

N and P-Channel Complementary Enhancement Mode MOSFET

Features

- N-Channel**

30V / 4.9A

$R_{DS(ON)}=39m\Omega(Typ.) @ V_{GS}=4.5V$

$R_{DS(ON)}=58m\Omega(Typ.) @ V_{GS}=2.5V$

- P-Channel**

-30V / -3A

$R_{DS(ON)}=82m\Omega(Typ.) @ V_{GS}=-4.5V$

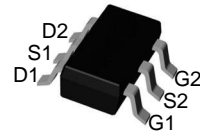
$R_{DS(ON)}=102m\Omega(Typ.) @ V_{GS}=-2.5V$

- Reliable and Rugged
- Lead Free and Green Devices Available (RoHSCompliant)

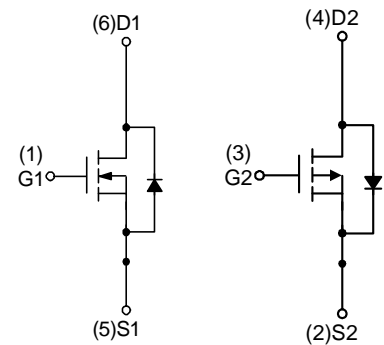
Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

Pin Description



Top View of TSOP6



N-Channel

P-Channel

Marking

Marking	F1****
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Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

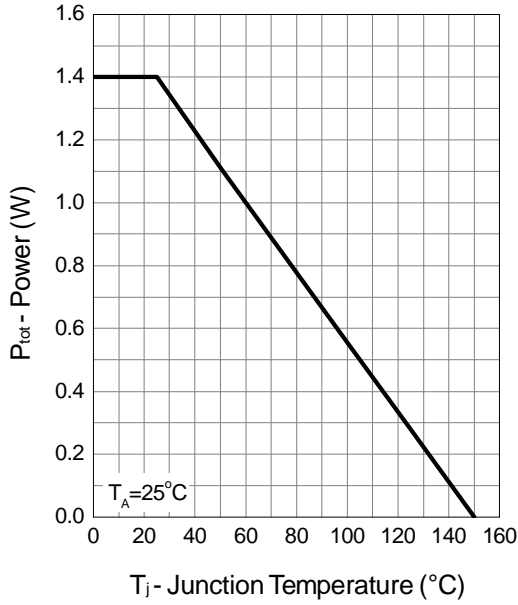
Symbol	Parameter	N Channel	P Channel	Unit	
Common Ratings					
V_{DSS}	Drain-Source Voltage	30	-30	V	
V_{GSS}	Gate-Source Voltage	± 12	± 12	V	
I_D	Continuous Drain Current	$T_A=25^\circ C$	4.9	-3	A
		$T_A=70^\circ C$	3.9	-2.4	
I_{DM}	300 μs Pulsed Drain Current	$V_{GS}=10V$	19	-12	
I_S	Diode Continuous Forward Current	1			
T_J	Maximum Junction Temperature	150		$^\circ C$	
T_{STG}	Storage Temperature Range	-55 to 150			
P_D	Maximum Power Dissipation	$T_A=25^\circ C$	1.4	W	
		$T_A=70^\circ C$	0.9		
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient	$t \leq 10s$	90	$^\circ C/W$	
		Steady State	125		

N Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

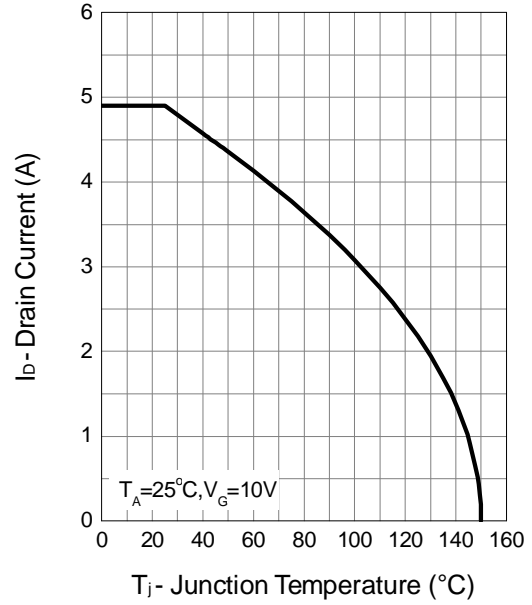
Symbol	Parameter	Test Conditions	N Channel			Unit	
			Min.	Typ.	Max.		
Static Characteristics							
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	μA	
		T _J =85°C	-	-	30		
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.5	0.7	1.0	V	
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA	
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} =4.5V, I _{DS} =4.9A	-	39	49	mΩ	
		V _{GS} =2.5V, I _{DS} =3A	-	58	68		
Diode Characteristics							
V _{SD} ^a	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.75	1.1	V	
t _{rr}	Reverse Recovery Time	I _{SD} =4.9A, dI _{SD} /dt=100A/μs	-	9.2	-	ns	
Q _{rr}	Reverse Recovery Charge		-	4.3	-	nC	
Dynamic Characteristics^b							
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	2.3	-	Ω	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	215	-	pF	
C _{oss}	Output Capacitance		-	37	-		
C _{rss}	Reverse Transfer Capacitance		-	28	-		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	5.3	8	ns	
T _r	Turn-on Rise Time		-	11	16		
t _{d(OFF)}	Turn-off Delay Time		-	12	17		
T _f	Turn-off Fall Time		-	2.6	4		
Gate Charge Characteristics^b							
Q _g	Total Gate Charge	V _{DS} =15V, I _{DS} =4.9A	V _{GS} =4.5V	-	3	-	nC
			V _{GS} =10V	-	5.8	-	
Q _{gs}	Gate-Source Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =4.9A	-	1.1	-		
Q _{gd}	Gate-Drain Charge		-	1.5	-		
Q _{gth}	Threshold Gate Charge		-	0.5	-		

