

Complementary MOSFET

2NP07

■ Features

● N-Channel

$V_{DS} = 30V$, $I_D = 5A$

$R_{DS(ON)} = 24m\Omega$ @ $V_{GS}=10V$

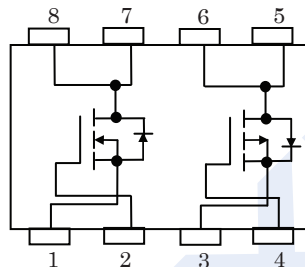
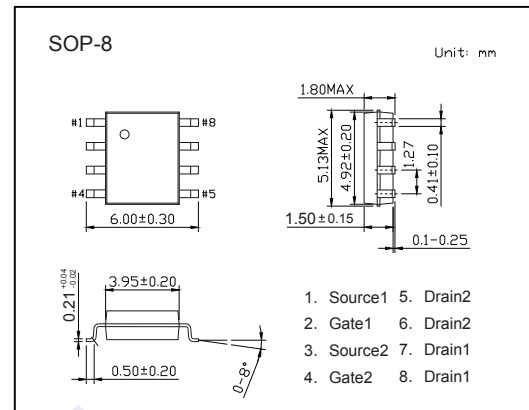
$R_{DS(ON)} = 35m\Omega$ @ $V_{GS}=4.5V$

● P-Channel

$V_{DS} = -30V$, $I_D = -5A$

$R_{DS(ON)} = 50m\Omega$ @ $V_{GS}=-10V$

$R_{DS(ON)} = 75m\Omega$ @ $V_{GS}=-4.5V$

■ Absolute Maximum Ratings ($T_A = 25^\circ C$ Unless otherwise specified)

Parameter	Symbol	N-CH	P-CH	Unit
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	
Continuous Drain Current (Note 1a)	I_D	5	-5	A
Pulsed Drain Current	I_{DM}	20	-20	
Power Dissipation for Dual Operation	P _D	2		W
Power Dissipation for Single Operation (Note 1a)		1.6		
(Note 1b)		1		
(Note 1c)		0.9		
Thermal Resistance, Junction- to-Ambient (Note 1a)	$R_{\theta JA}$	78		°C/W
Thermal Resistance, Junction- to-Case (Note 1)	$R_{\theta JC}$	40		
Junction Temperature	T_J	150		°C
Storage Temperature Range	T_{stg}	-55 to 150		

Notes:

- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.
 - 78°C/W when mounted on a 0.5 in² pad of 2 oz copper
 - 125°C/W when mounted on a 0.02 in² pad of 2 oz copper
 - 135°C/W when mounted on a minimum pad.

2NP07

■ Electrical Characteristics (TA = 25°C Unless otherwise specified)

