

MT100P50B

P-Channel Power MOSFET

-100V, -60A, 39mΩ

General Description

This P-channel MOSFET is produced using MOS-TECH Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- $V_{DS} = -100V$, $I_D = -60A$
 $R_{DS(ON)} 39m\Omega @ V_{GS} = -10V$
 $R_{DS(ON)} 41m\Omega @ V_{GS} = -4.5V$
- High Power and current handling capability
- Lead free product is acquired
- RoHS compliant

Applications

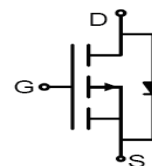
- DC/DC converters



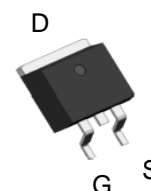
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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



TO-263-2L

Table 1. Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	-100	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	V
I_D	Drain Current-Continuous($T_C=25^\circ C$)	-60	A
	Drain Current-Continuous($T_C=100^\circ C$)	-42.5	A
I_{DM} (pulse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	-160	A
P_D	Maximum Power Dissipation($T_C=25^\circ C$)	167	W
	Maximum Power Dissipation($T_C=100^\circ C$)	83	W
E_{AS}	Avalanche energy (Note 2)	661	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ C$

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.9	$^\circ C/W$

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-100	-121		V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-100V, V _{GS} =0V			-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.8	-2.5	V
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-15A		50		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-15A		39	49	mΩ
		V _{GS} =-4.5V, I _D =-10A		41	53	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-25V, V _{GS} =0V, f=1.0MHz		8056		pF
C _{oss}	Output Capacitance			195		pF
C _{rss}	Reverse Transfer Capacitance			70		pF
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-50V, R _L =3.3Ω, R _{GEN} =9.1Ω		13		nS
t _r	Turn-on Rise Time			64		nS
t _{d(off)}	Turn-Off Delay Time			36		nS
t _f	Turn-Off Fall Time			52		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-50V, I _D =-10A		147		nC
Q _{gs}	Gate-Source Charge			17		nC
Q _{gd}	Gate-Drain Charge			31		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				-60	A
V _{SD}	Forward on Voltage (Note 3)	V _{GS} =0V, I _S =-15A			-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-15A, di/dt=100A/μs		72		ns
Q _{rr}	Reverse Recovery Charge	I _F =-15A, di/dt=100A/μs		120		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=50V$, $V_G=-10V$, $R_g=25\Omega$, $L=0.5mH$.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

