40V Complementary Enhancement Mode MOSFET

● Features

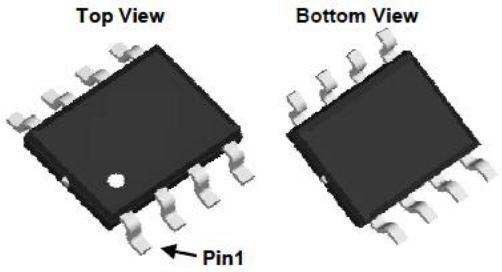
N-channel

V_{DS}	$R_{DS(ON)TYP}$	I_D
40V	25 mΩ@10V	6A
	40 mΩ@4.5V	

P-channel

V_{DS}	$R_{DS(ON)TYP}$	I_D
-40V	40 mΩ@-10V	-5.1A
	55 mΩ@-4.5V	

● Pin Configurations



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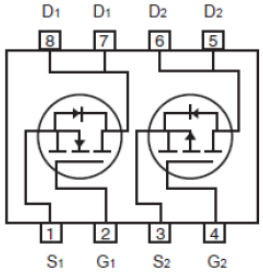


● General Description

- used in inverter
- other applications

● Absolute Maximum Ratings @T_A=25℃ unless otherwise noted

Parameter		Symbol	N-Ratings	P-Ratings	Unit
Drain-Source Voltage		V_{DSS}	40	-40	V
Gate-Source Voltage		V_{GSS}	±20	±20	V
Drain Current (Continuous) *AC	T_A=25°C	I_D	6	-5.1	A
	T_A=100°C		3.9	-3.2	
Drain Current (Pulse) *B		I_{DM}	24	-20	A
Power Dissipation	T_A=25°C	P_D	2		W
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	-55~150	℃

● Thermal Resistance Ratings

Parameter		Symbol	Maximum	Unit
Maximum Junction-to-Ambient	Steady State	R_{thJA}	62.5	°C/W

Electrical Characteristics

N-Channel

T_A=25℃ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D= 250μA	40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_{DS}= 250μA	1	1.6	2.2	V
Gate Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	--	--	±100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 6A	--	25	35	mΩ
	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 5A	--	40	55	mΩ
Diode Forward Voltage	V_{SD}	I_{SD}= 1A , V_{GS}=0V	--	0.77	1.3	V
Diode Forward Current *AC	I_S	T_A =25°C	--	--	2.6	A
Switching						
Total Gate Charge	Q_g	V_{GS} = 10 V, V_{DS} = 20 V, I_{DS} = 6 A	--	11	--	nC
Gate-Source Charge	Q_{gs}		--	2	--	nC
Gate-Drain Charge	Q_{gd}		--	2.2	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 20 V, V_{GEN} = 10 V, R_G = 3.3 Ω, R_L = 3.3 Ω, I_{DS} = 6 A	--	1.9	--	ns
Turn-on Rise Time	t_r		--	18.6	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	8.7	--	ns
Turn-Off Fall Time	t_f		--	2.6	--	ns
Reverse Recovery Time	t_{rr}	I_{SD} = 6 A, dI_{SD}/dt = 100 A/μs		4		ns
Reverse Recovery Charge	Q_{rr}			1.5		nC
Dynamic						
Input Capacitance	C_{iss}	V_{DS} = 20V, V_{GS} = 0V, f = 1.0 MHz	--	600	--	pF
Output Capacitance	C_{oss}		--	62	--	pF
Reverse Transfer Capacitance	C_{rss}		--	48	--	pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

Electrical Characteristics

P-Channel

T_A=25℃ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D= -250 μ A	-40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -40 V, V_{GS} = 0V	--	--	-1	μ A
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_{DS}= -250 μ A	-1	-1.6	-2.2	V
Gate Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	--	--	±100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -4A	--	40	50	mΩ
	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -3A	--	55	75	mΩ
Diode Forward Voltage	V_{SD}	I_{SD}= -1A , V_{GS}=0V	--	-0.78	-1.2	V
Diode Forward Current *AC	I_S	T_A =25°C	--	--	-2.6	A
Switching						
Total Gate Charge	Q_g	V_{GS} = - 10 V, V_{DS} = - 20 V, I_{DS} = - 5.1 A	--	20	--	nC
Gate-Source Charge	Q_{gs}		--	5.7	--	nC
Gate-Drain Charge	Q_{gd}		--	4.6	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = - 20 V, V_{GEN} = - 10 V, R_G = 3.3 Ω, R_L = 3.9 Ω, I_{DS} = - 5.1 A	--	6.8	--	ns
Turn-on Rise Time	t_r		--	33	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	30	--	ns
Turn-Off Fall Time	t_f		--	12	--	ns
Reverse Recovery Time	t_{rr}	I_{SD} = 6 A, dI_{SD}/dt = 100 A/μs		6.1		ns
Reverse Recovery Charge	Q_{rr}			1.6		nC
Dynamic						
Input Capacitance	C_{iss}	V_{DS} = -20V, V_{GS} = 0V, f = 1.0 MHz	--	1100	--	pF
Output Capacitance	C_{oss}		--	100	--	pF
Reverse Transfer Capacitance	C_{rss}		--	80	--	pF