Parameter	Symbol	Test Conditions	Type	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage	VDSS	ID=250μA, VGS=0V	N-CH	30			V
		ID=-250μA, VGS=0V	P-CH	-30			
Zero Gate Voltage Drain Current	IDSS	VDS=24V, VGS=0V	N-CH			1	μA
		VDS=-24V, VGS=0V	P-CH			-1	
Gate-Body Leakage Current	IGSS	VDS=0V, VGS=±20V	N-CH			±100	nA
		VDS=0V, VGS=±20V	P-CH			±100	
On Characteristics (Note 2)							
Gate Threshold Voltage	VGS(th)	VDS=VGS, ID=250μA	N-CH	1		3	V
		VDS=VGS, ID=-250μA	P-CH	-1		-3	
Static Drain-Source On-Resistance	RDS(on)	VGS=10V, ID=5A	N-CH		24	30	mΩ
		VGS=10V, ID=5A, TJ=125°C			32	42	
		VGS=4.5V, ID=4A			35	40	
		VGS=-10V, ID=-5A	P-CH		50	54	
		VGS=-10V, ID=-5A, TJ=125°C			58	78	
		VGS=-4.5V, ID=-4A			75	80	
Forward Transconductance	gFS	VDS=5V, ID=5A	N-CH		19		S
		VDS=-5V, ID=-5A	P-CH		11		
Dynamic Characteristics (Note 2, 3)							
Input Capacitance	Ciss	N-Channel: VGS=0V, VDS=10V, f=1MHz P-Channel: VGS=0V, VDS=-10V, f=1MHz	N-CH		789		pF
			P-CH		690		
Output Capacitance	Coss		N-CH		173		
			P-CH		306		
Reverse Transfer Capacitance	Crss		N-CH		66		
			P-CH		77		
Switching Characteristics (Note 2, 3)							
Total Gate Charge	Qg	N-Channel: VGS=10V, VDS=15V, ID=7A P-Channel: VGS=-10V, VDS=-15V, ID=-5A	N-CH		16	26	nC
			P-CH		14	23	
Gate Source Charge	Qgs		N-CH		2.5		
			P-CH		2.4		
Gate Drain Charge	Qgd		N-CH		2.6		
			P-CH		4.8		
Turn-On Delay Time	td(on)		N-CH		2.2		ns
			P-CH		6.7		
Turn-On Rise Time	tr		N-CH		7.5		
			P-CH		9.7		
Turn-Off Delay Time	td(off)		N-CH		11.8		
			P-CH		19.8		
Turn-Off Fall Time	tf	N-CH		3.7			
		P-CH		12.3			
Drain-Source Diode Characteristics							
Diode Forward Voltage	VSD	IS=1.3A, VGS=0V	N-CH			1.2	V
		IS=-1.3A, VGS=0V	P-CH			-1.2	

Notes 2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

3. Guaranteed by design, not subject to production

■ Marking

Marking	NP07 KC***
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2NP07

■ Typical Characteristics (N-CH)

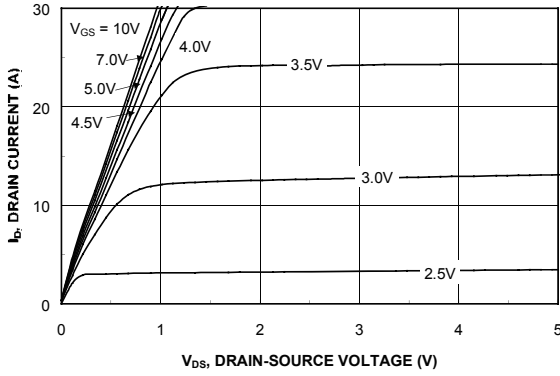


Figure 1. On-Region Characteristics.

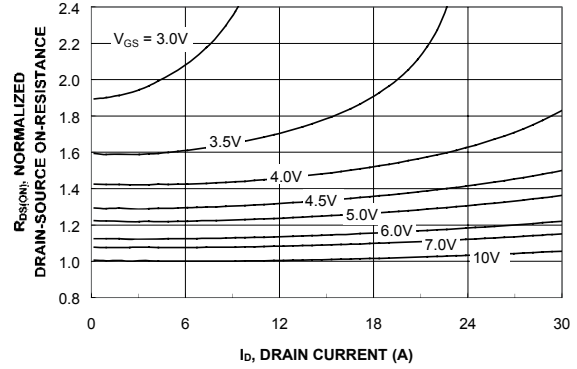


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

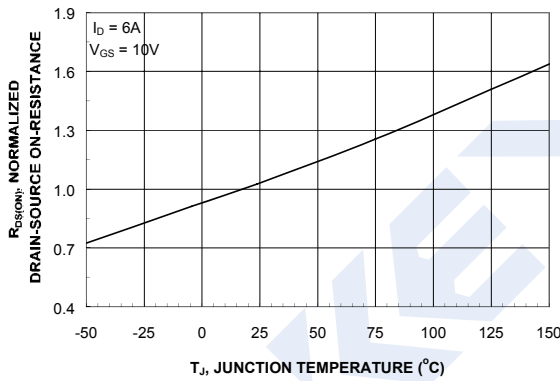


Figure 3. On-Resistance Variation with Temperature.

