

## P-Channel Enhancement Mode Power MOSFET

### Description

The SI00P03M uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge. This device is suitable for use as a load switch or in PWM applications.

### Application

- PWM applications
- Load switch
- Power management

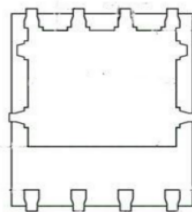
### General Features

- $V_{DS} = -30V, I_D = -30A$
- $R_{DS(ON)} < 9.5m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} < 15m\Omega @ V_{GS} = -4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface mount package
- 150 °C operating temperature
- Pb-free lead plating

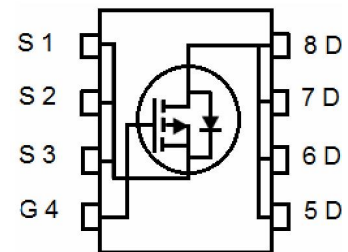
### DFN 3.3X3.3-8L



Top View



Bottom View



Schematic Diagram

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
010P03M	SI010P03M	DFN3.3X3.3-8L	Ø330mm	12mm	5000 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	-30	A
Drain Current-Continuous ( $T_C = 100^\circ C$ )	$I_D(100^\circ C)$	-22.5	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	-100	A
Maximum Power Dissipation	$P_D$	40	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

### Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	3.13	$^\circ C/W$
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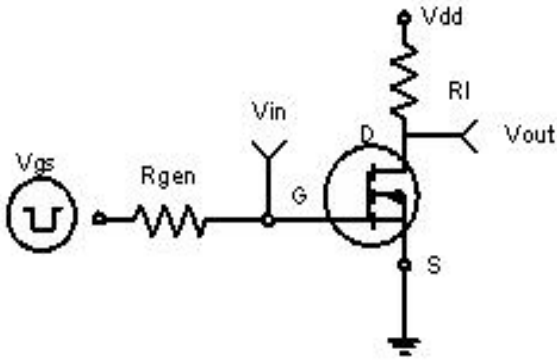
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V	-	-	-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1	-1.6	-2.2	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-15A	-	8	9.5	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A	-	11.5	15	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-15A	-	35	-	S
<b>Dynamic Characteristics</b> (Note4)						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1.0MHz	-	2151	-	PF
Output Capacitance	C <sub>OSS</sub>		-	217	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	187	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-15V, I <sub>D</sub> =-15A, V <sub>GS</sub> =-10V, R <sub>GEN</sub> =1Ω	-	12	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	10	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	25	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	13	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-15A, V <sub>GS</sub> =-10V	-	42.8	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	5.3	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	9.7	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-15A	-	-	-1.2	V

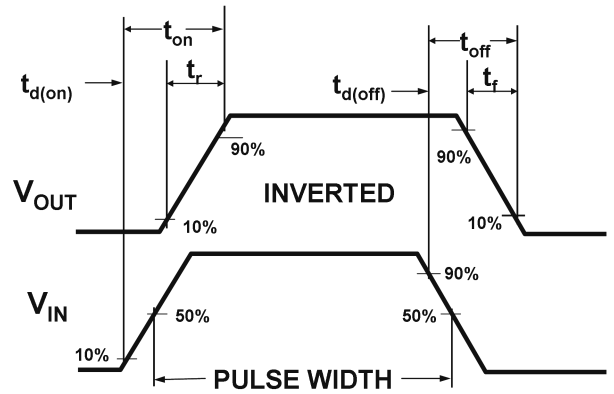
**Notes:**

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

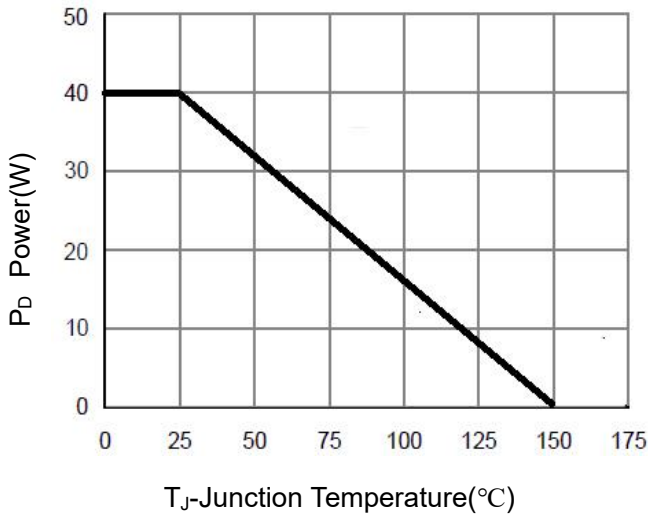
**Typical Electrical and Thermal Characteristics**