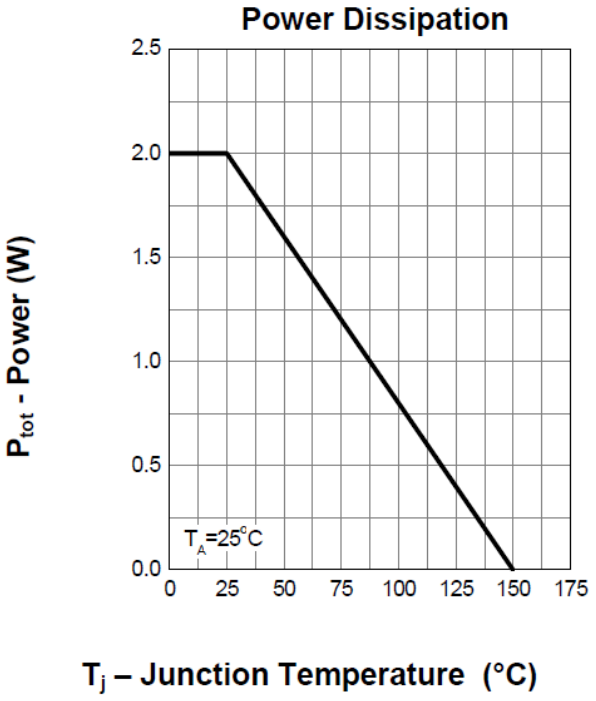
A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

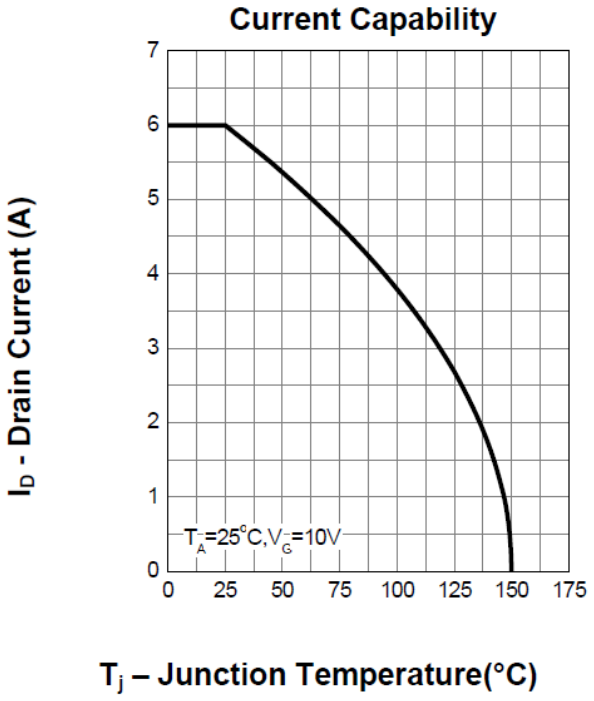
B: Repetitive rating, pulse width limited by junction temperature.

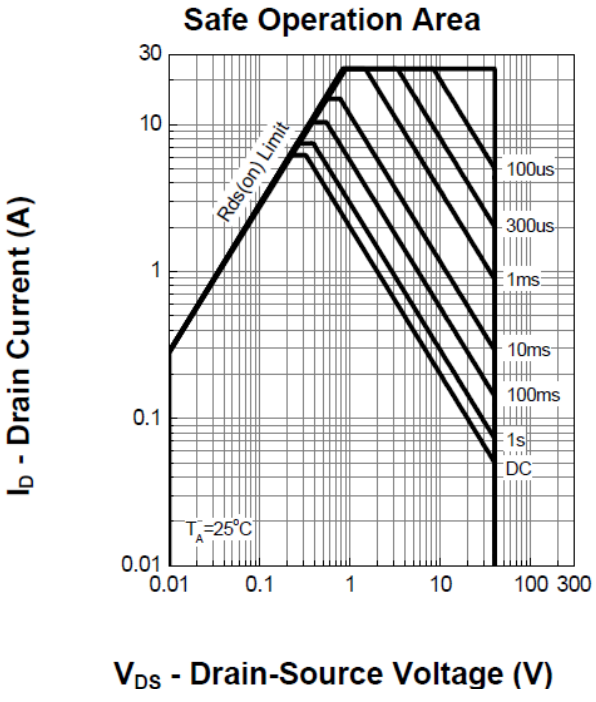
C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

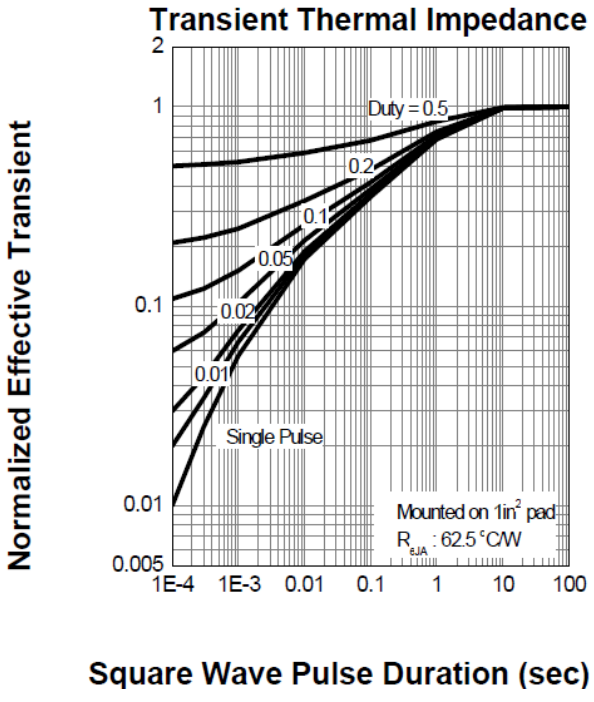
Typical Electrical and Thermal Characteristics