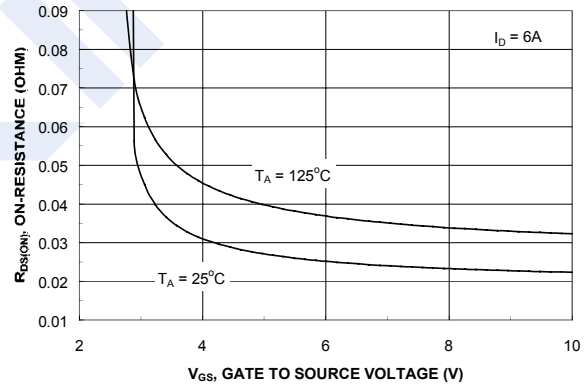


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

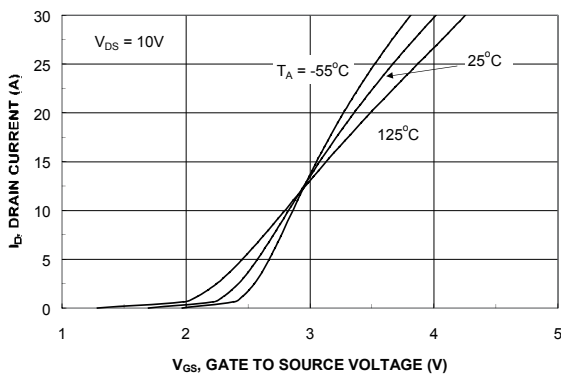


Figure 5. Transfer Characteristics.

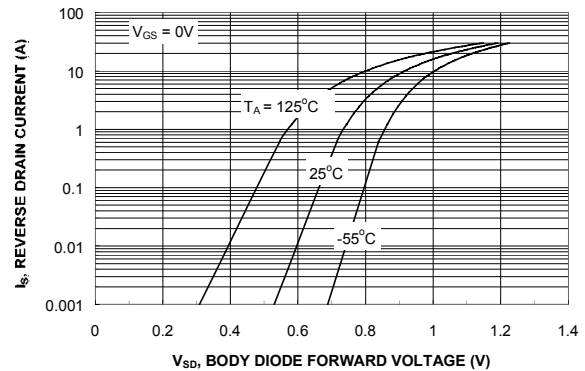


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

2NP07

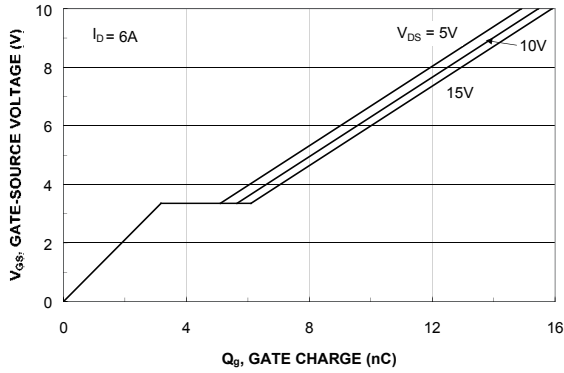


Figure 7. Gate Charge Characteristics.

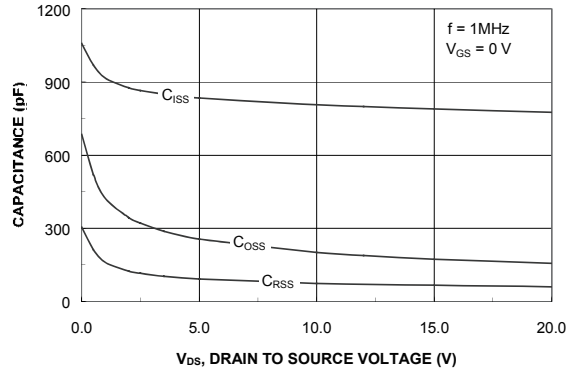


Figure 8. Capacitance Characteristics.