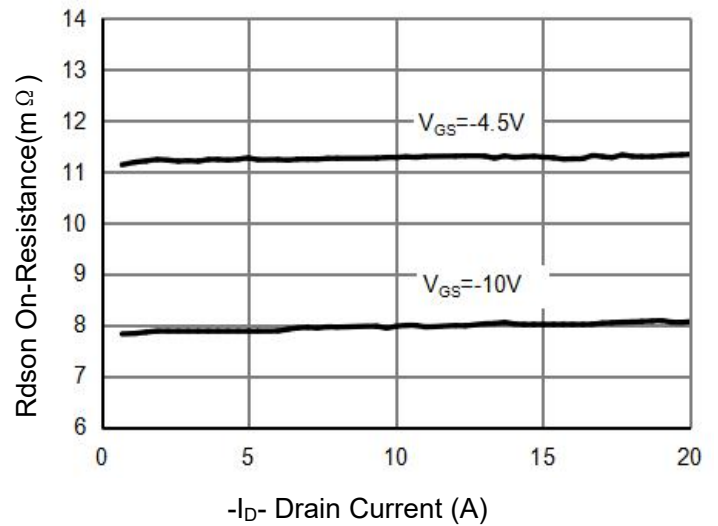
**Figure 1: Switching Test Circuit**



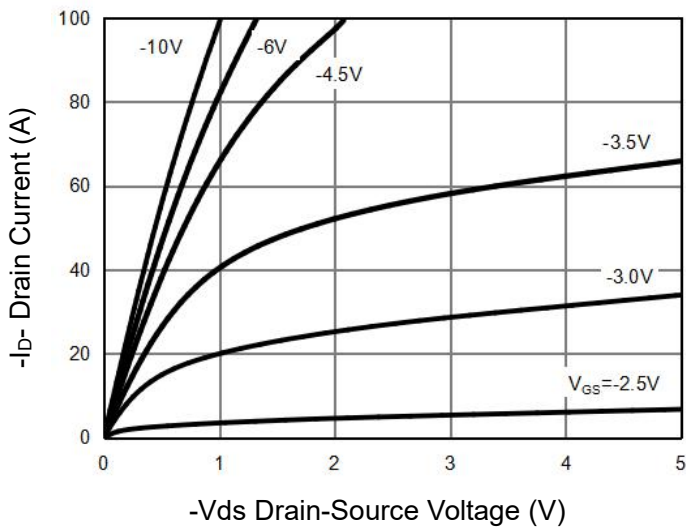
**Figure 2: Switching Waveforms**



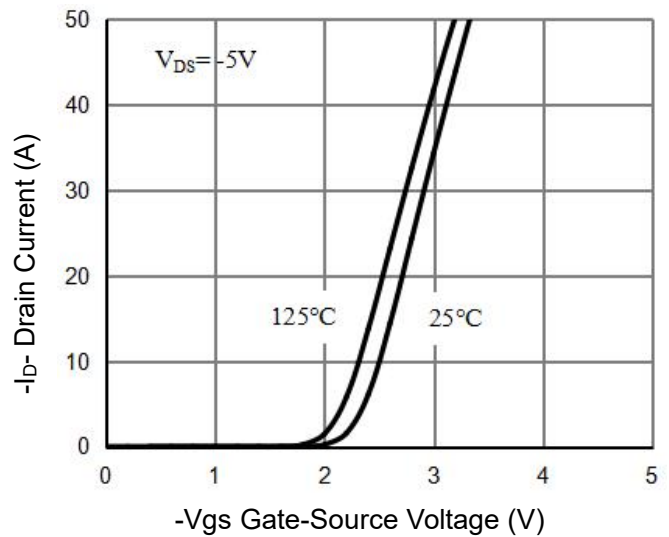
