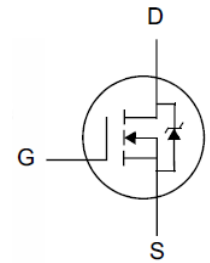


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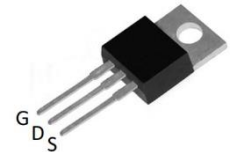
General Features

- Proprietary New Trench Technology
- $R_{DS(ON),max.}=20m\Omega@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode



Applications

- Hard Switching and High Speed Circuit
- Motor Control
- UPS



TO220

Absolute Maximum ratings

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	250	V
I_D	Drain Current - Continuous	70	A
	@ $T_C = 25^\circ C$	48	
I_{DM}	Drain Current - Pulsed	280	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy	2000	mJ
dv/dt	Peak diode Recovery dv/dt	5	V/ns
P_D	Power Dissipation ($T_C = 25^\circ C$)	250	W
	Derating Factor above $25^\circ C$	2	W/ $^\circ C$
T_J, T_{stg}	Junction and Storage Temperature Range	-55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.5	$^\circ C/W$
$R_{\theta JA}$	Thermal resistance, Junction to ambient	62	$^\circ C/W$

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Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{dss}	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	250			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = 200\text{ V}, V_{GS} = 0\text{ V},$ $T_J = 125^\circ\text{C}$			1 100	μA
I_{GSS}	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			± 100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.5		4.5	V
$R_{DS(On)}$	Drain-Source on-state resistance	$V_{GS} = 10\text{ V}, I_D = 35\text{ A}$		18	20	m Ω
Dynamic Characteristics						
C_{iss}	Input capacitance	$V_{GS} = 0\text{ V},$		10602		pF
C_{oss}	Output capacitance	$V_{DS} = 125\text{ V},$		274		pF
C_{rss}	Reverse transfer capacitance	$F = 1\text{ MHz}$		8.1		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	$V_{DD} = 125\text{ V}, I_D = 40\text{ A},$ $V_{GS} = 10\text{ V}, R_G = 4.7\text{ }\Omega$		54.5		ns
t_r	Rising Time			24.2		ns
$t_{d(off)}$	Turn Off Delay Time			73.6		ns
t_f	Fall Time			15.6		ns
Q_g	Total Gate Charge	$V_{DD} = 125\text{ V}, I_D = 40\text{ A},$ $V_{GS} = 10\text{ V}$		136		nC
Q_{gs}	Gate-Source Charge			52		nC
Q_{gd}	Gate-Drain Charge			25		nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 50\text{ A}$			1.2	V
T_{rr}	Reverse recovery time	$I_F = 40\text{ A}$		267		ns
Q_{rr}	Reverse recovery charge	$di_F/dt = 100\text{ A}/\mu\text{s}$		765		nC