N Channel Typical Operating Characteristics

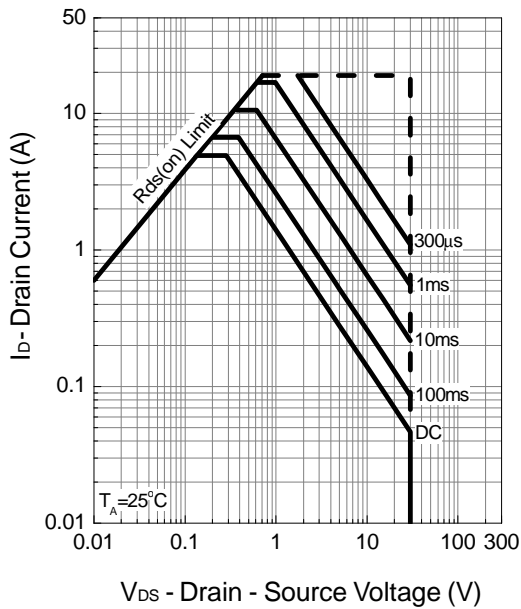
Power Dissipation



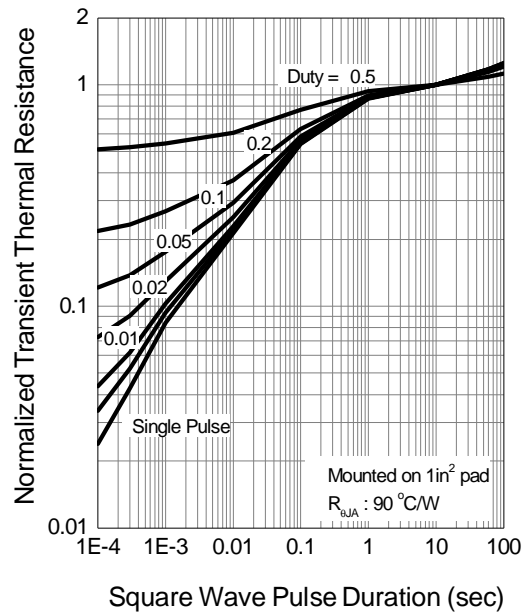
Drain Current



Safe Operation Area

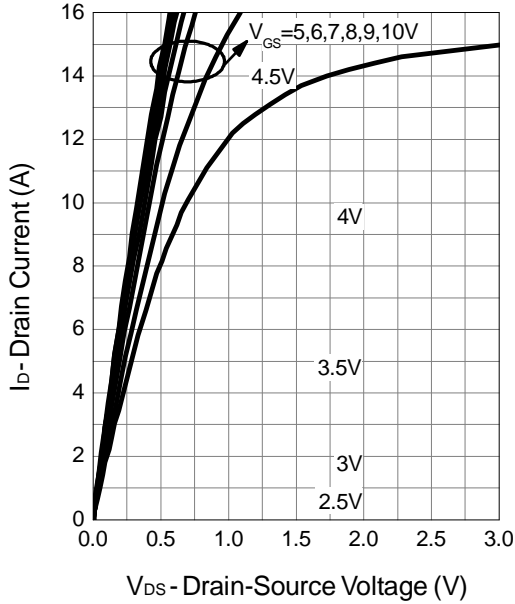


Thermal Transient Impedance

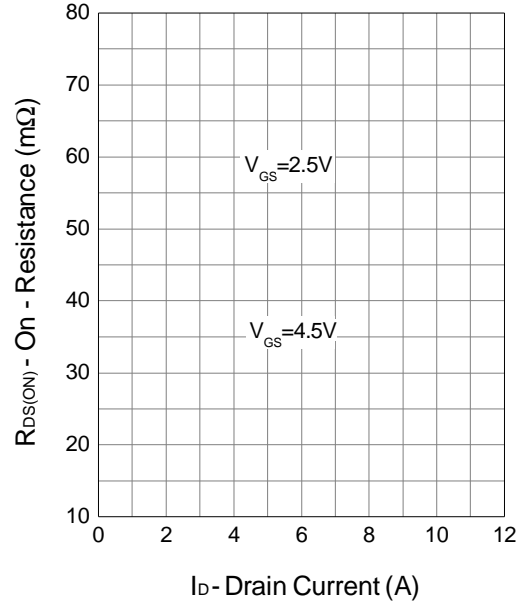


N Channel Typical Operating Characteristics (Cont.)

