MT1510S5

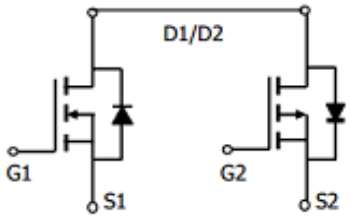
100V Complementary Power MosFET

MT Semiconductor®

http://www.mtsemi.com

Features

- N-Channel
  100V/6.0A,
  $R_{DS(ON)}$ = 150mΩ(max.) @ VGS = 10V
  $R_{DS(ON)}$ = 170mΩ(max.) @ VGS = 4.5V
- P-Channel
  -100V/-5.0A,
  $R_{DS(ON)}$ = 190mΩ(max.) @ VGS = -10V
  $R_{DS(ON)}$ = 215mΩ(max.) @ VGS = -4.5V
- RoHS Compliant



N-channel **P-channel**

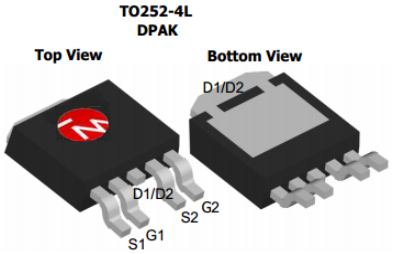
General Description

This complementary MOSFET device is produced using Mos-tech's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain low gate charge for superior switching performance.

Applications

- DC-DC converter
- Power management
- LCD backlight inverter
- DC-FAN

MARKING DIAGRAM & PIN ASSIGNMENT



Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	N-CH	P-CH	Units
V_{DSS}	Drain-Source Voltage	100	-100	V
V_{GSS}	Gate-Source Voltage	±20	±20	V
I_D	Drain Current - Continuous	6.0	-5.0	A
	- Pulsed	25	-20	
P_D	Power Dissipation for Dual Operation	25	20	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	58	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	39.5	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
MT1510S5	MT1510S5	-	-	2500 units

Electrical Characteristics T_A = 25°C unless otherwise noted

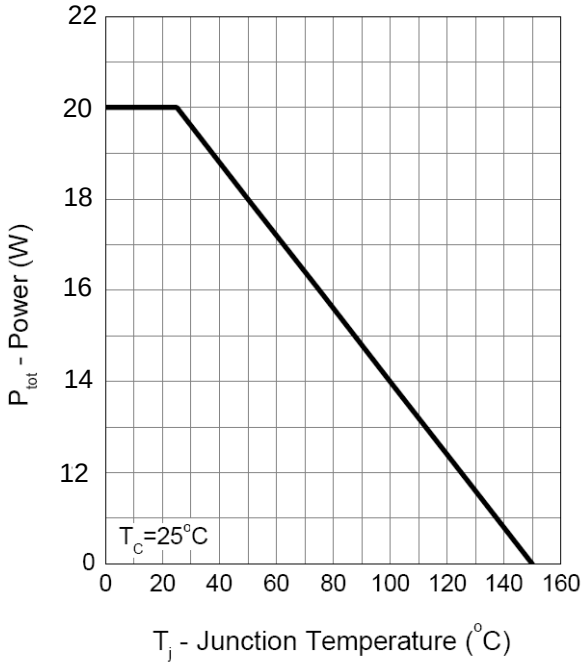
Symbol	Parameter	Test Conditions	Type	Min	Typ	Max	Units
Off Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA V_{GS} = 0 V, I_D = –250 μA	N-CH P-CH	100 -100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80 V, V_{GS} = 0 V V_{DS} = –80 V, V_{GS} = 0 V	N-CH P-CH	-	-	1 –1	μA
I_{GSS}	Gate-Body Leakage	V_{GS} = ±20 V, V_{DS} = 0 V V_{GS} = ±16 V, V_{DS} = 0 V	N-CH P-CH	-	-	± 30 ± 30	μA
On Characteristics (Note 2)							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA V_{DS} = V_{GS}, I_D = –250 μA	N-CH P-CH	1 –1	2.0 –2.0	3 –3	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 6 A V_{GS} = 4.5 V, I_D = 3 A	N-CH	-		150 170	mΩ
		V_{GS} = –10 V, I_D = - 5 A V_{GS} = –4.5 V, I_D = - 3 A	P-CH	-		190 215	
$I_{D(on)}$	On-State Drain Current	V_{GS} = 10 V, V_{DS} = 5 V V_{GS} = –10 V, V_{DS} = –5 V	N-CH P-CH	6 -5	-	-	A
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 3A V_{DS} = –5 V, I_D = 3A	N-CH P-CH	-	3 5	-	S
Dynamic Characteristics							
C_{iss}	Input Capacitance	N-CH V_{DS} = 30 V, V_{GS} = 0 V, f = 1.0 MHz P-CH V_{DS} = –30 V, V_{GS} = 0 V, f = 1.0 MHz	N-CH P-CH	-	440 1050	-	pF
C_{oss}	Output Capacitance		N-CH P-CH	-	36 70	-	pF
C_{rss}	Reverse Transfer Capacitance		N-CH P-CH	-	20 40	-	pF
Switching Characteristics (Note 2)							
$t_{d(on)}$	Turn-On Delay Time	N-CH V_{DD} = 50 V, I_D = 1 A, V_{GS} = 10V, R_{GEN} = 6 Ω P-CH V_{DD} = –50 V, I_D = –1 A, V_{GS} = –10 V, R_{GEN} = 6 Ω	N-CH P-CH	-	11 11	21 21	ns
t_r	Turn-On Rise Time		N-CH P-CH	-	10 10	19 19	ns
$t_{d(off)}$	Turn-Off Delay Time		N-CH P-CH	-	24 55	44 100	ns
t_f	Turn-Off Fall Time		N-CH P-CH	-	21 30	39 55	ns
Q_g	Total Gate Charge	N-CH V_{DS} = 50 V, I_D = 6 A , V_{GS} = 10 V P-CH V_{DS} = – 50 V, I_D = - 5 A, V_{GS} = –10V	N-CH P-CH	-	9.5 20.9	13 38	nC
Q_{gs}	Gate-Source Charge		N-CH P-CH	-	1.9 4.2	-	nC
Q_{gd}	Gate-Drain Charge		N-CH P-CH	-	2.1 5.2	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
I_S	Maximum Continuous Drain-Source Diode Forward Current		N-CH P-CH			4 – 4	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 2 A (Note 2) V_{GS} = 0 V, I_S = -1 A (Note 2)	N-CH P-CH		0.8 –0.8	1.1 -1.1	V