- **N-Channel (TJ = 25 °C, unless otherwise noted)**









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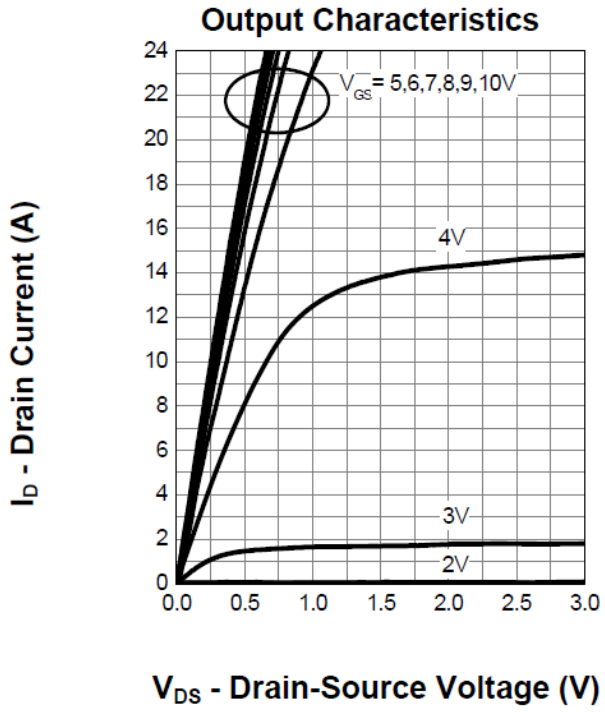