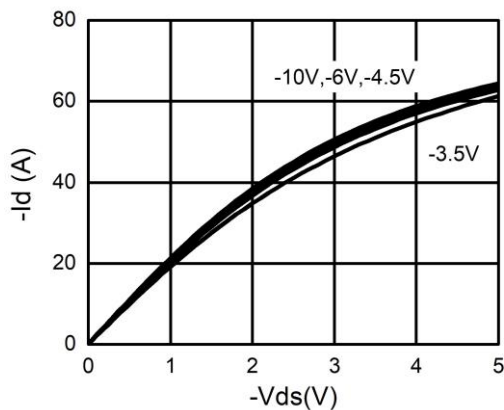


Figure 2. Transfer Characteristics

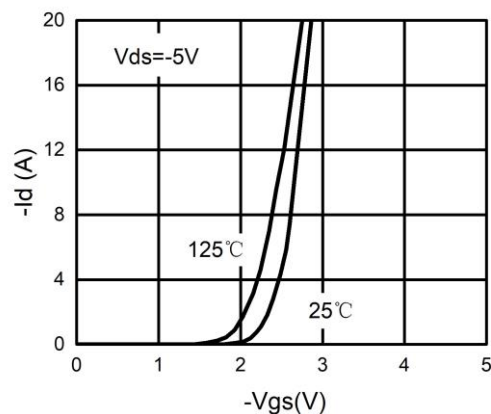


Figure 3. Power Dissipation

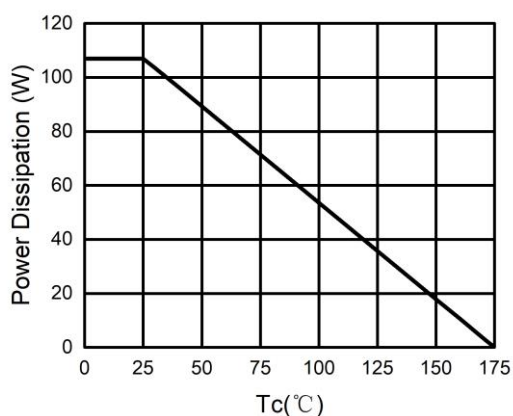


Figure 4. Drain Current

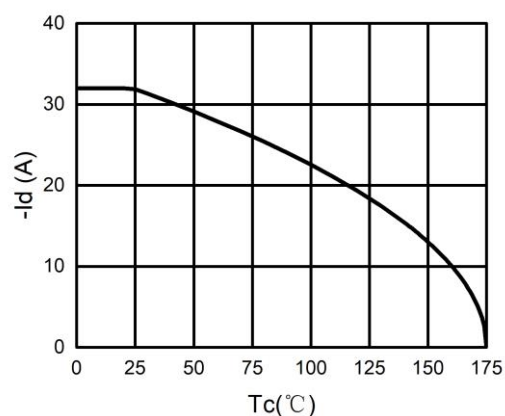


Figure 5. BV_{DSS} vs Junction Temperature

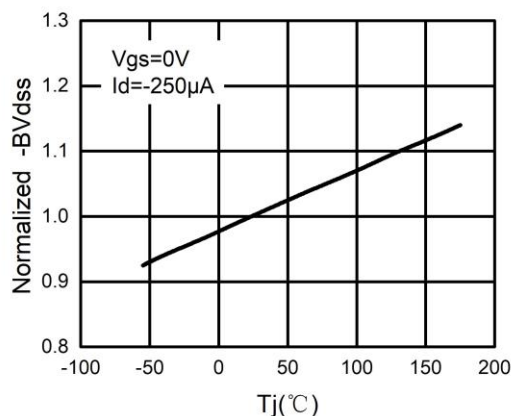