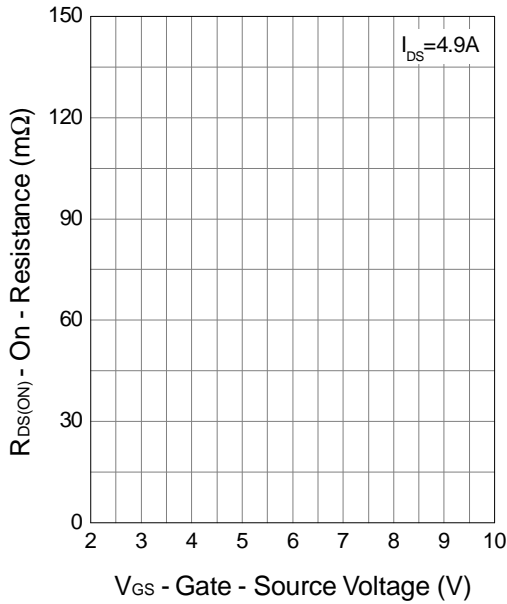
Output Characteristics



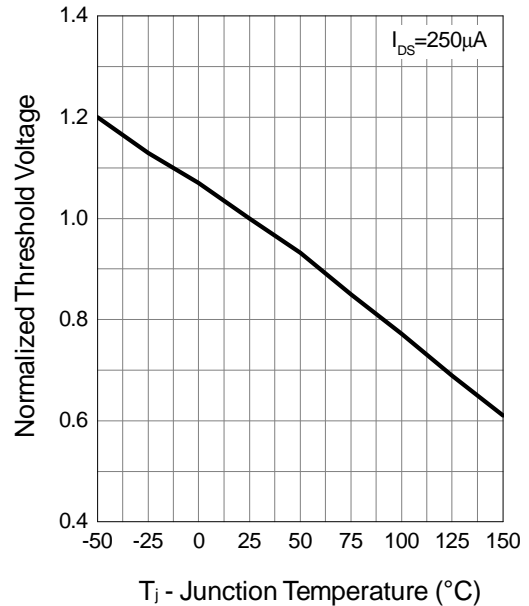
Drain-Source On Resistance



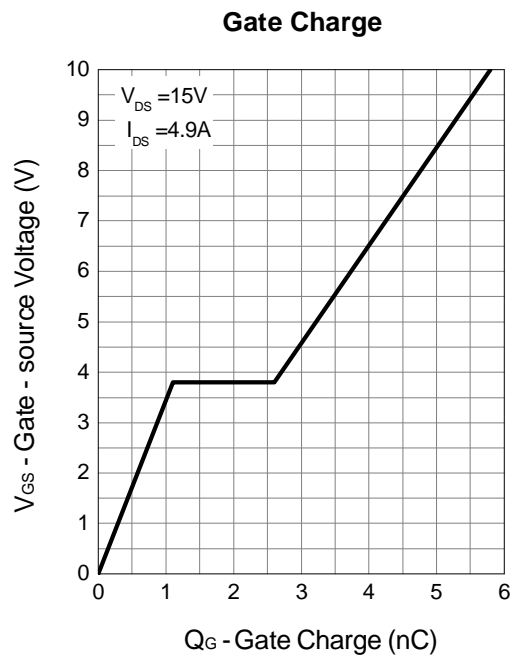
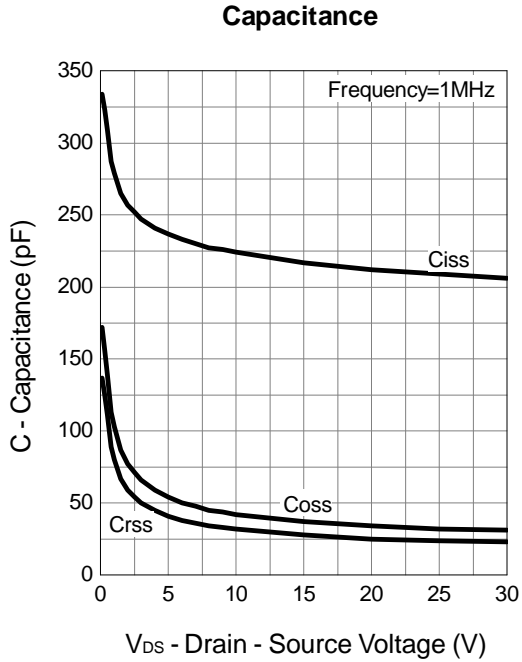
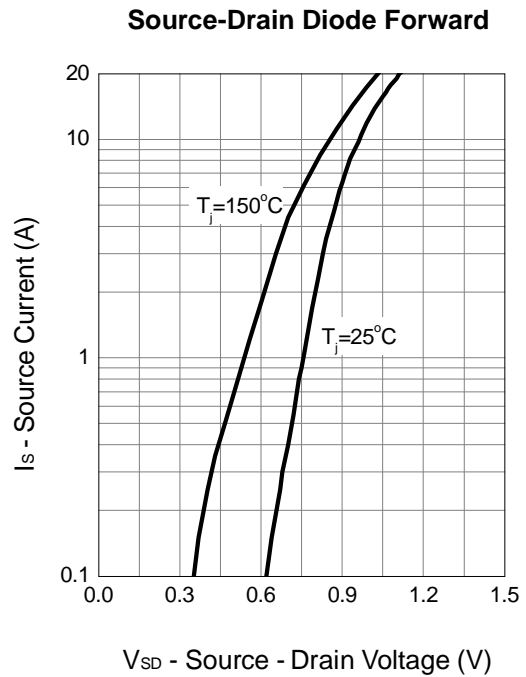
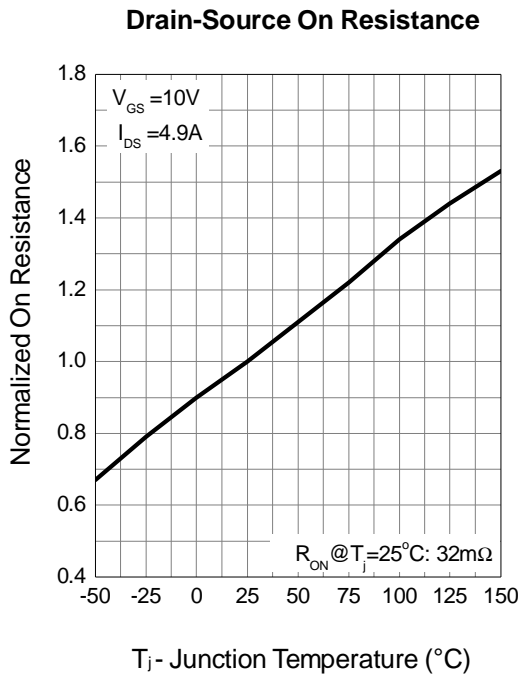
Gate-Source On Resistance