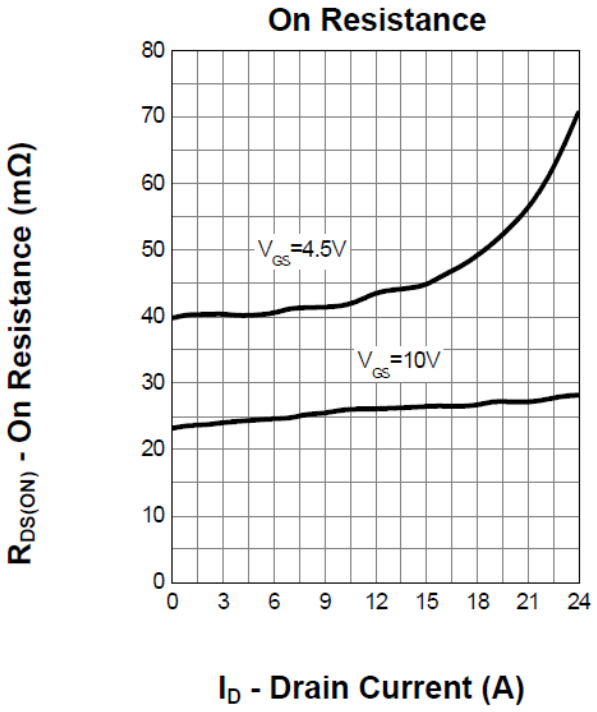

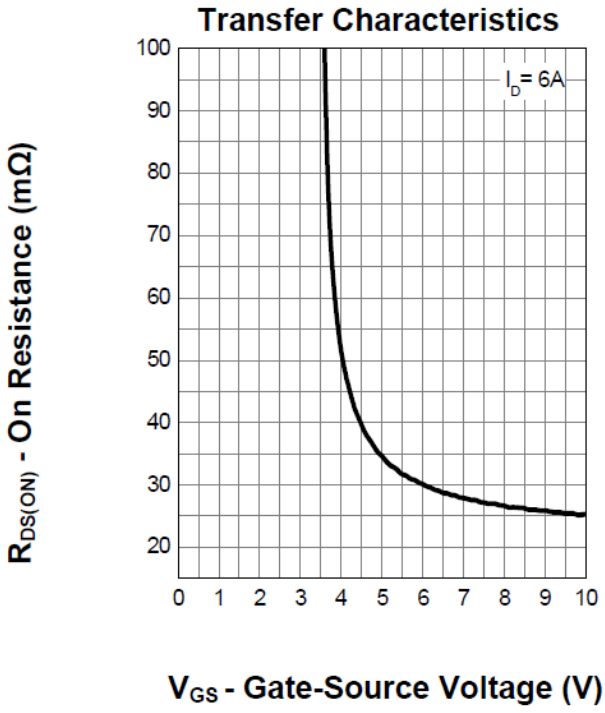

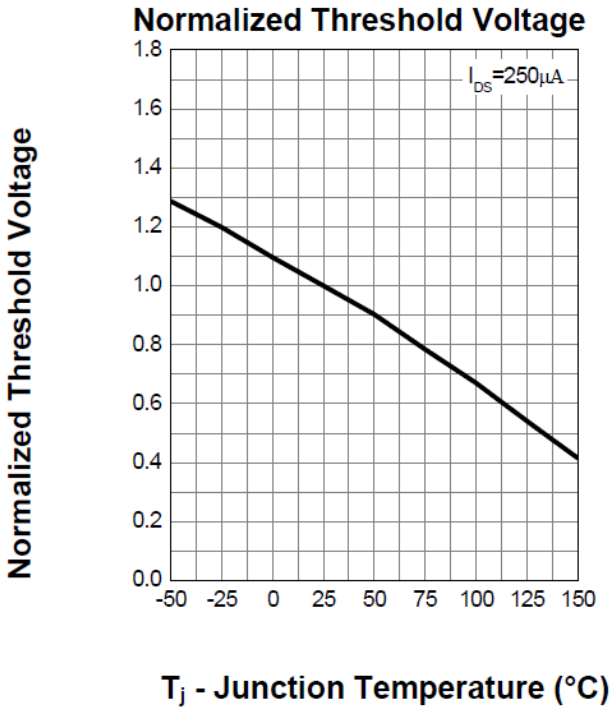

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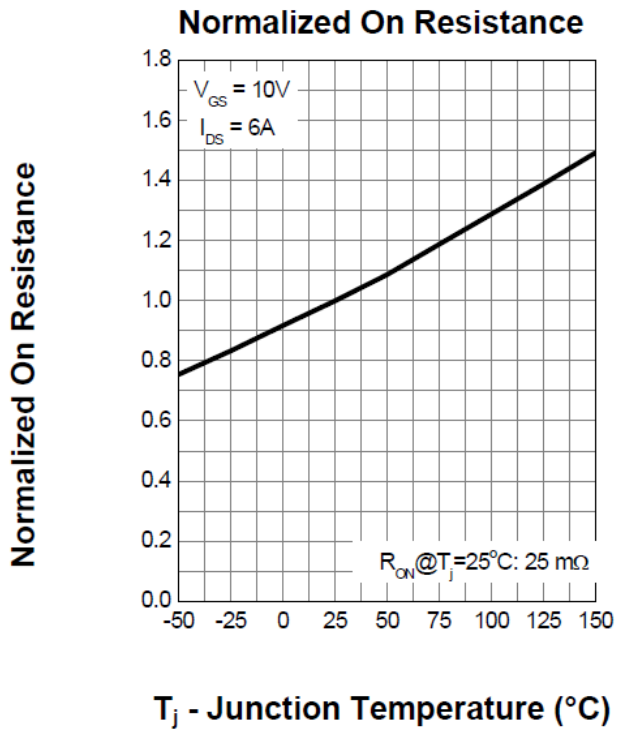
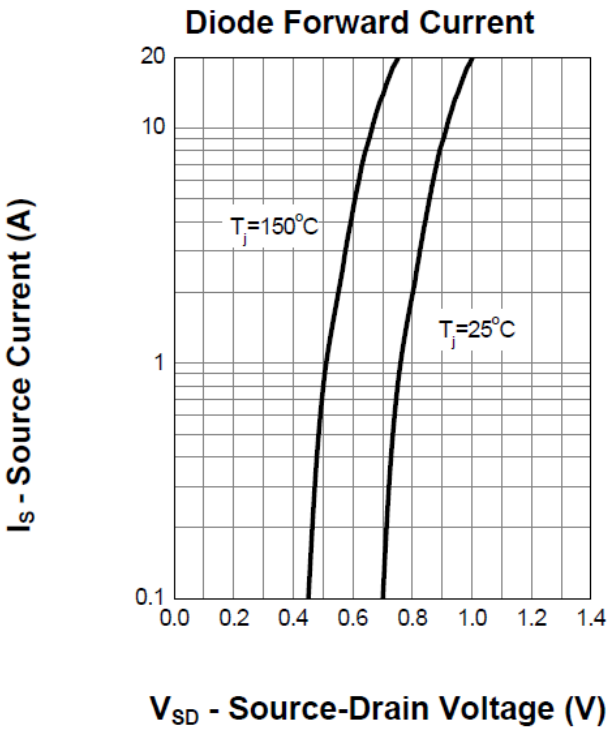
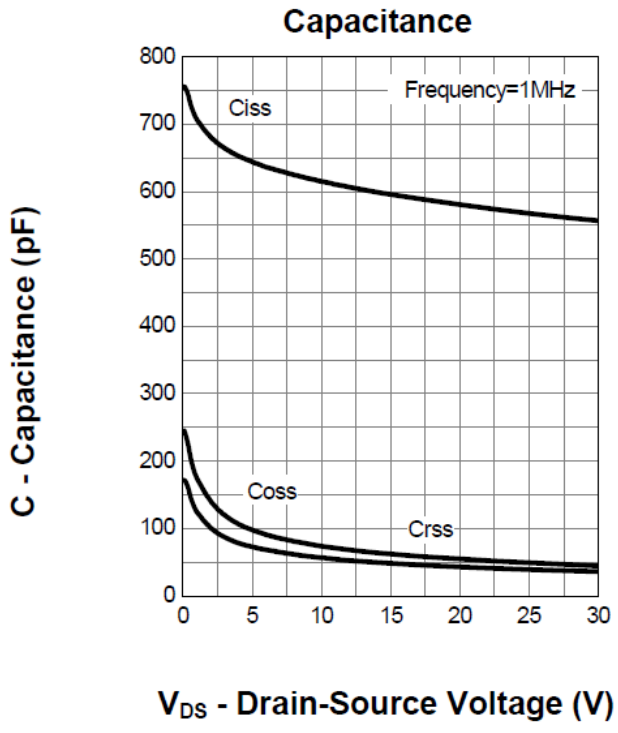
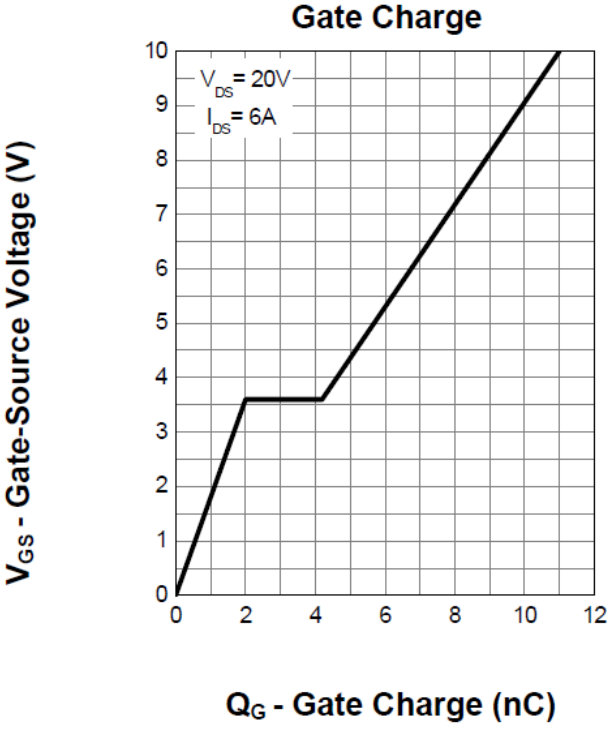


