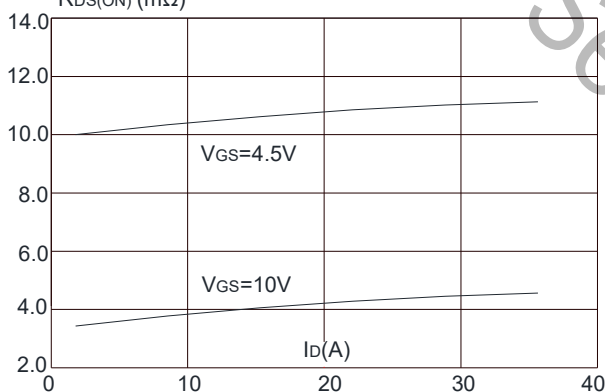


Figure 4: Body Diode Characteristics

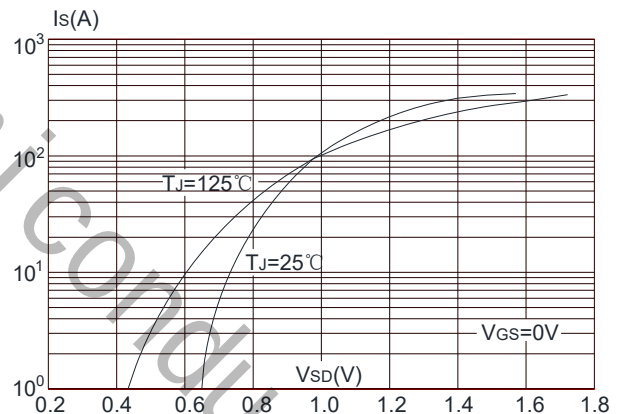


Figure 5: Gate Charge Characteristics

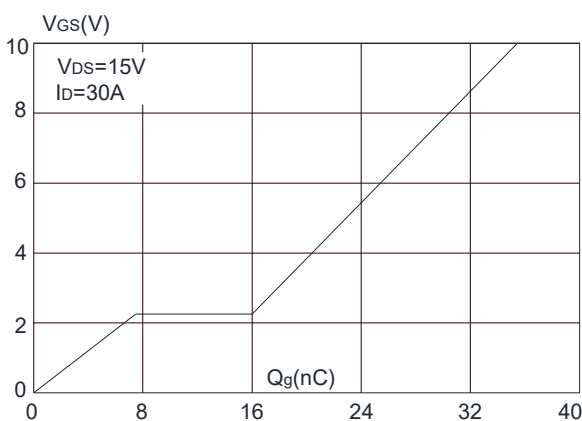


Figure 6: Capacitance Characteristics

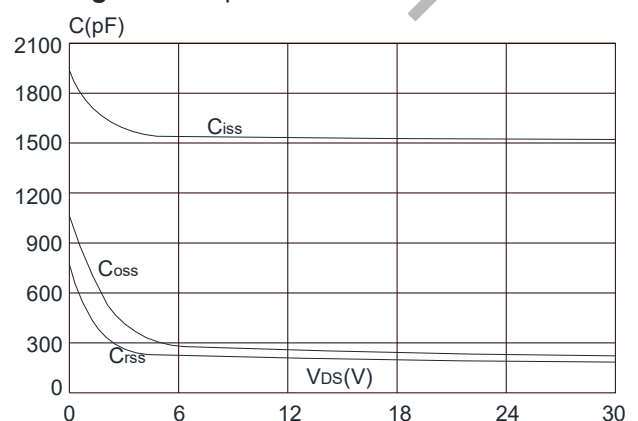


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