Gate Threshold Voltage



N Channel Typical Operating Characteristics (Cont.)

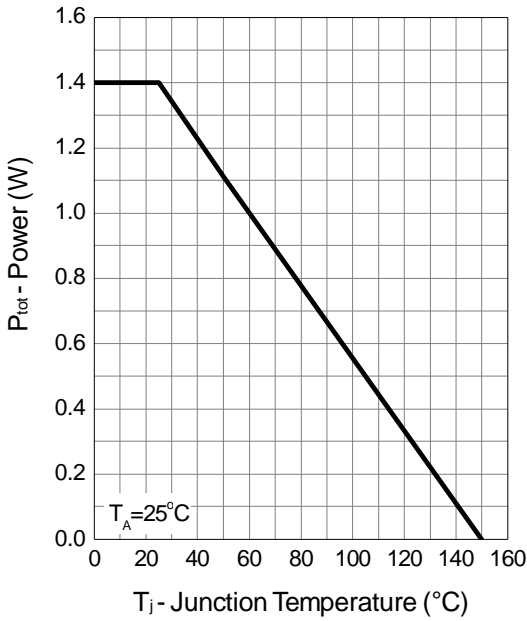


P Channel Electrical Characteristics (T_A = 25°C unless otherwise noted)

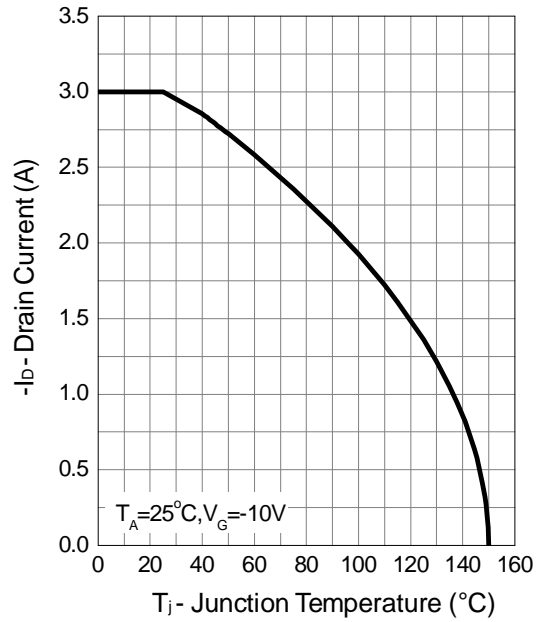
Symbol	Parameter	Test Conditions	P Channel			Unit	
			Min.	Typ.	Max.		
Static Characteristics							
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-30	-	-	V	
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V, V _{GS} =0V	-	-	-1	μA	
		T _J =85°C	-	-	-30		
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-0.5	-0.7	-1.0	V	
I _{GSS}	Gate Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA	
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _{DS} =-3A	-	82	100	mΩ	
		V _{GS} =-2.5V, I _{DS} =-1.9A	-	102	150		
Diode Characteristics							
V _{SD} ^a	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.75	-1.1	V	
t _{rr}	Reverse Recovery Time	I _{SD} =-3A, dI _{SD} /dt=100A/μs	-	19	-	ns	
Q _{rr}	Reverse Recovery Charge		-	14	-	nC	
Dynamic Characteristics^b							
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	7	-	Ω	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz	-	229	-	pF	
C _{oss}	Output Capacitance		-	42	-		
C _{riss}	Reverse Transfer Capacitance		-	33	-		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V, R _L =15Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	7.2	-	ns	
T _r	Turn-on Rise Time		-	9.3	-		
t _{d(OFF)}	Turn-off Delay Time		-	15.4	-		
T _f	Turn-off Fall Time		-	3.6	-		
Gate Charge Characteristics^b							
Q _g	Total Gate Charge	V _{DS} =-15V, I _{DS} =-3A	V _{GS} =-4.5V,	-	3.3	-	nC
			V _{GS} =-10V	-	6.5	-	
Q _{gs}	Gate-Source Charge	V _{DS} =-15V, V _{GS} =-10V, I _{DS} =-3A	-	1.1	-		
Q _{gd}	Gate-Drain Charge		-	1.1	-		
Q _{gth}	Threshold Gate Charge		-	0.6	-		