Note: 1: Pulse test ; pulse width ≦300ns, duty cycle ≦ 2%.

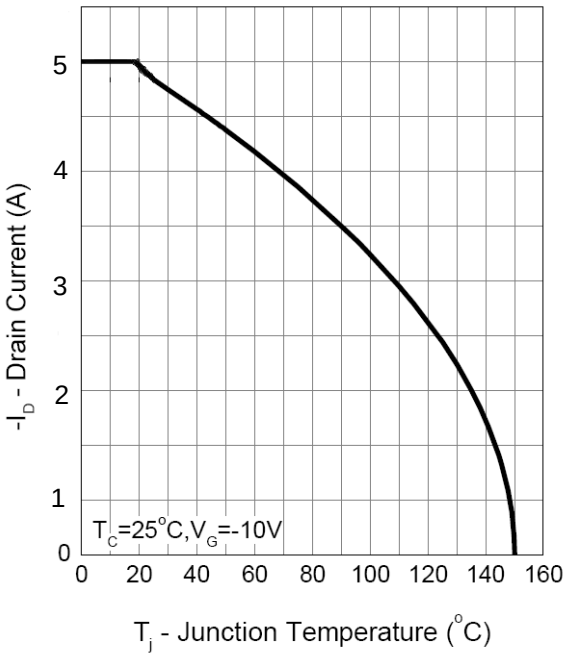
2: Guaranteed by design, not subject to production testing.