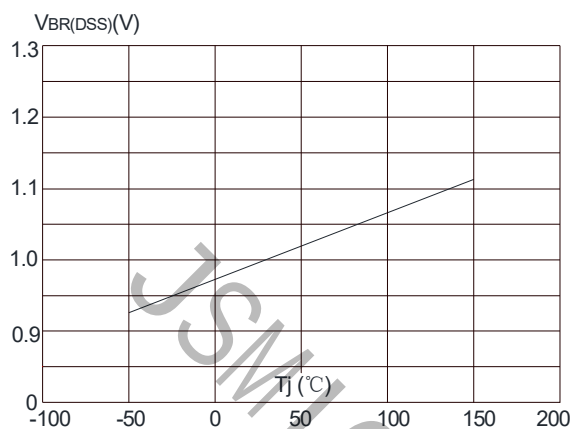


Figure 8: Normalized on Resistance vs. Junction Temperature

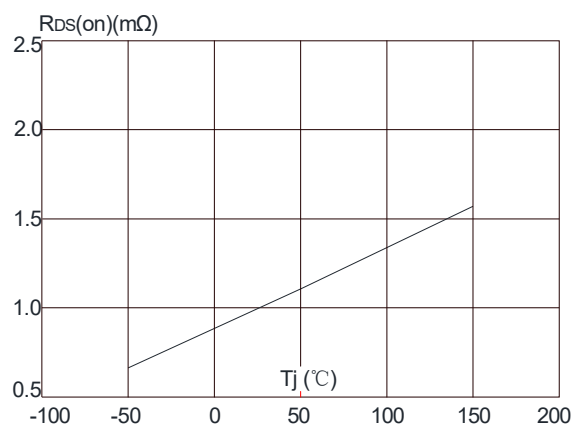


Figure 9: Maximum Safe Operating Area

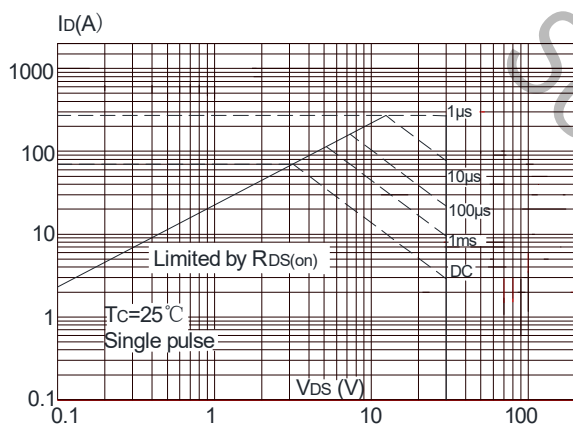


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

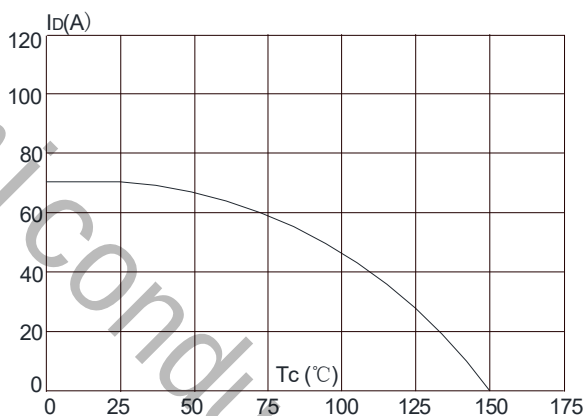
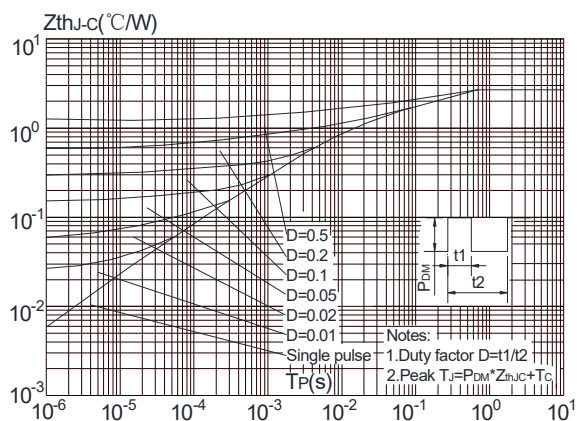