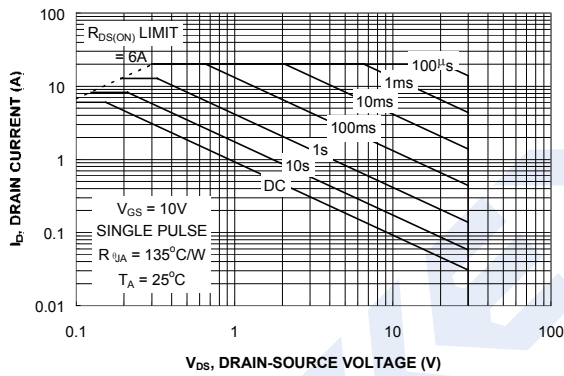


Figure 9. Maximum Safe Operating Area.

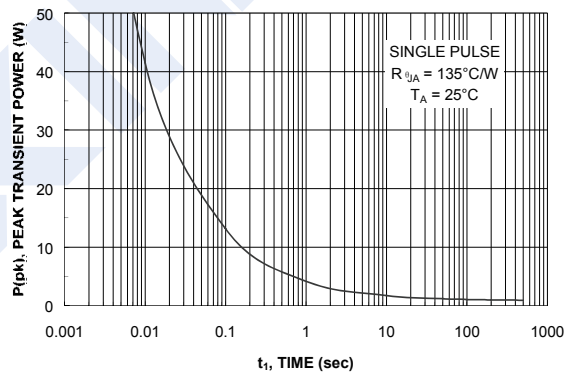


Figure 10. Single Pulse Maximum Power Dissipation.

2NP07

Typical Characteristics (P-CH)

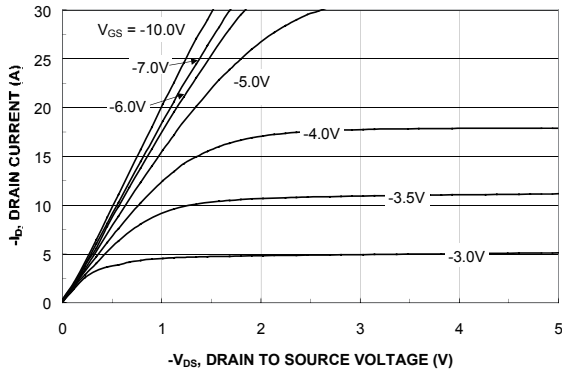


Figure 11. On-Region Characteristics.

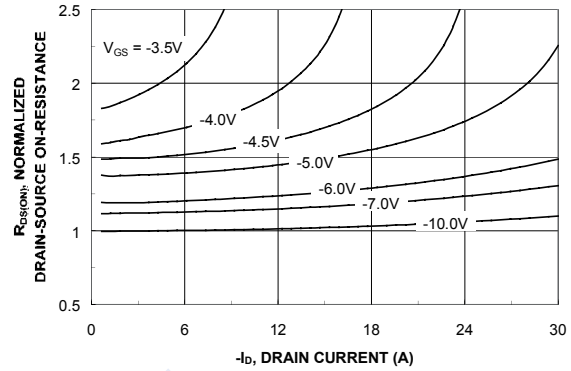


Figure 12. On-Resistance Variation with Drain Current and Gate Voltage.

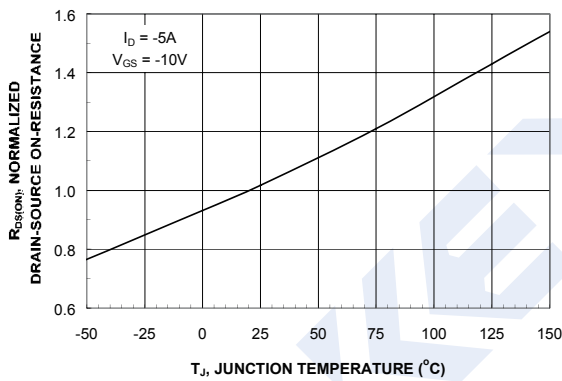


Figure 13. On-Resistance Variation with Temperature.