Typical Characteristics: P-ch

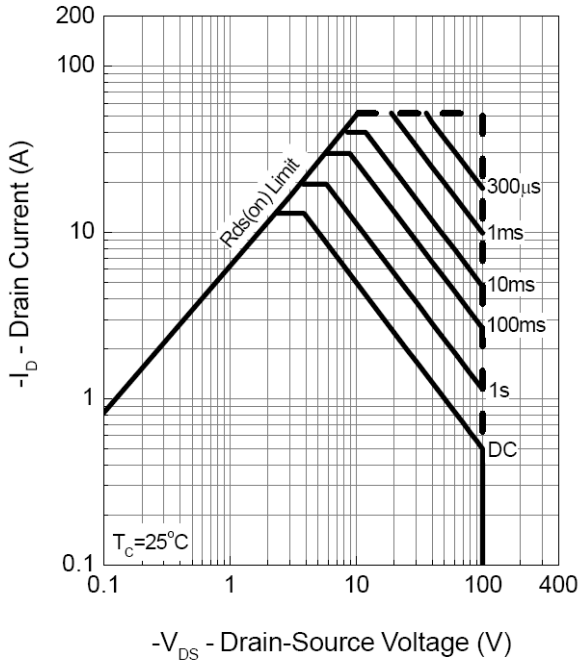
Power Dissipation



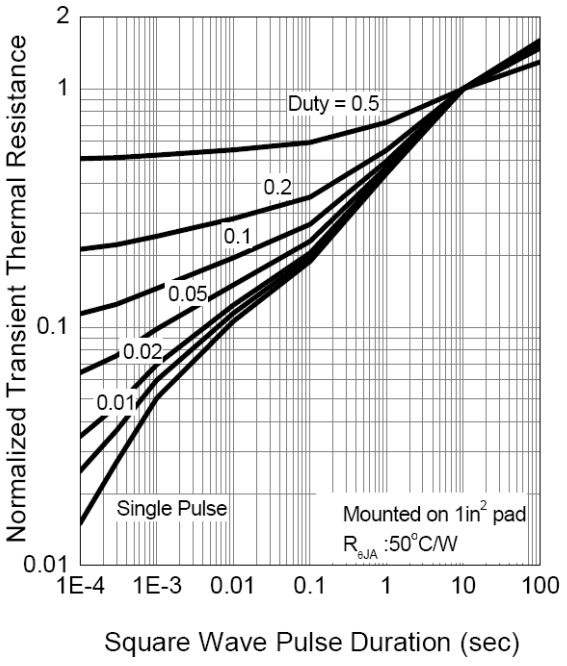
Drain Current



Safe Operation Area

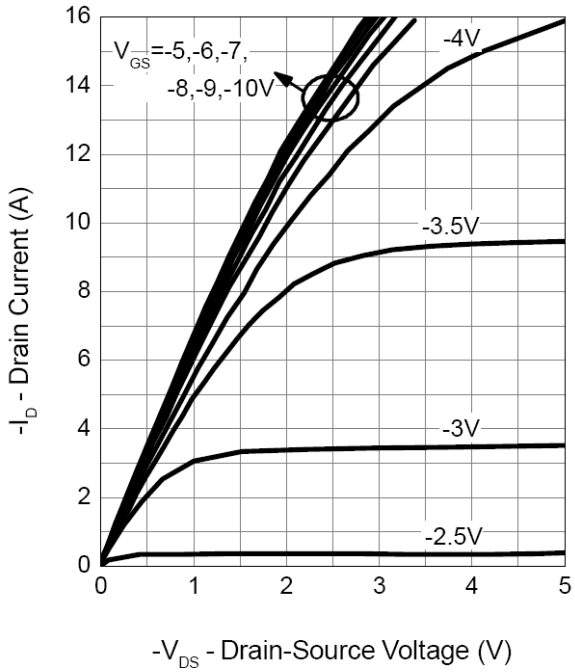


Thermal Transient Impedance

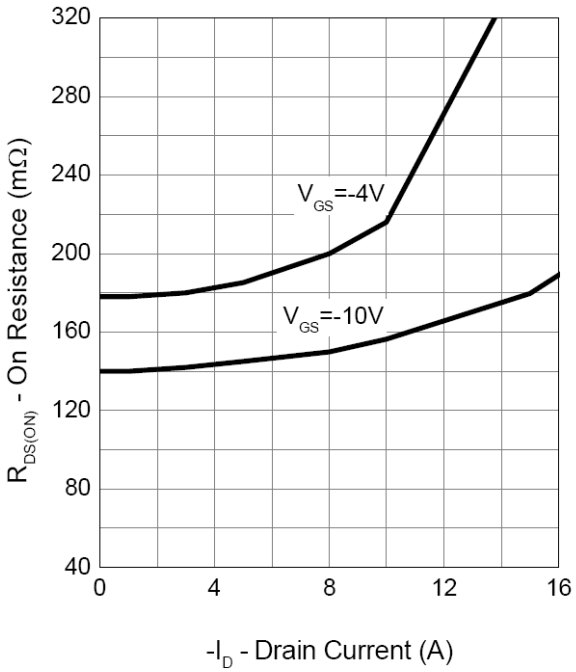


Typical Characteristics (Cont.): P-ch

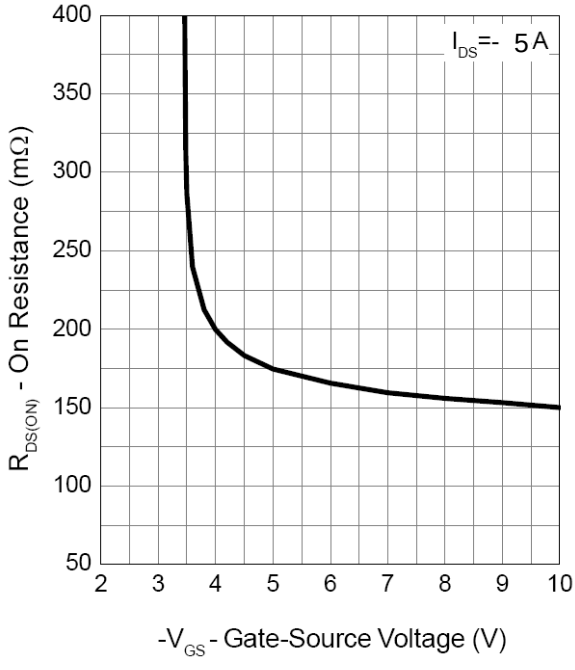
Output Characteristics