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

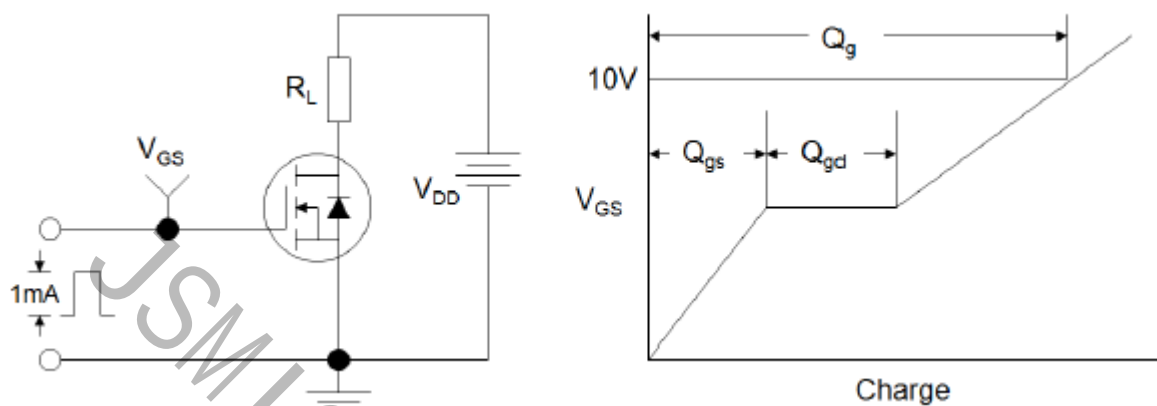


Figure1:Gate Charge Test Circuit & Waveform

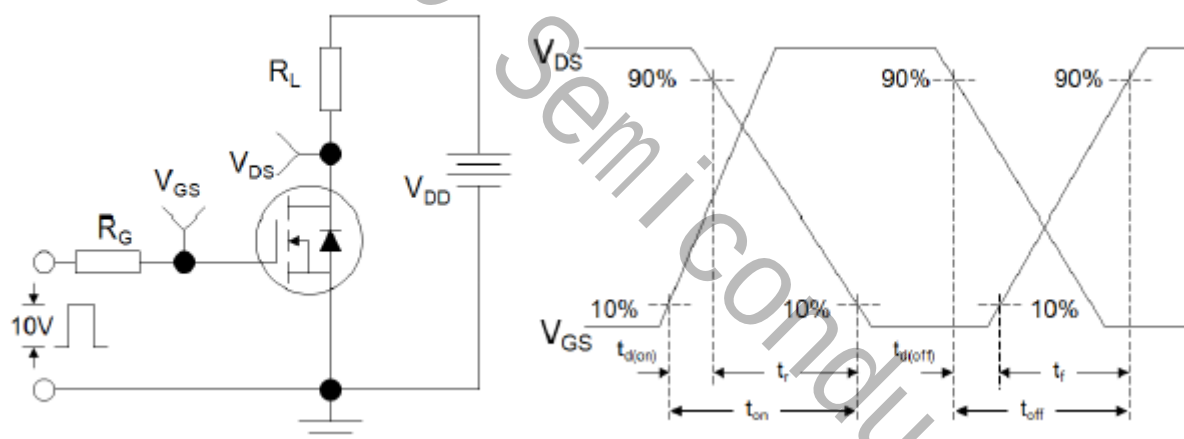


Figure 2: Resistive Switching Test Circuit & Waveforms

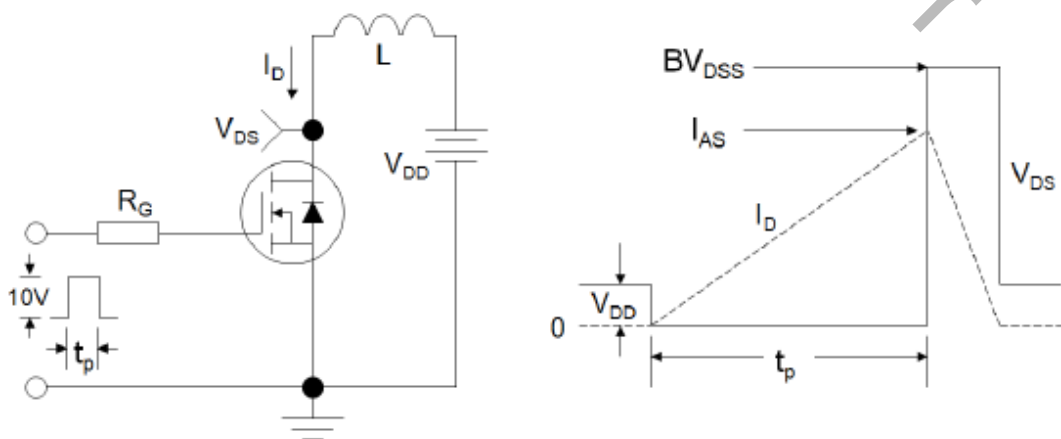
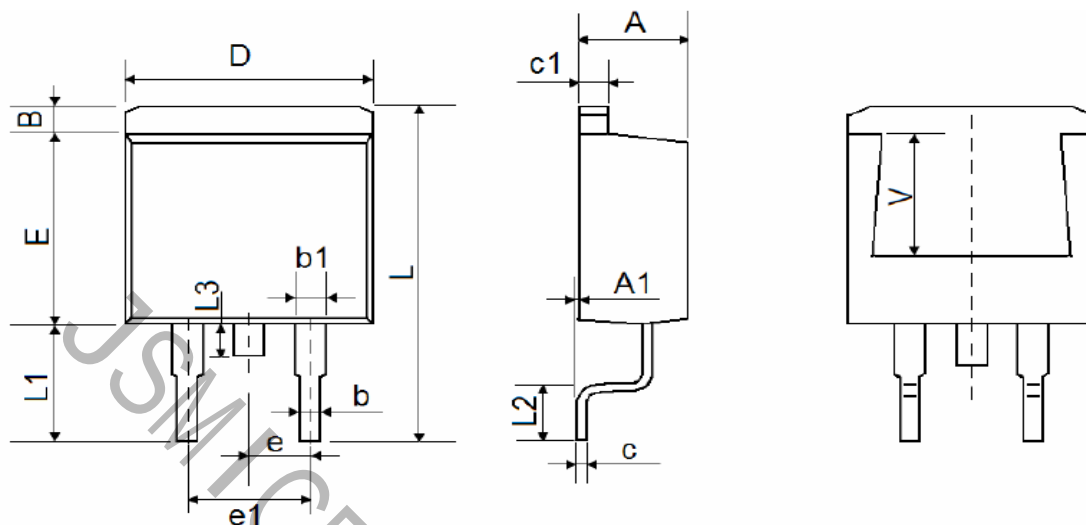


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Package Outline: TO-263


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.80	0.173	0.189
A1	0.00	0.15	0.000	0.006
B	1.17	1.37	0.046	0.054
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.31	0.53	0.012	0.021
c1	1.17	1.37	0.046	0.054
D	10.01	10.31	0.394	0.406
E	8.50	8.90	0.335	0.350
e	2.54 BSC.		0.100 BSC.	
e1	4.98	5.18	0.196	0.204
L	15.05	15.45	0.593	0.608
L1	5.08	5.48	0.200	0.216
L2	2.34	2.74	0.092	0.108
L3	1.30	1.70	0.051	0.067
V	5.600 Ref.		0.220 Ref.	