**Figure 3 Power Dissipation**



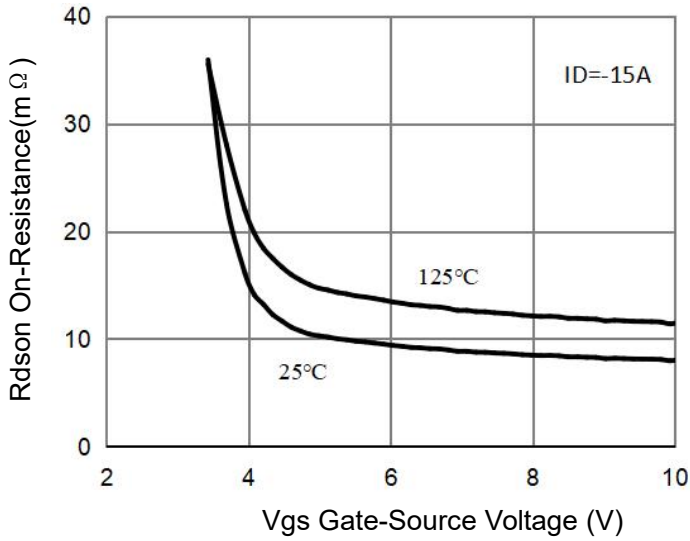
**Figure 4 Drain-Source On-Resistance**



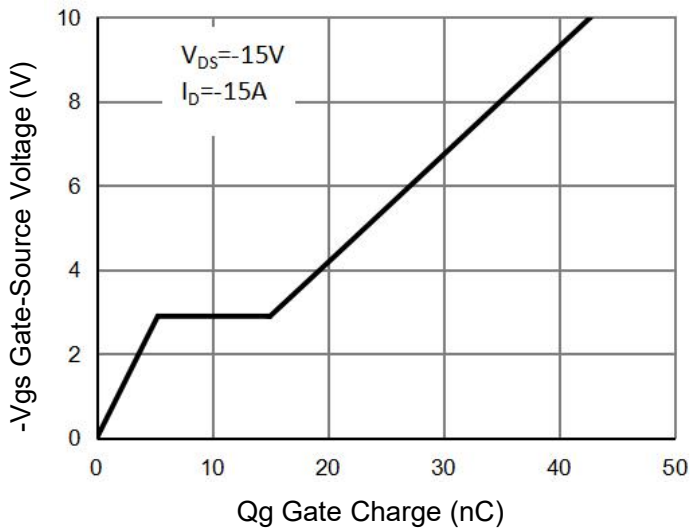
**Figure 5 Output Characteristics**



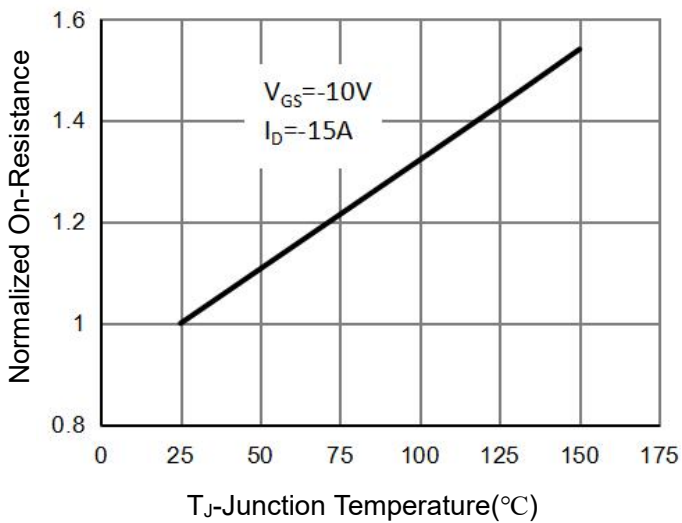