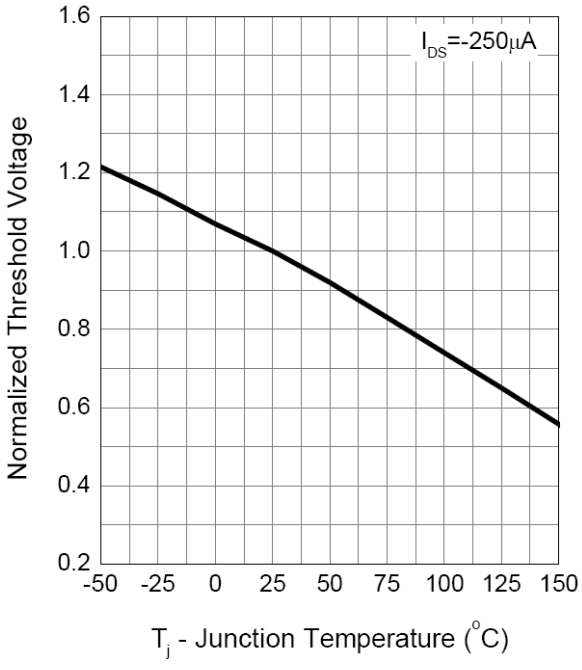
Drain-Source On Resistance



Gate-Source On Resistance

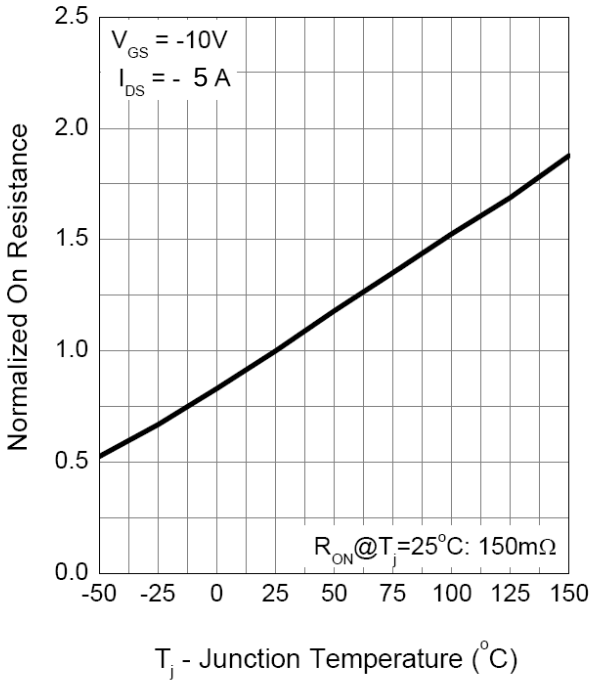


Gate Threshold Voltage

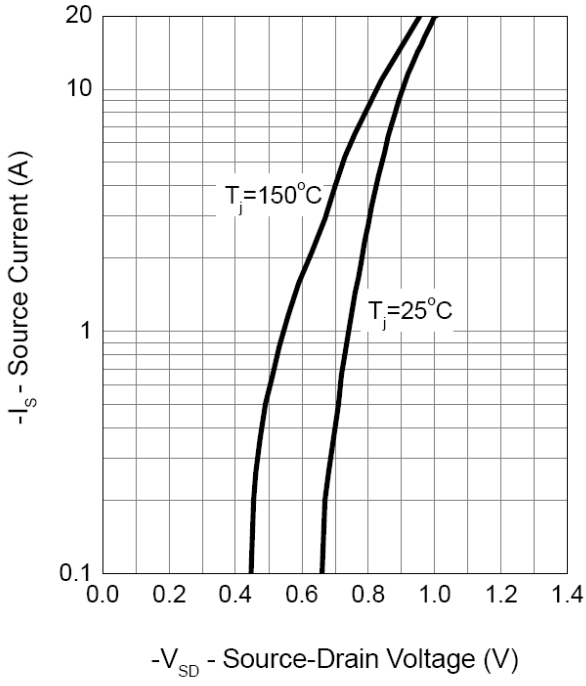


Typical Characteristics (Cont.): P-ch

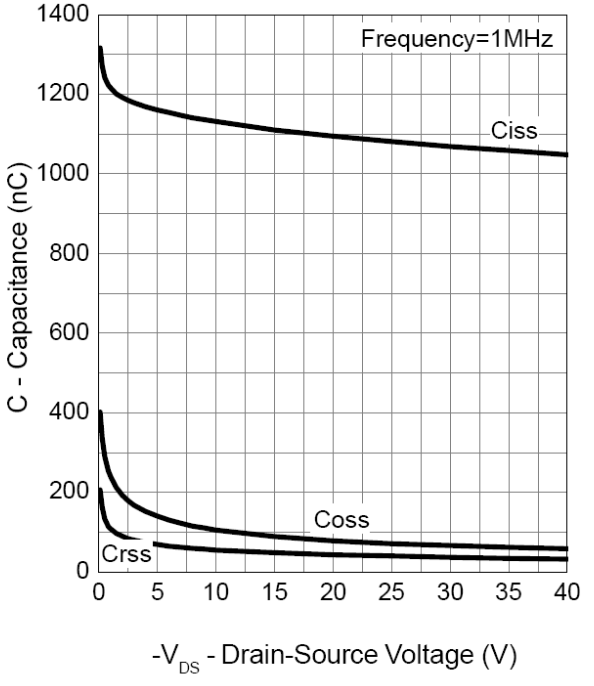
Drain-Source On Resistance



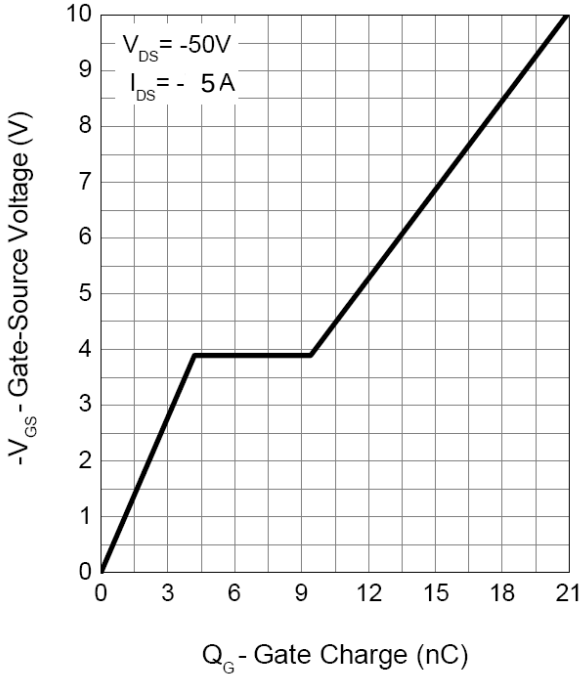
Source-Drain Diode Forward