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Typical Characteristics

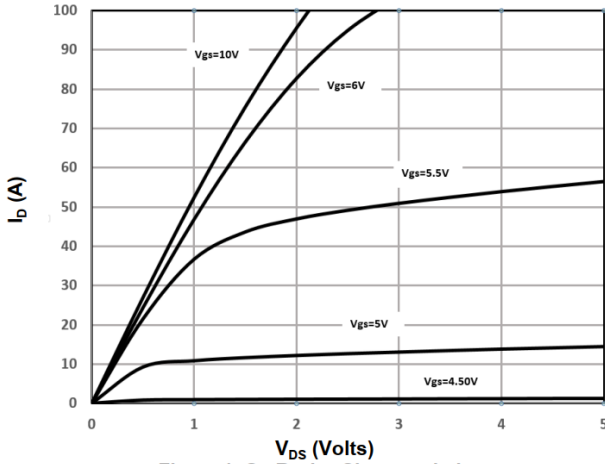


Figure 1: On-Region Characteristics

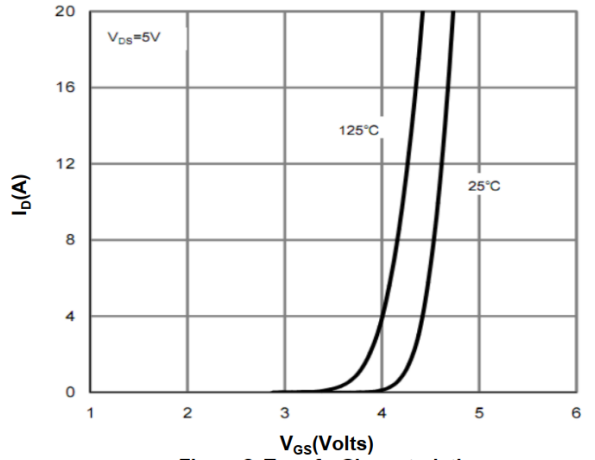


Figure 2: Transfer Characteristics

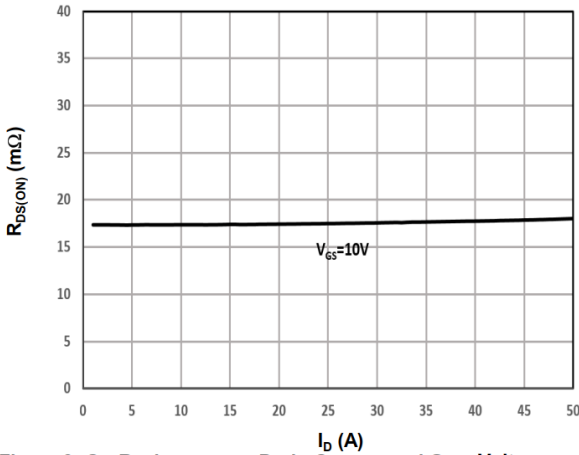


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