**Figure 6 Transfer Characteristics**



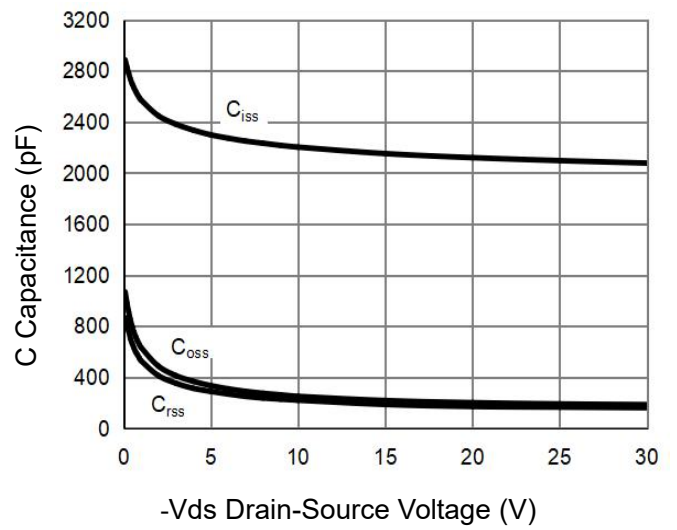
**Figure 7 Rdson vs Vgs**



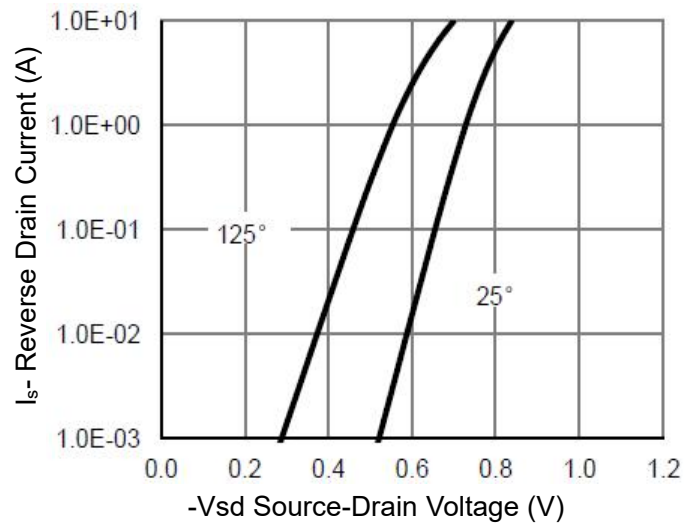
**Figure 9 Gate Charge**



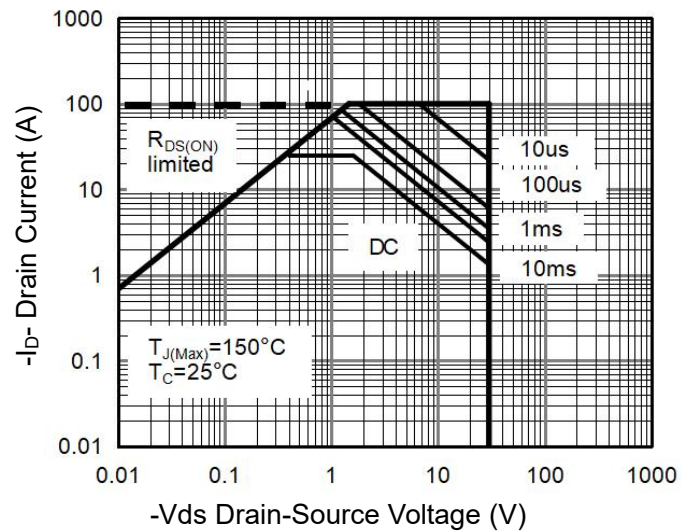
**Figure 11 Drain-Source On-Resistance**