Capacitance

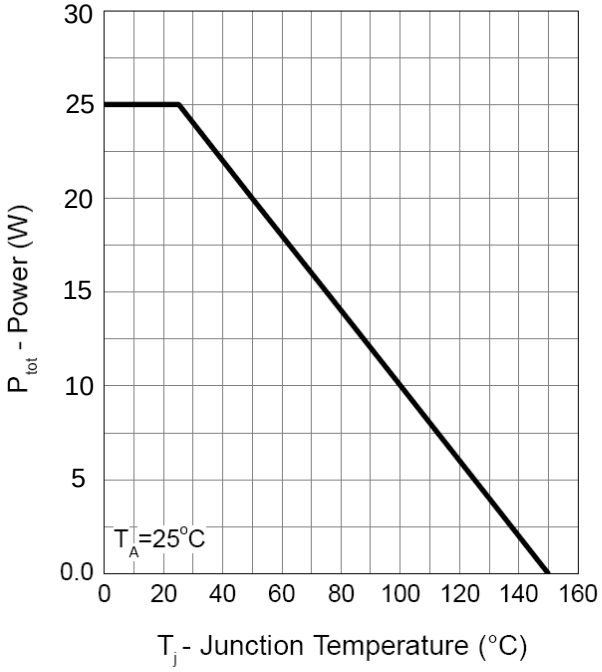


Gate Charge

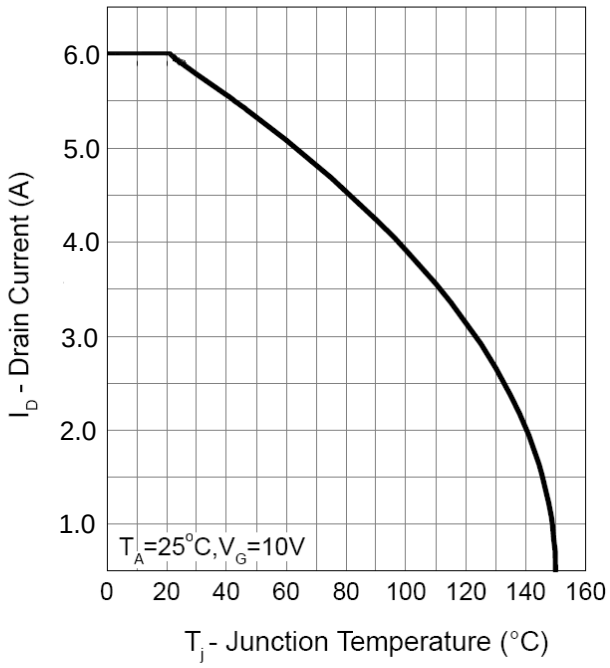


Typical Characteristics: N-ch

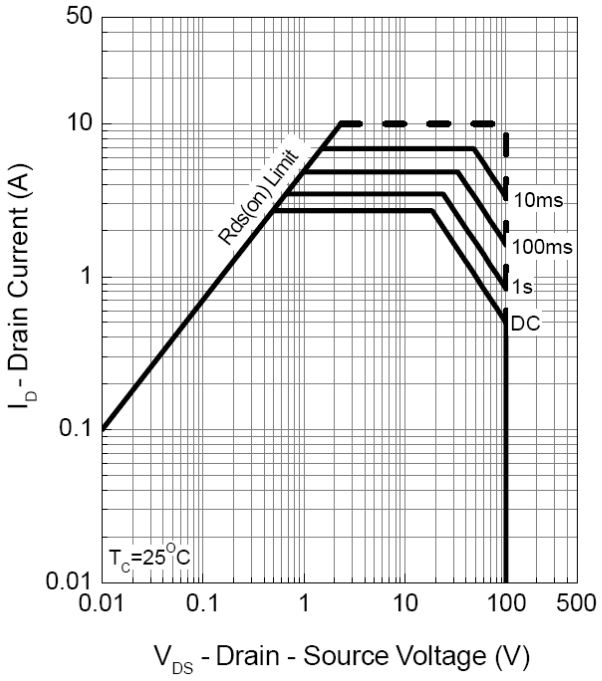
Power Dissipation



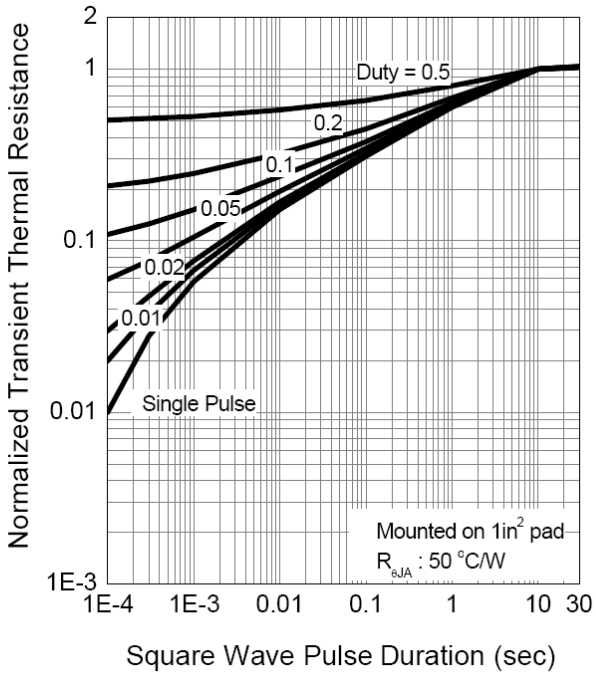
Drain Current



Safe Operation Area

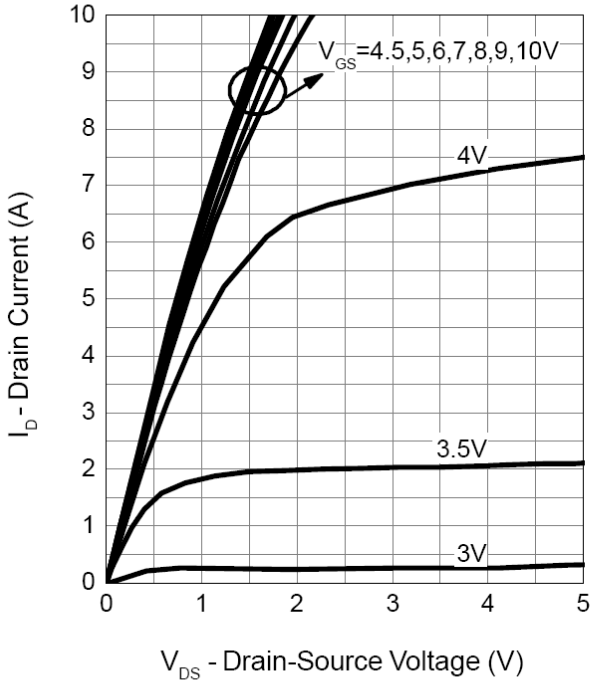


Thermal Transient Impedance

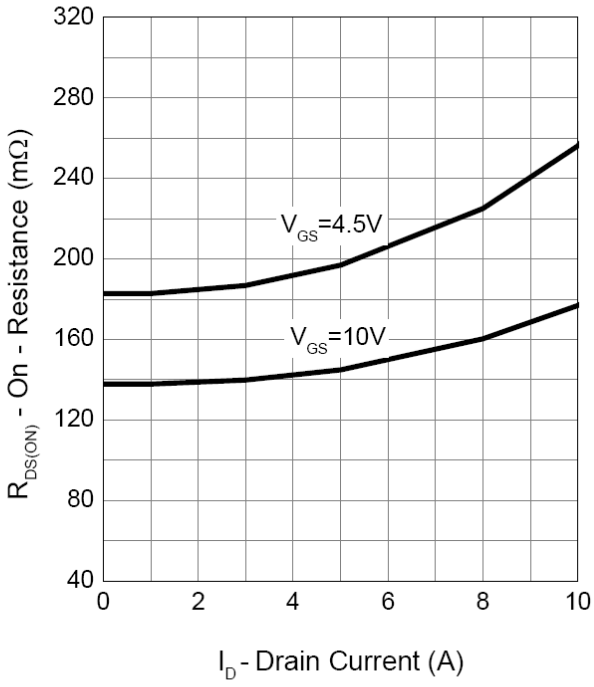