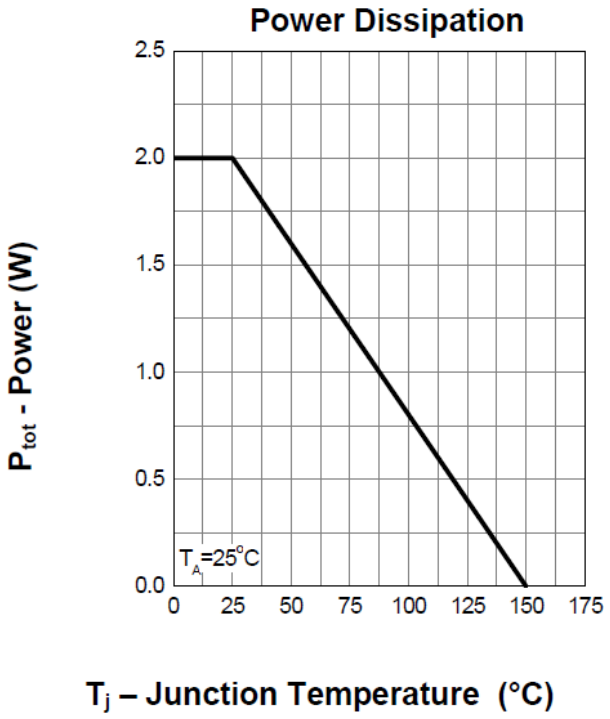


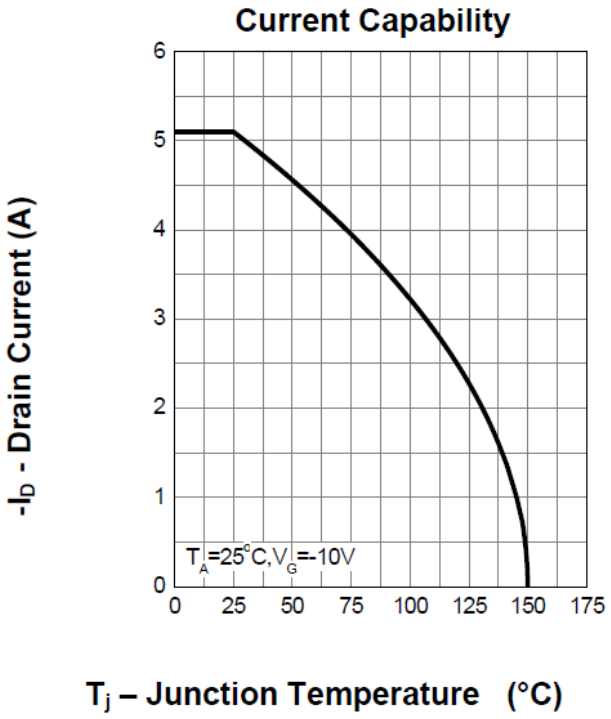


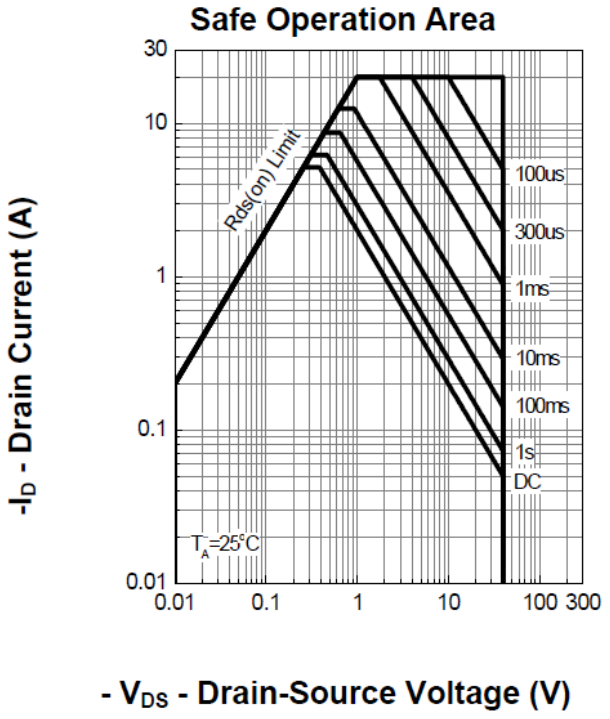


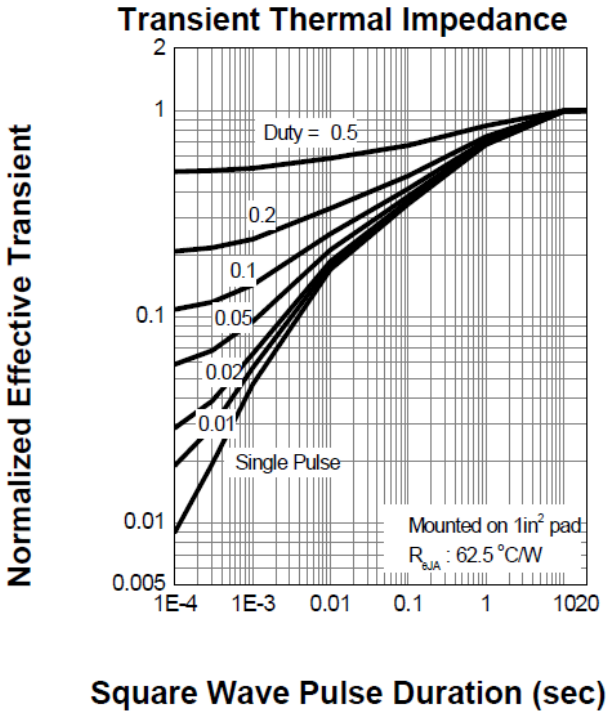
Typical Electrical and Thermal Characteristics

- **P-Channel (TJ = 25 °C, unless otherwise noted)**









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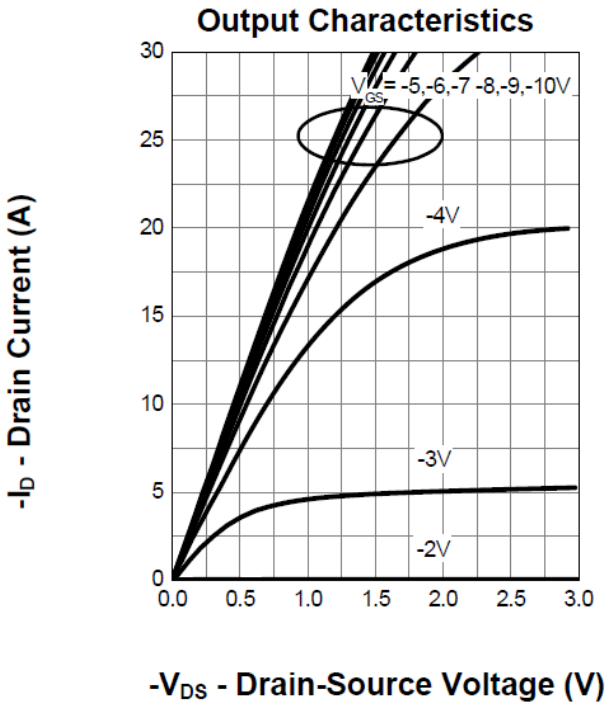