P Channel Typical Operating Characteristics

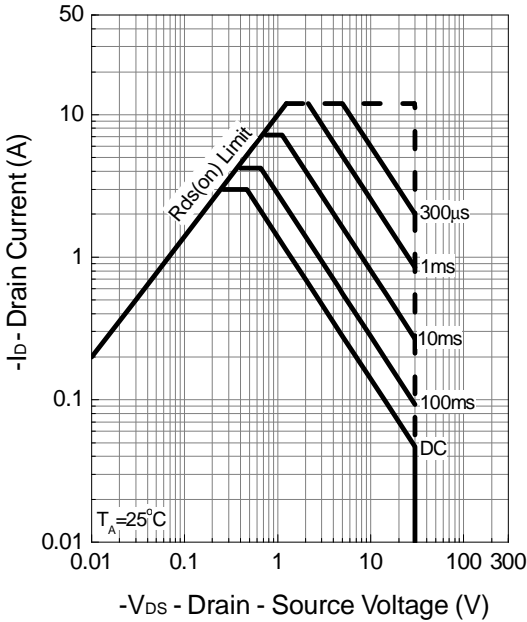
Power Dissipation



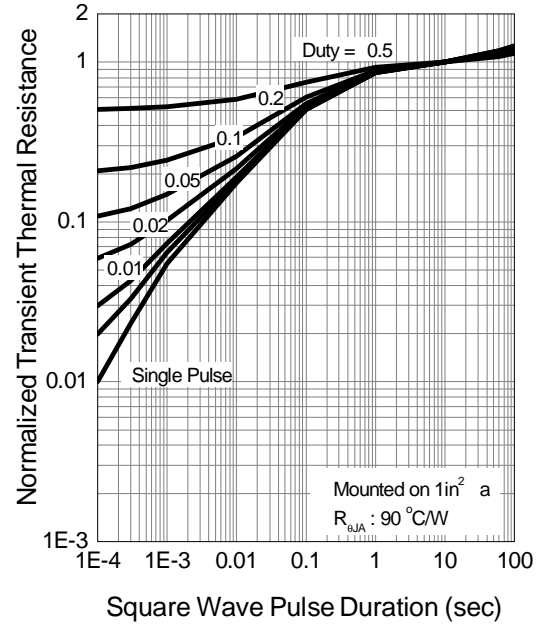
Drain Current



Safe Operation Area

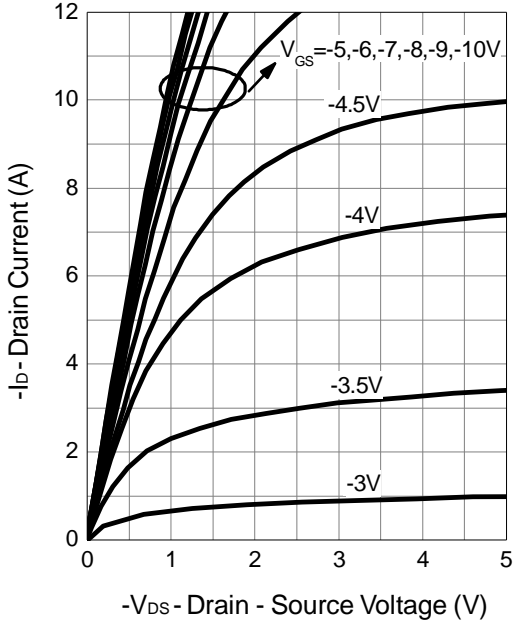


Thermal Transient Impedance

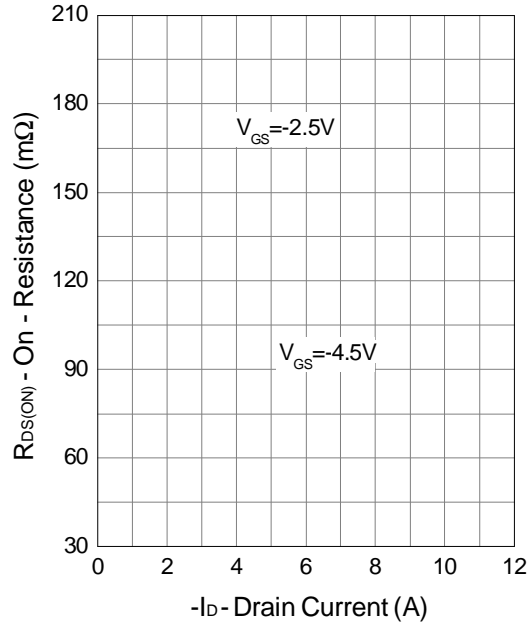


P Channel Typical Operating Characteristics (Cont.)