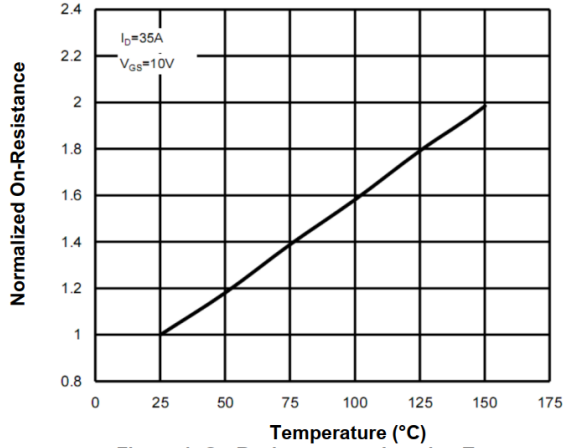


Figure 4: On-Resistance vs. Junction Temperature

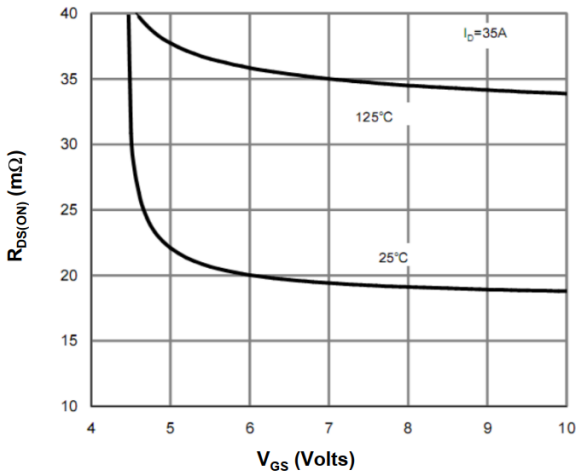


Figure 5: On-Resistance vs. Gate-Source Voltage

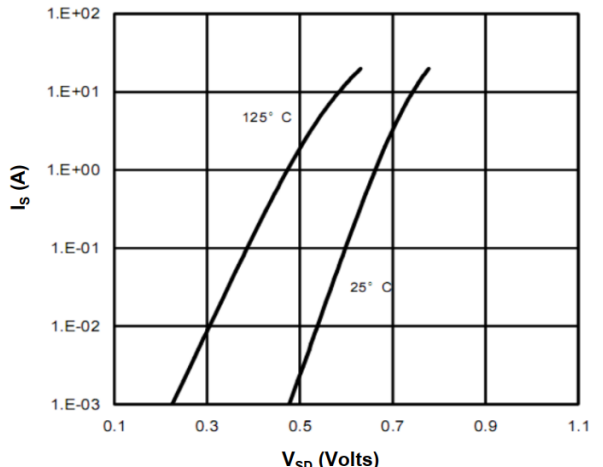


Figure 6: Body-Diode Characteristics

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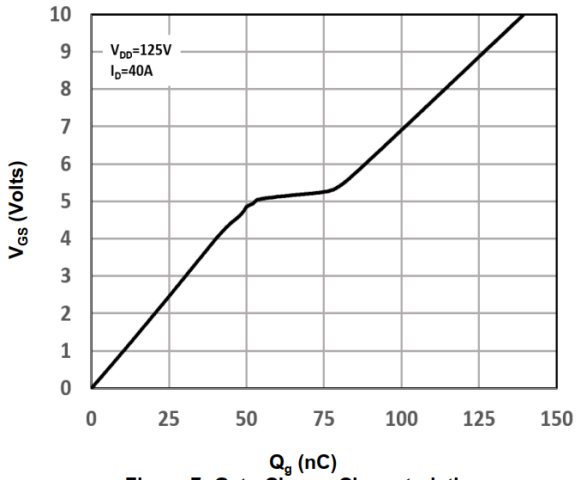