Typical Characteristics: N-ch

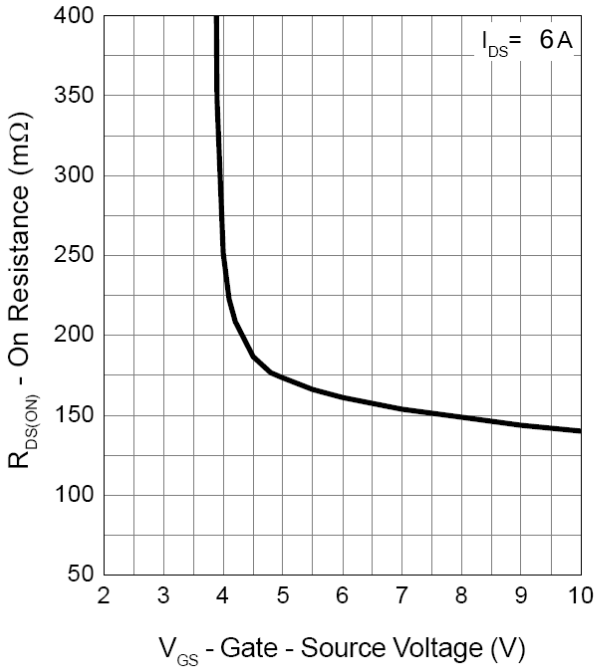
Output Characteristics



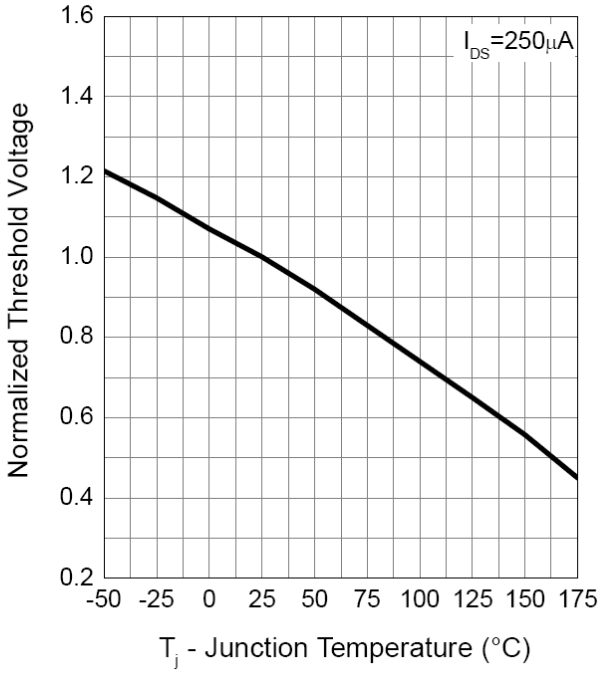
Drain-Source On Resistance



Gate-Source On Resistance

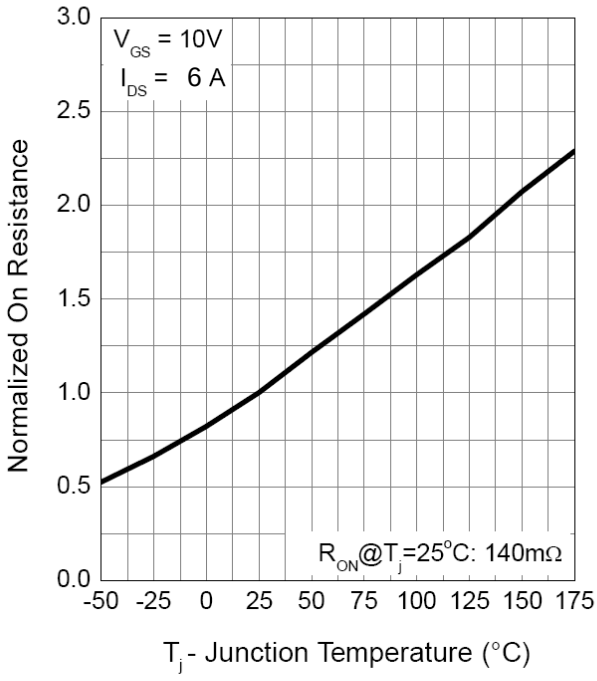


Gate Threshold Voltage

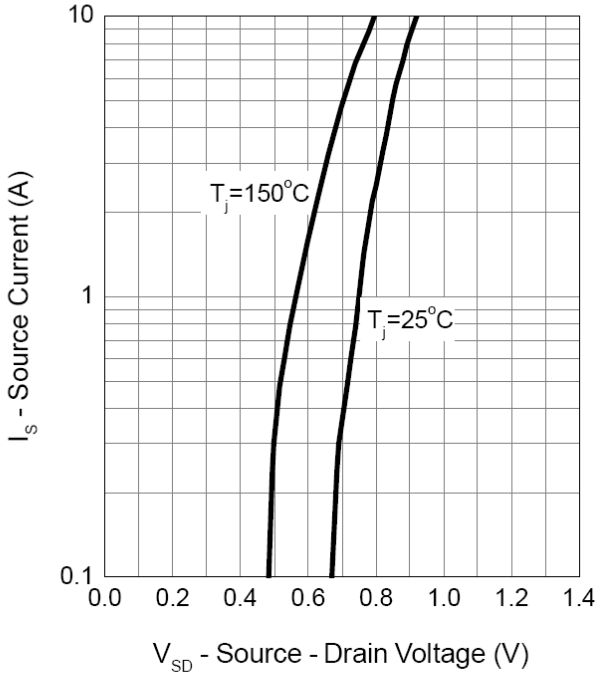


Typical Characteristics: N-ch

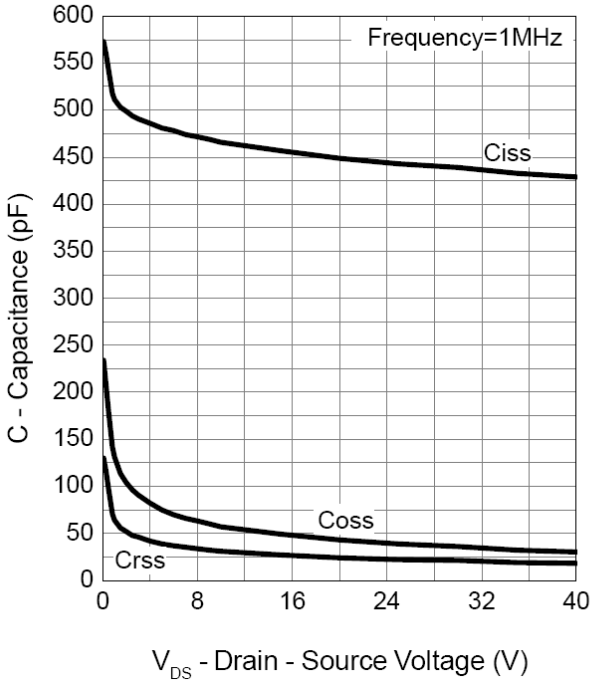