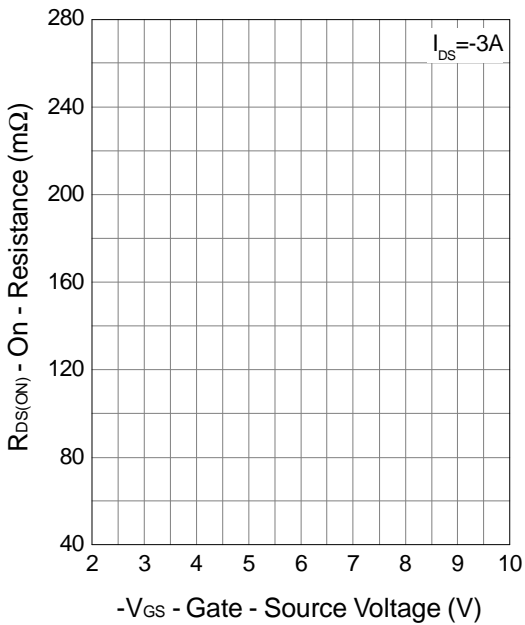
Output Characteristics



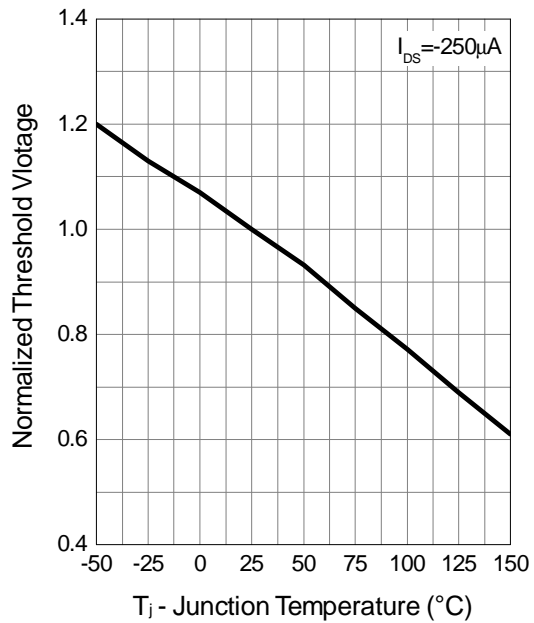
Drain-Source On Resistance



Gate-Source On Resistance

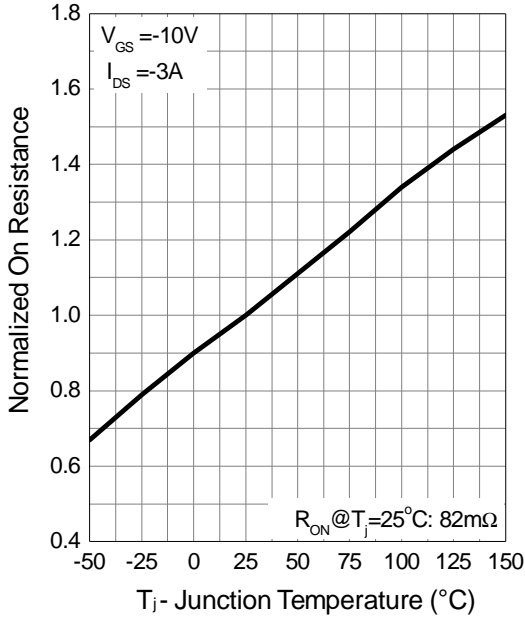


Gate Threshold Voltage

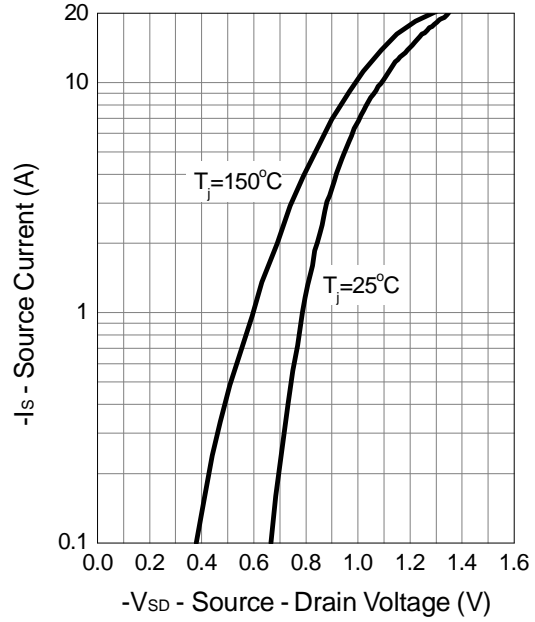


P Channel Typical Operating Characteristics (Cont.)