Figure 7: Gate-Charge Characteristics

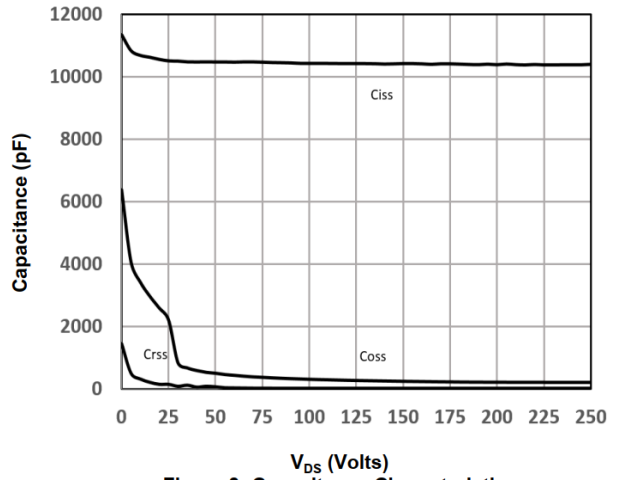


Figure 8: Capacitance Characteristics

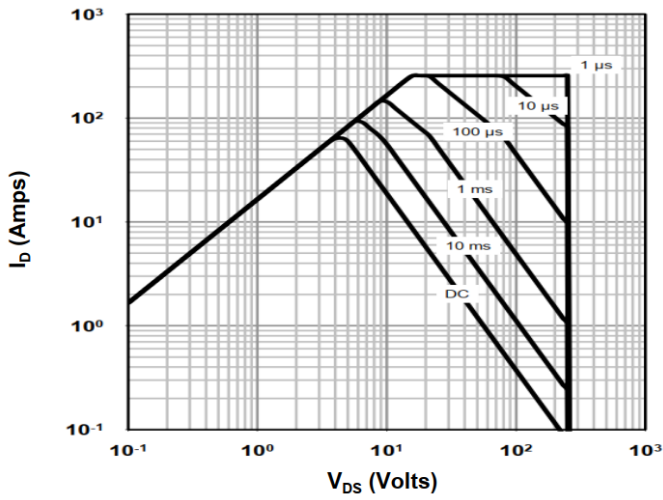


Figure 9: Maximum Forward Biased Safe Operating Area

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Test Circuits and Waveforms

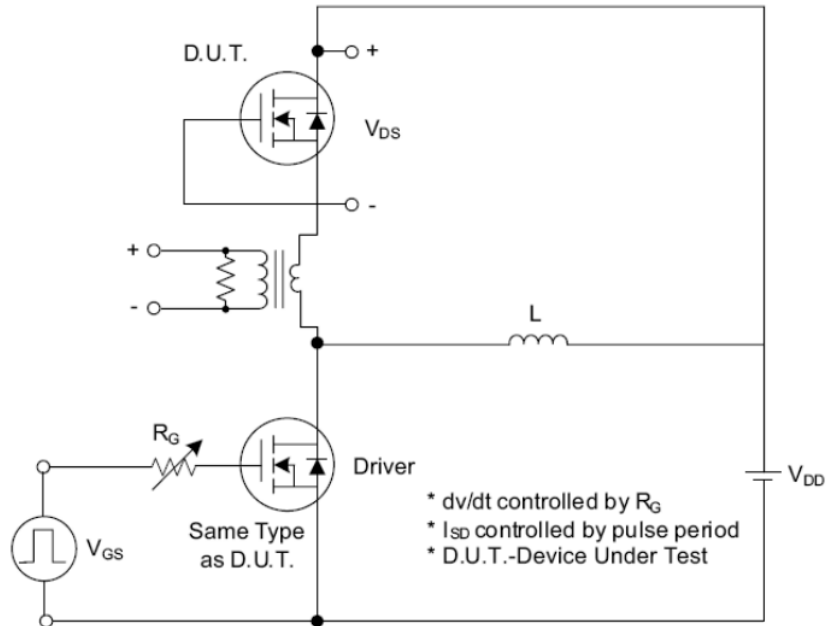


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

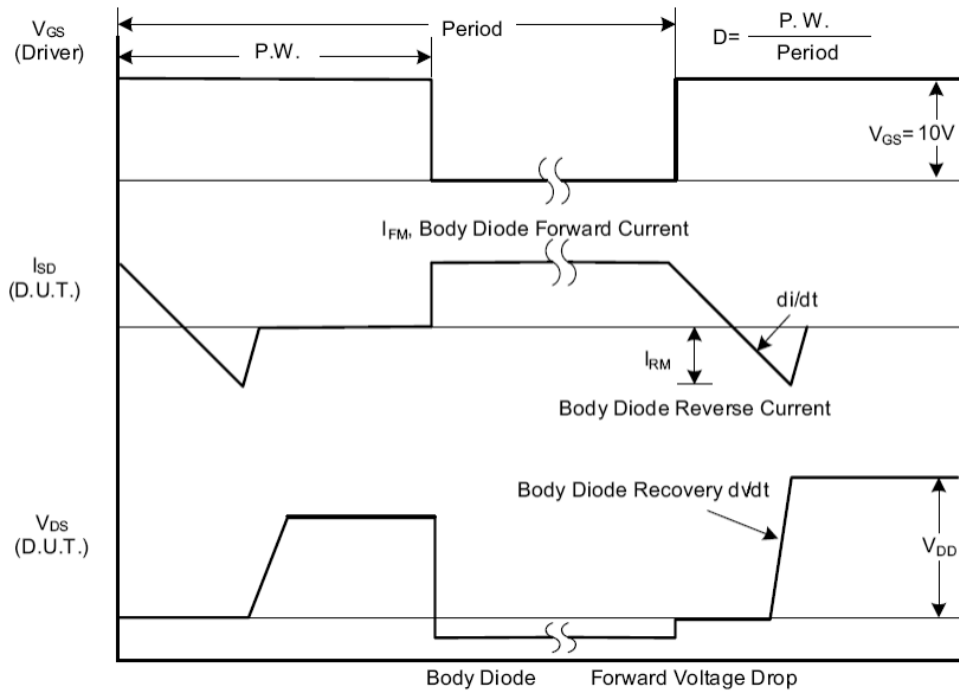


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

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Test Circuits and Waveforms (Cont.)