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

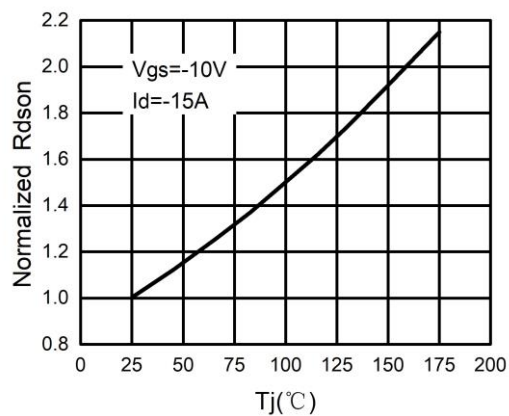


Figure 7. Gate Charge Waveforms

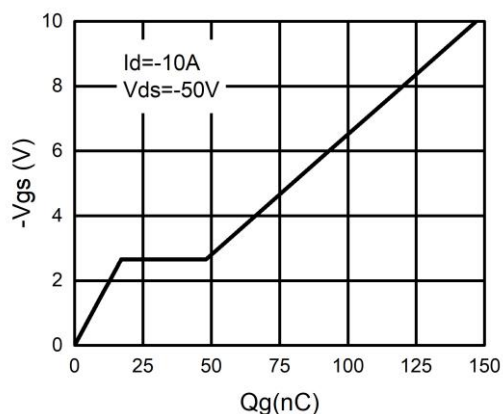


Figure 8. Capacitance

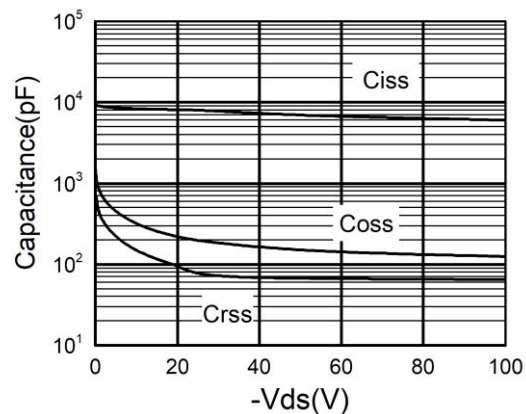


Figure 9. Body-Diode Characteristics

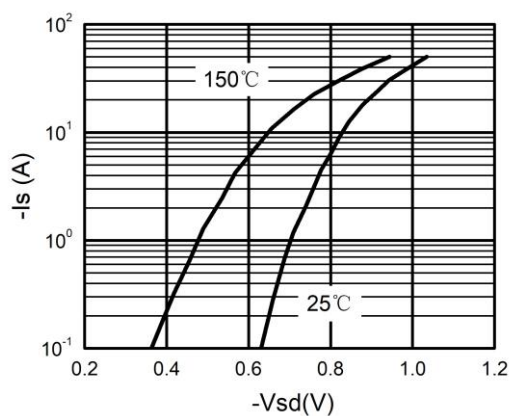
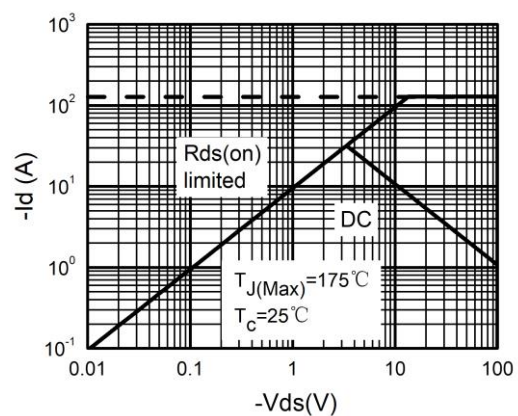
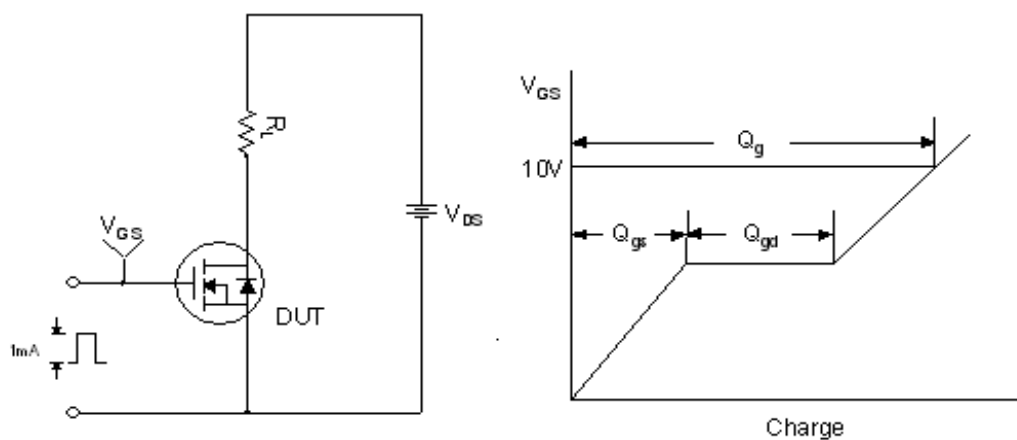