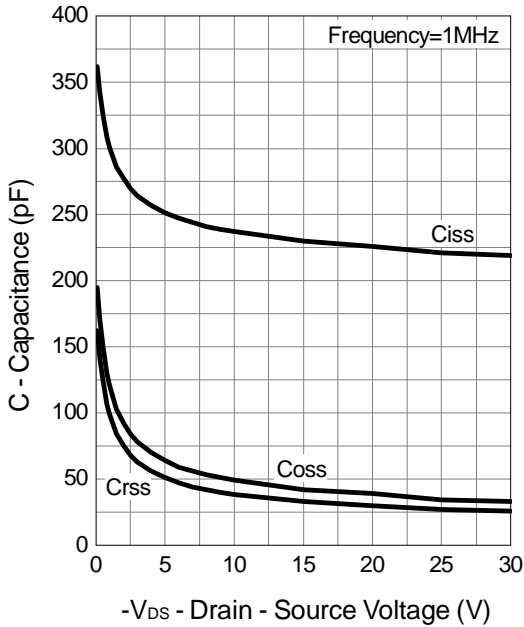
Drain-Source On Resistance



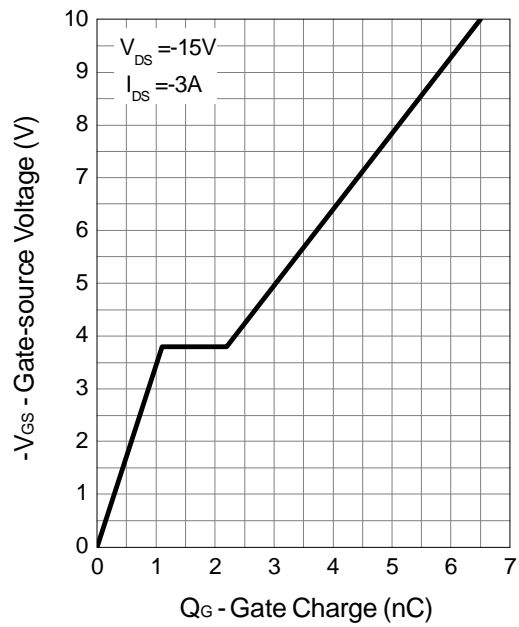
Source-Drain Diode Forward



Capacitance

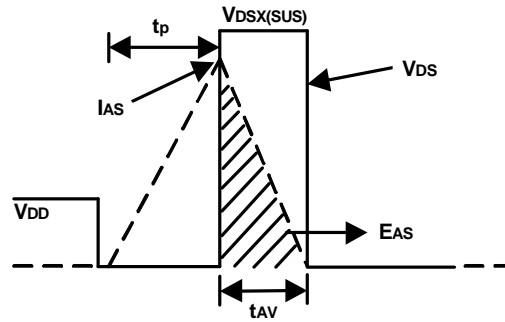
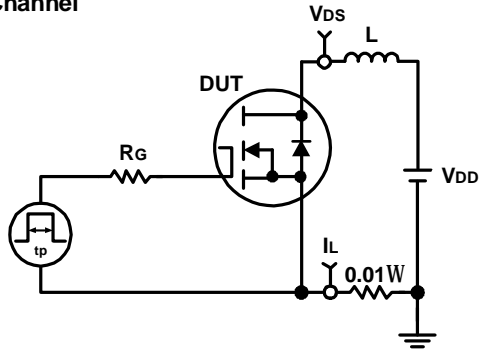


Gate Charge

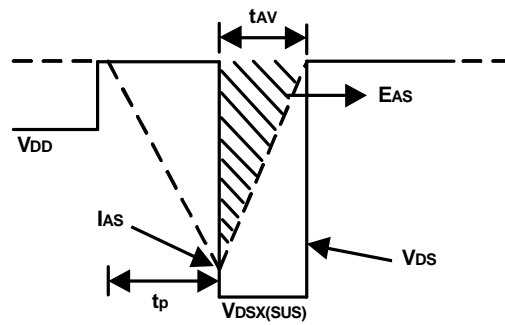
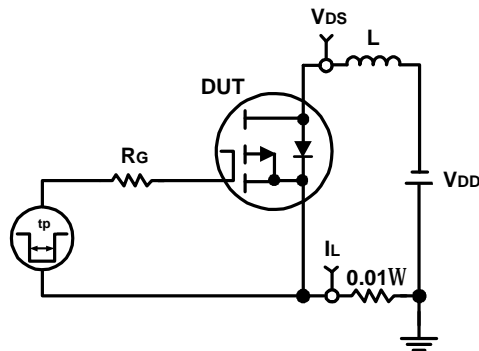


Avalanche Test Circuit and Waveforms

N Channel

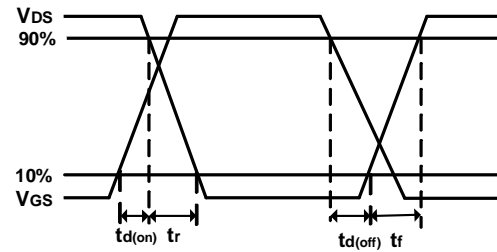
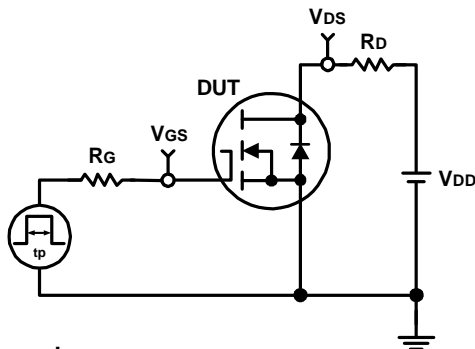