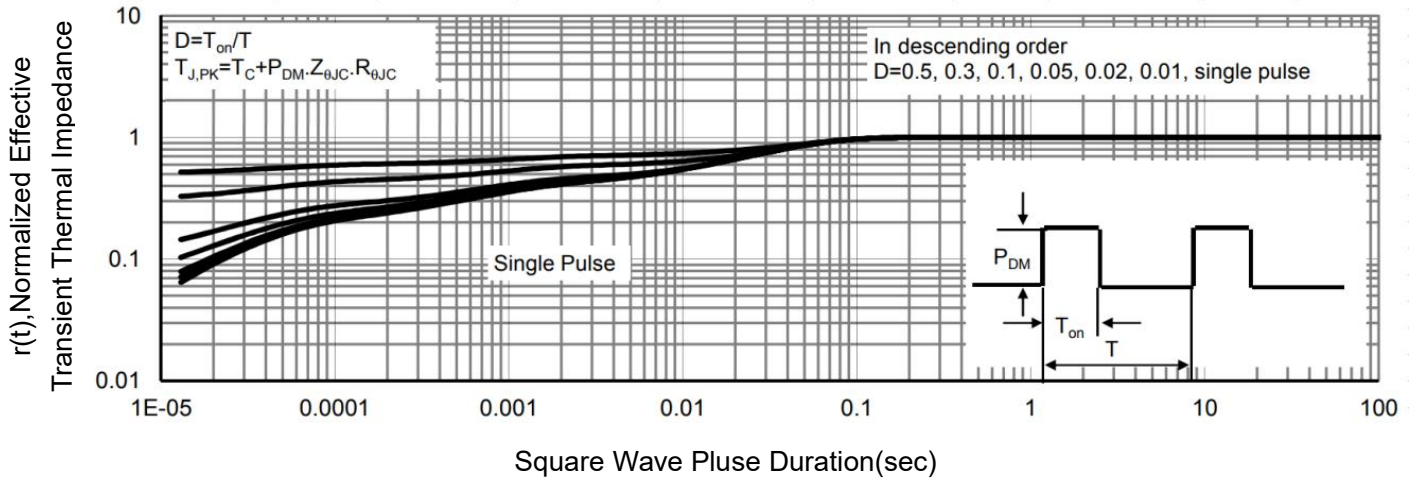
**Figure 8 Capacitance vs Vds**



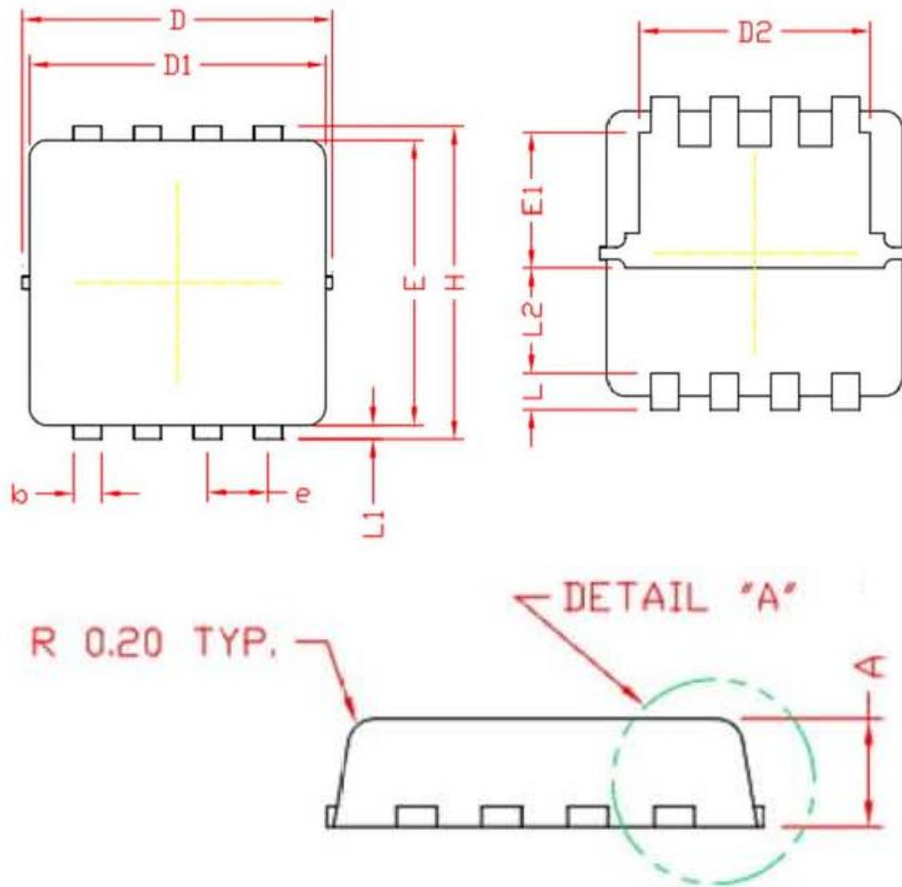
**Figure 10 Source-Drain Diode Forwa**



**Figure 12 Safe Operation Area**



**Figure 13 Normalized Maximum Transient Thermal Impedance**

**DFN3.3X3.3-8L Package Information**


(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
A1	0.00	0.03	0.05
b	0.24	0.30	0.35
c	0.10	0.15	0.20
D	3.25	3.32	3.40
D1	3.05	3.15	3.25
D2	2.40	2.50	2.60
E	3.00	3.10	3.20
E1	1.35	1.45	1.55
e	0.65 BSC.		
H	3.20	3.30	3.40
L	0.30	0.40	0.50
L1	0.10	0.15	0.20
L2	1.13 REF.		