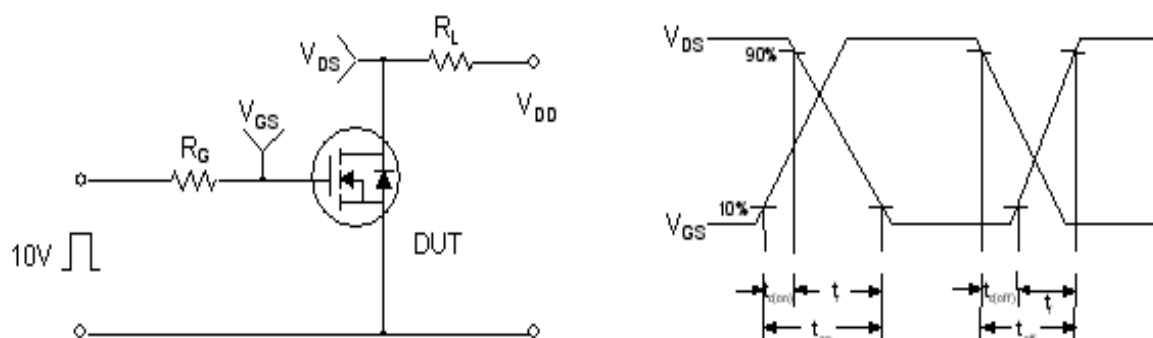
Figure 10. Maximum Safe Operating Area



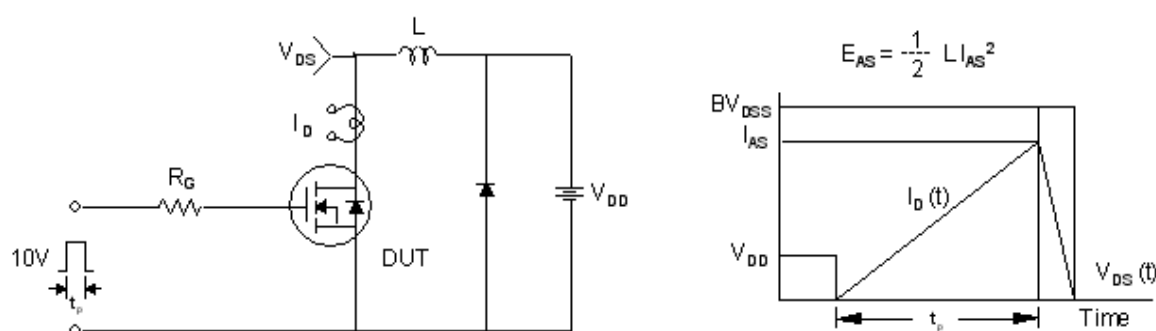
Gate Charge Test Circuit & Waveform



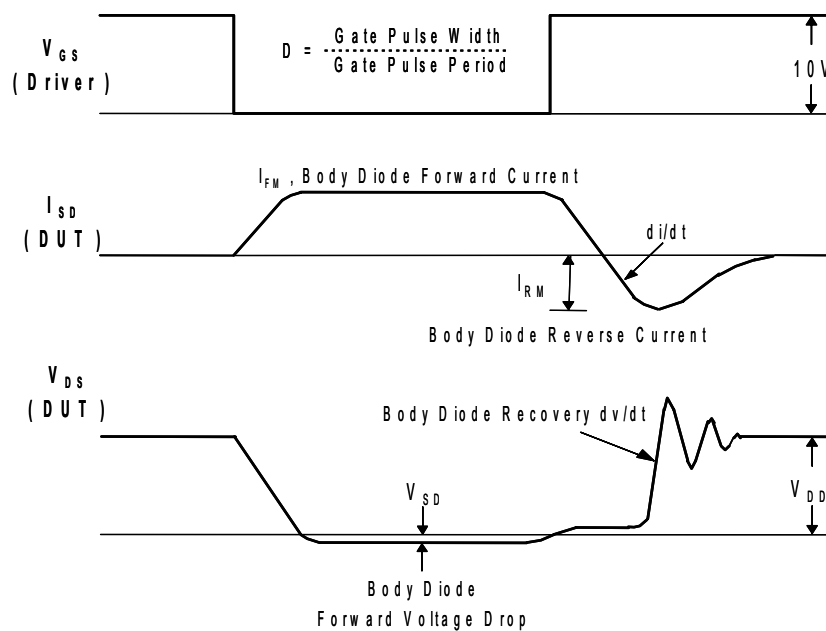
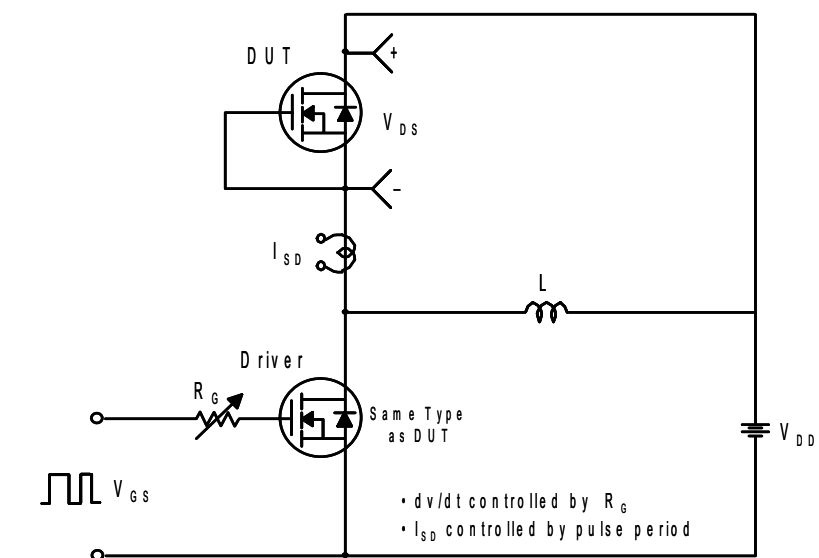
Resistive Switching Test Circuit & Waveforms