P Channel

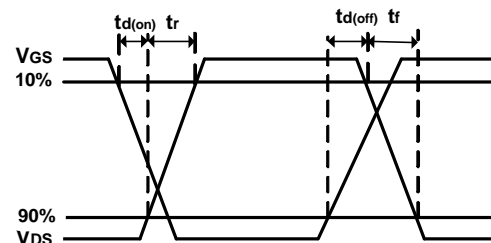
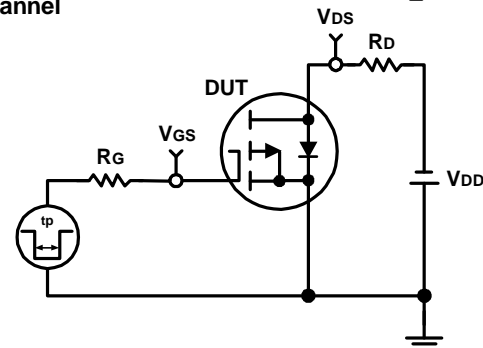


Switching Time Test Circuit and Waveforms

N Channel

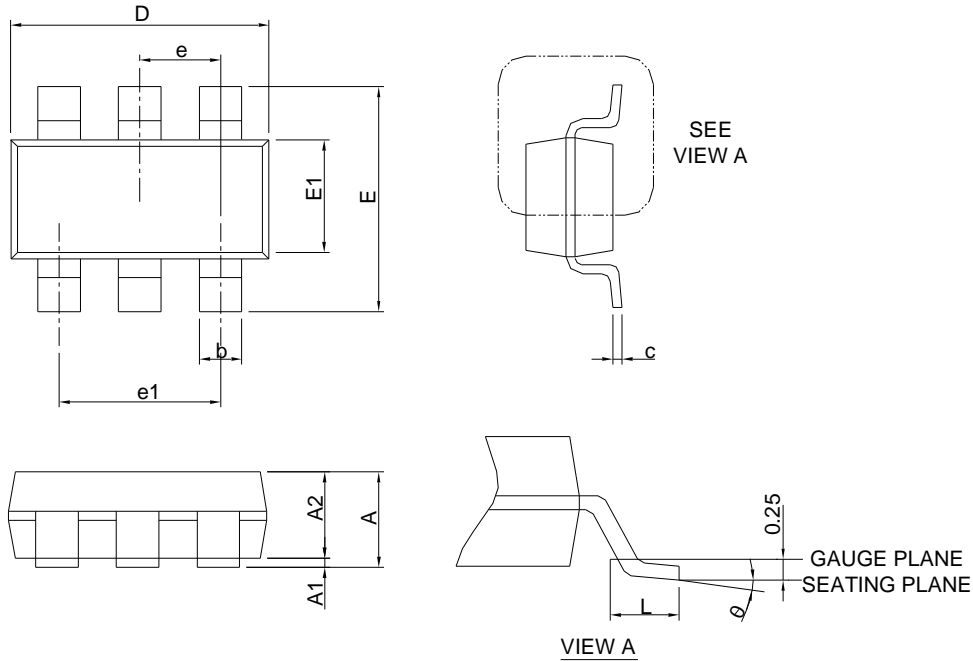


P Channel



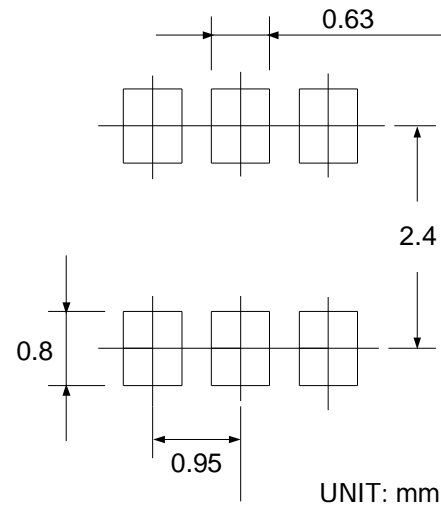
Package Information

TSOP6



SYMBOL	TSOP6			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	-	1.25	-	0.049
A1	0.00	0.05	0.000	0.002
A2	0.90	1.20	0.035	0.047
b	0.30	0.50	0.012	0.020
c	0.08	0.22	0.003	0.009
D	2.70	3.10	0.106	0.122
E	2.60	3.00	0.102	0.118
E1	1.40	1.80	0.055	0.071
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

RECOMMENDED LAND PATTERN



- Note : 1. Follow JEDEC TO-178 AB.
2. Dimension D and E1 do not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 10 mil per side.

Attention

- Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress rating only and functional device operation is not implied. YiDeng Wei Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all YiDeng Wei Semiconductor products described or contained herein.
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