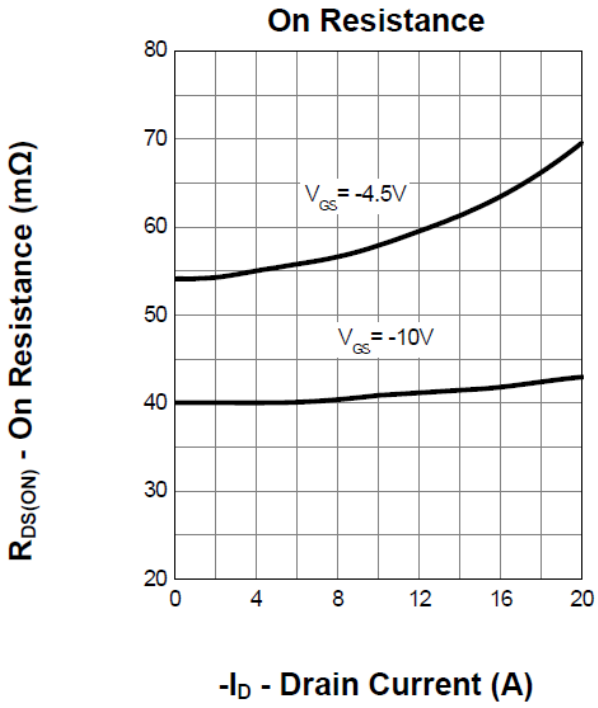

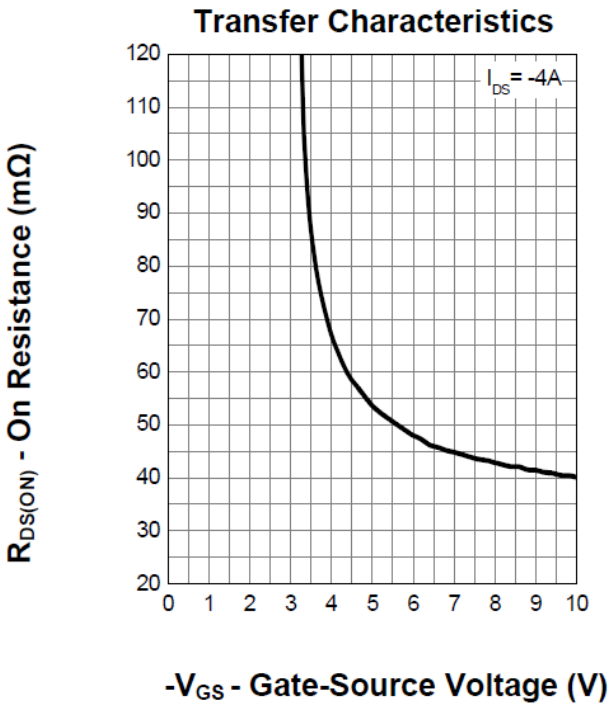

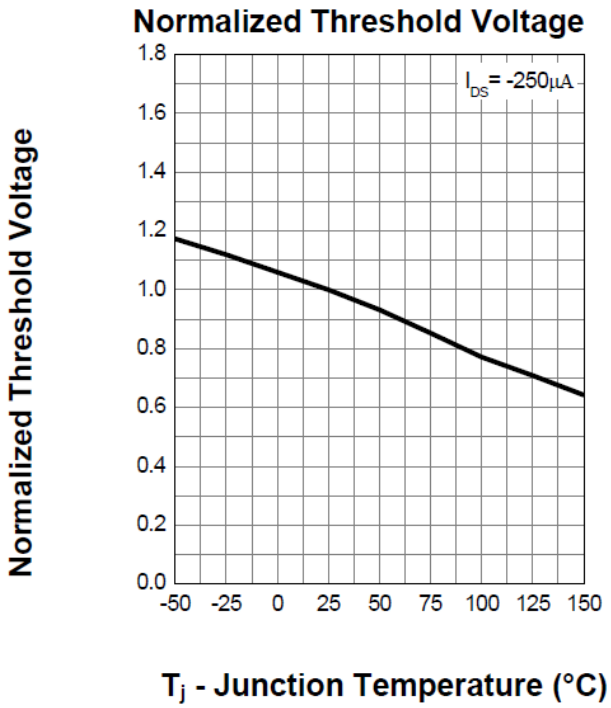

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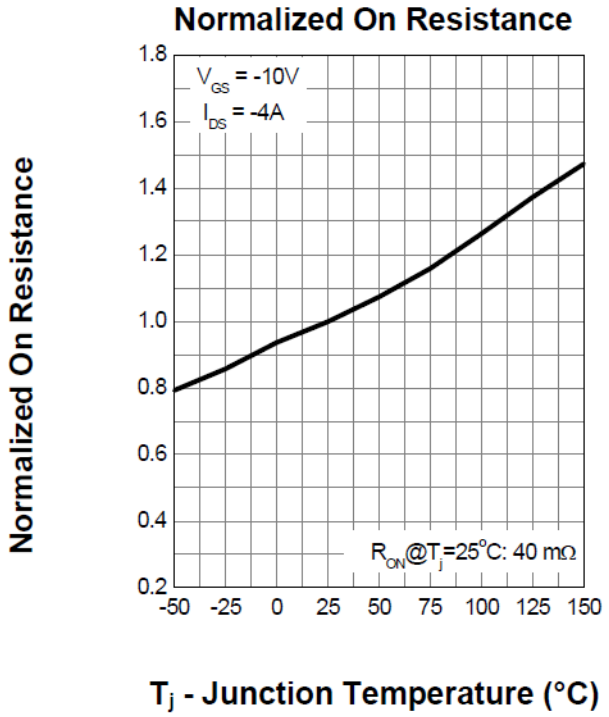