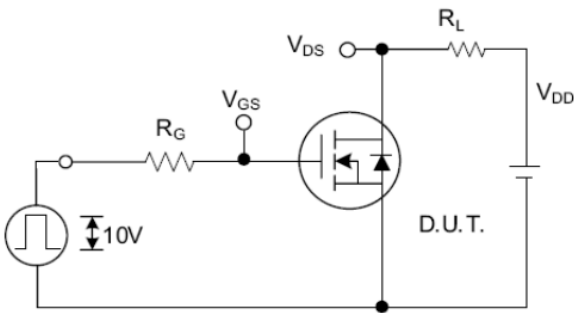


Fig. 2.1 Switching Test Circuit

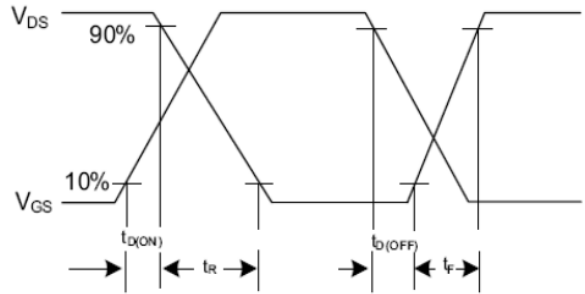


Fig. 2.2 Switching Waveforms

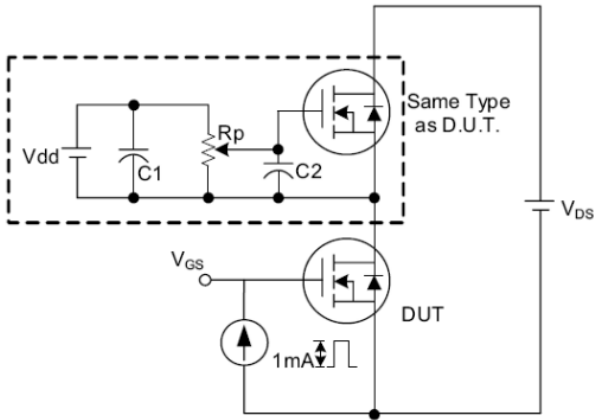


Fig. 3.1 Gate Charge Test Circuit

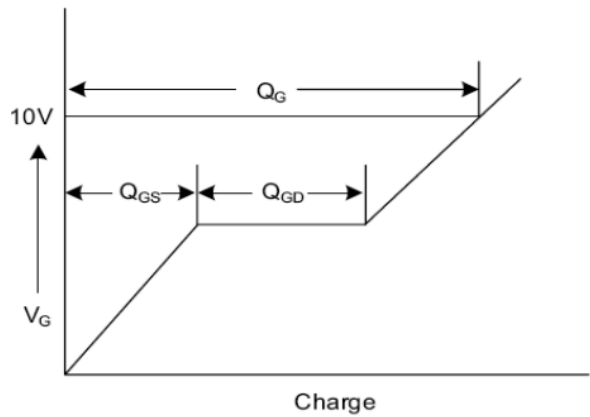


Fig. 3.2 Gate Charge Waveform

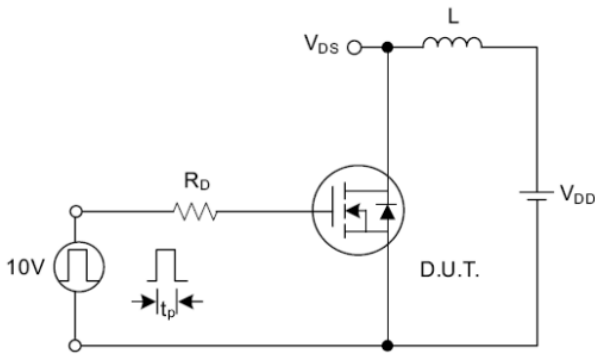


Fig. 4.1 Unclamped Inductive Switching Test Circuit

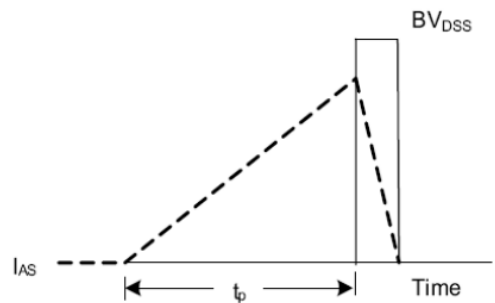


Fig. 4.2 Unclamped Inductive Switching Waveforms