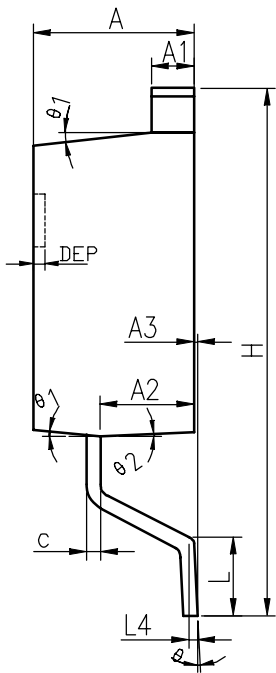
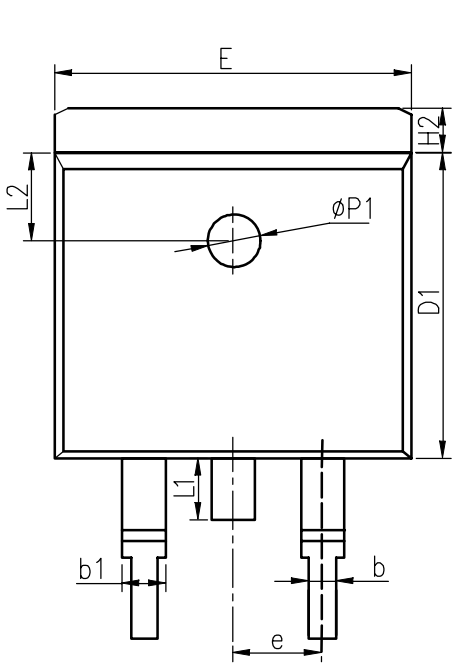
Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms

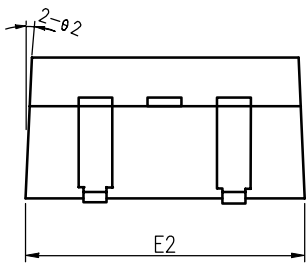


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Version	L



COMMON DIMENSIONS

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.22	1.27	1.32	0.048	0.050	0.052
A2	2.59	2.69	2.79	0.102	0.106	0.110
A3	0.00	0.10	0.20	0.000	0.004	0.008
b	0.77	0.813	0.90	0.030	0.032	0.035
b1	1.20	1.270	1.36	0.047	0.050	0.054
c	0.34	0.381	0.47	0.013	0.015	0.019
D1	8.60	8.70	8.80	0.339	0.343	0.346
E	10.00	10.16	10.26	0.394	0.400	0.404
E2	10.00	10.10	10.20	0.394	0.398	0.402
e	2.54 BSC			0.100 BSC		
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.17	1.27	1.40	0.046	0.050	0.055
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.45	1.55	1.70	0.057	0.061	0.067
L2	2.50 REF			0.098 REF		
L4	0.25 BSC			0.010 BSC		
	0°	5°	8°	0°	5°	8°
1	5°	7°	9°	5°	7°	9°
2	1°	3°	5°	1°	3°	5°
ΦP1	1.40	1.50	1.60	0.055	0.059	0.063
DEP	0.05	0.10	0.20	0.002	0.004	0.008



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