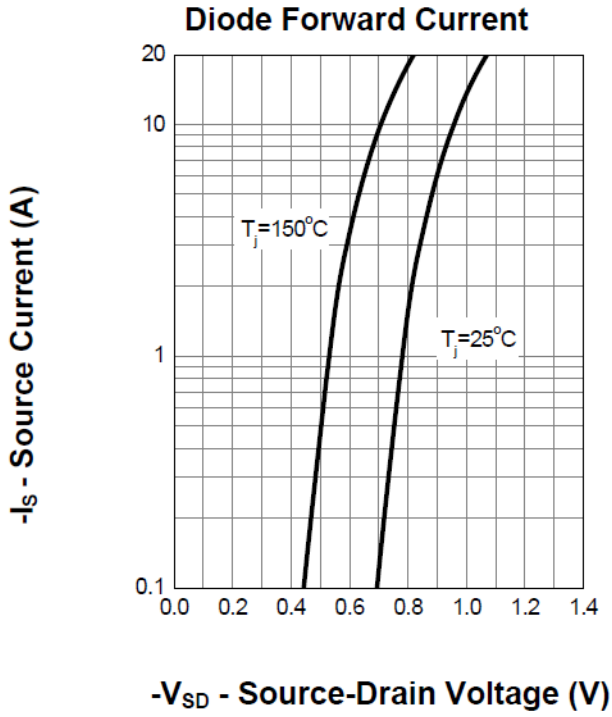
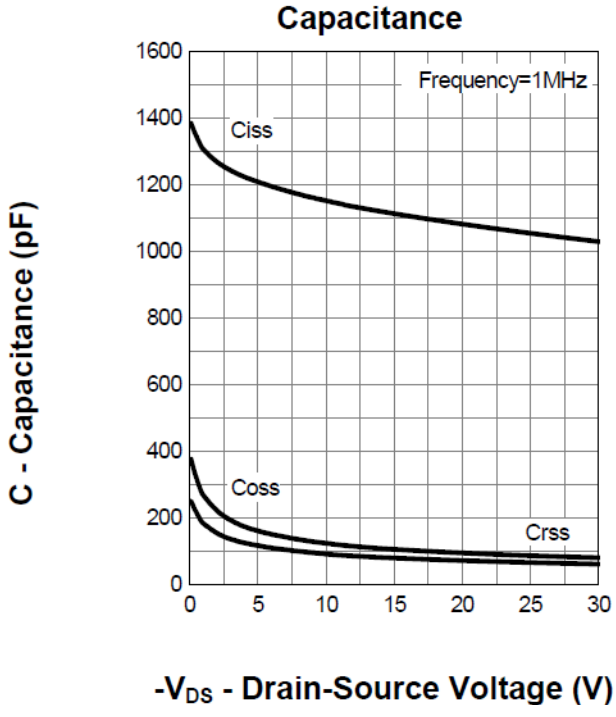
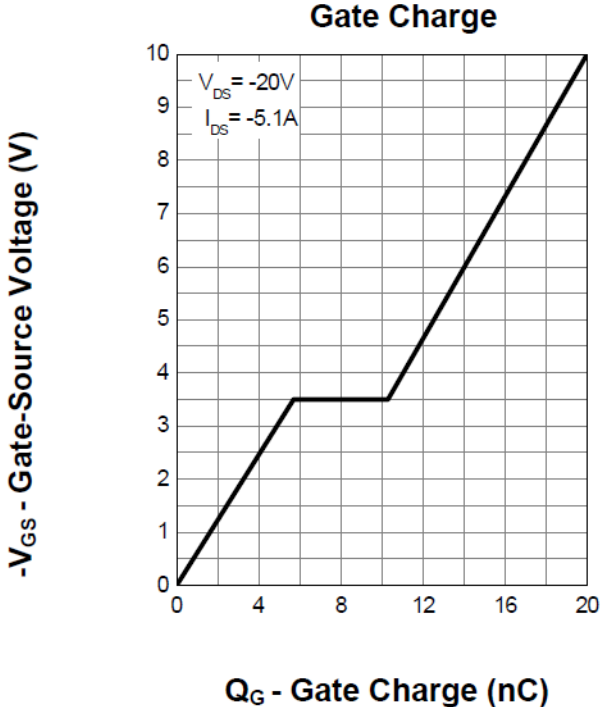
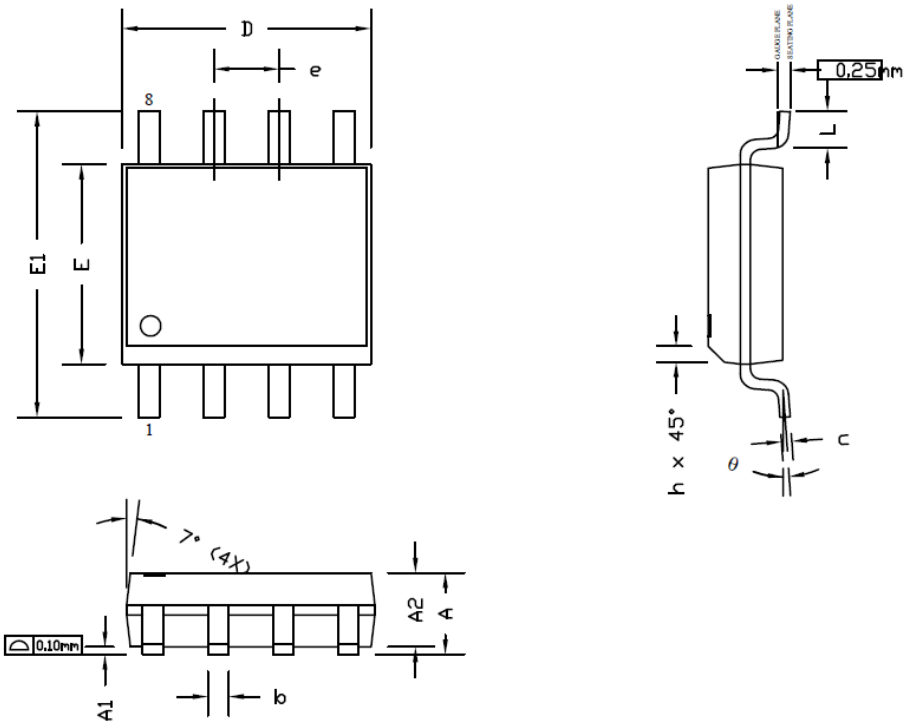