Drain-Source On Resistance



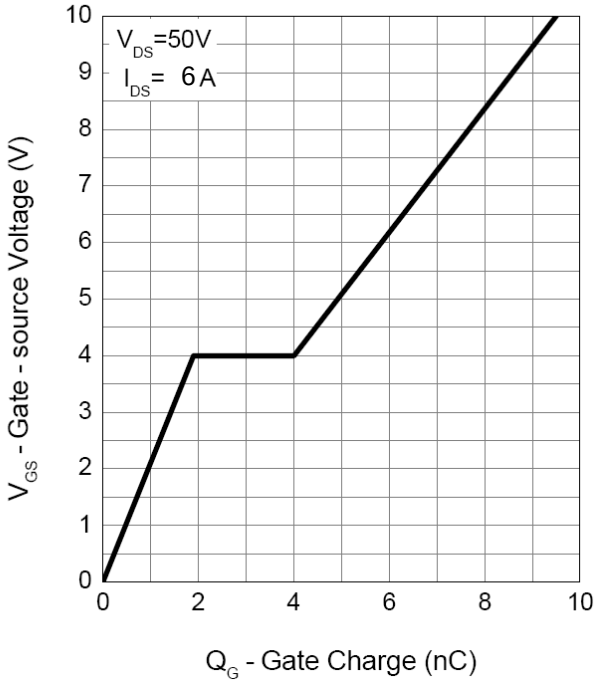
Source-Drain Diode Forward

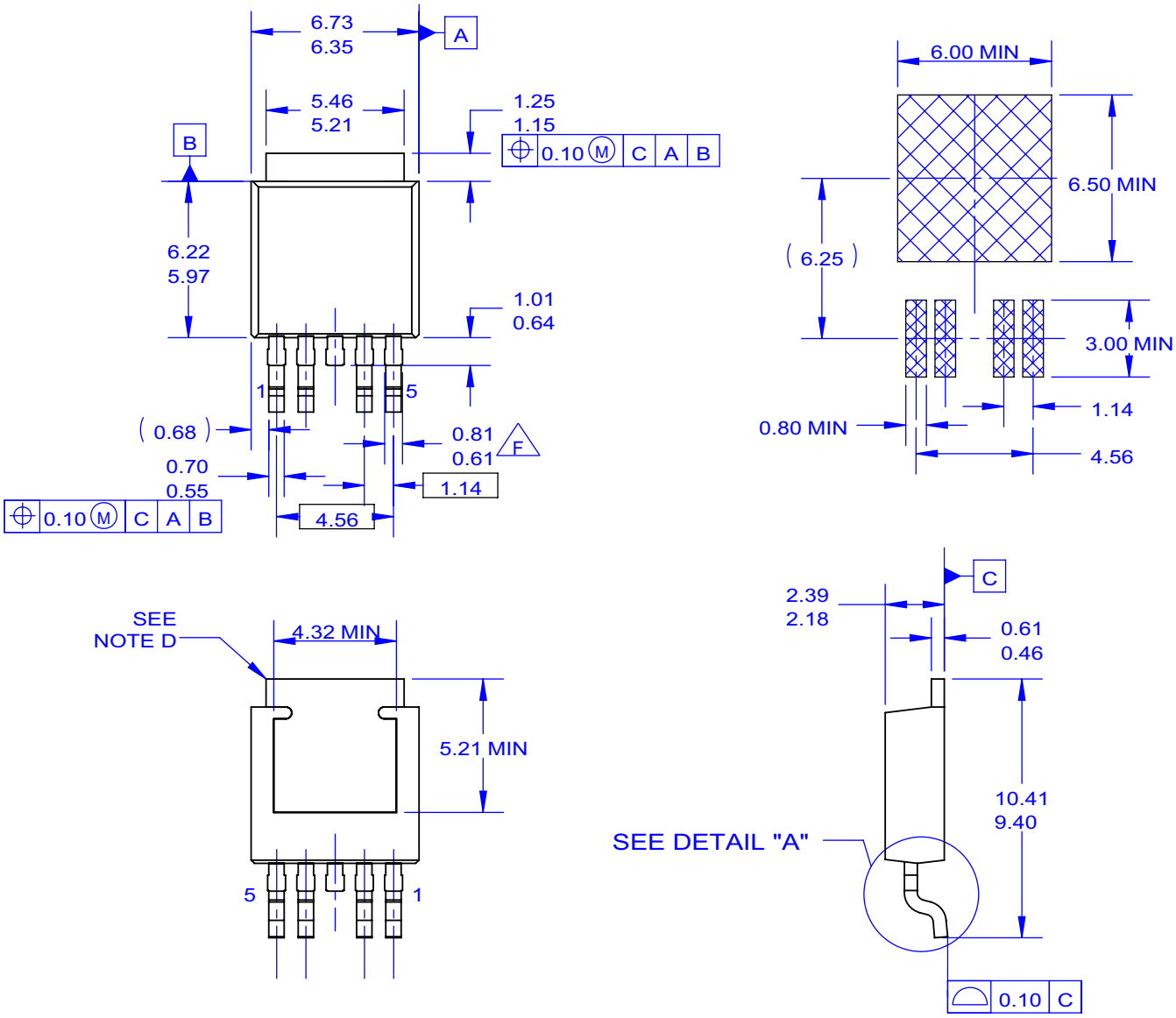


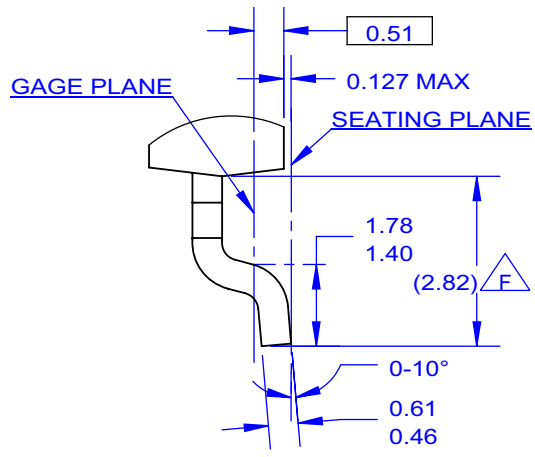
Capacitance



Gate Charge







DETAIL A
SCALE 2:1

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F EXCEPTION TO TO-252 STANDARD.
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   2）植埋于人体使用的装置。
   3）用于治疗（切除患部、给药等）的装置。
   4）其他直接影响到人的生命的装置。
9. 在使用本资料所记载的产品时，对于最大额定值、工作电源电压的范围、放热特性、安装条件及其他条件请在本公司规定的保证范围内使用。如果超出了本公司规定的保证范围使用时，对于由此而造成的故障和出现的事故，本公司将不承担任何责任。
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Keep safety first in your circuit designs!

1. MOS-TECH Semiconductor Corp. puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.
   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.