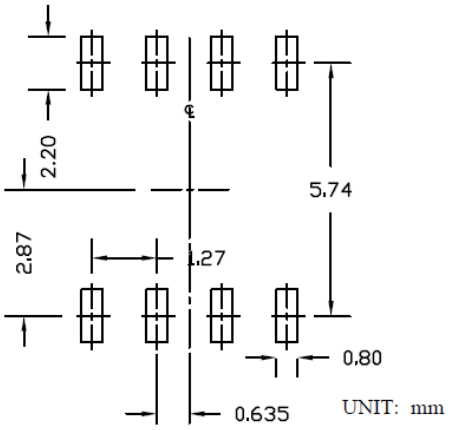




Package Information



RECOMMENDED LAND PATTERN



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	1.65	1.75	0.053	0.065	0.069
A1	0.10	0.15	0.25	0.004	0.006	0.010
A2	1.25	1.50	1.65	0.049	0.059	0.065
b	0.31	0.41	0.51	0.012	0.016	0.020
c	0.17	0.20	0.25	0.007	0.008	0.010
D	4.80	4.90	5.00	0.189	0.193	0.197
E	3.80	3.90	4.00	0.150	0.154	0.157
e	1.27 BSC			0.050 BSC		
E1	5.80	6.00	6.20	0.228	0.236	0.244
h	0.25	0.30	0.50	0.010	0.012	0.020
L	0.40	0.69	1.27	0.016	0.027	0.050
θ	0°	4°	8°	0°	4°	8°

NOTE
1. ALL DIMENSIONS ARE IN MILLMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
   MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH.
4. DIMENSION L IS MEASURED IN GAUGE PLANE.
5. CONTROLLING DIMENSION IS MILLIMETER.
   CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.