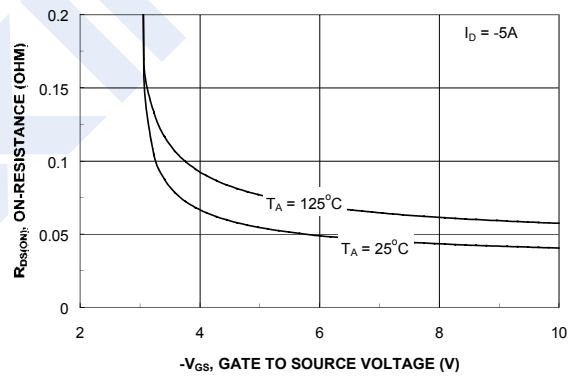


Figure 14. On-Resistance Variation with Gate-to-Source Voltage.

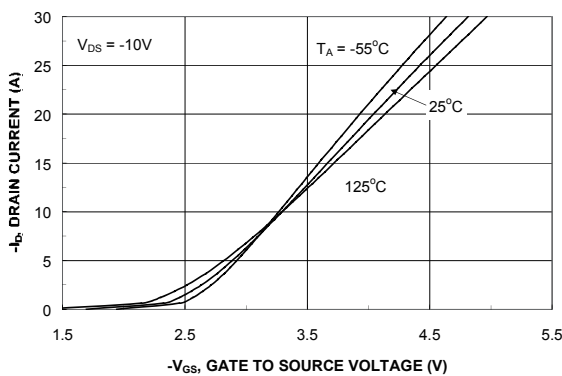


Figure 15. Transfer Characteristics.

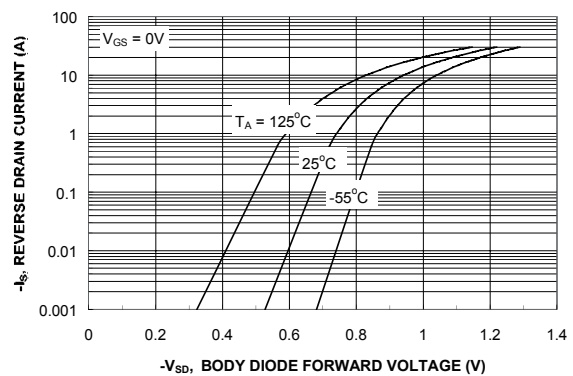


Figure 16. Body Diode Forward Voltage Variation with Source Current and Temperature.

2NP07

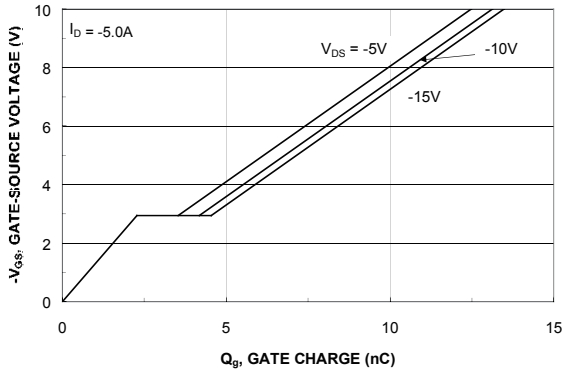


Figure 17. Gate Charge Characteristics.

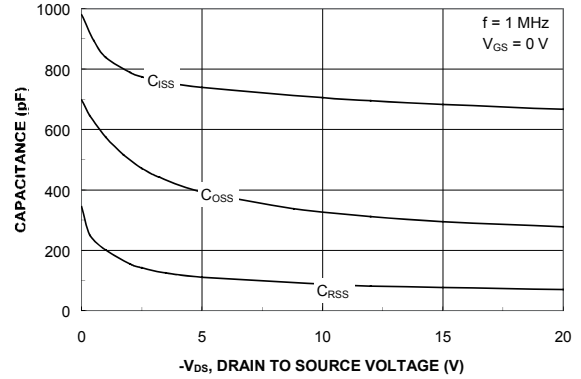


Figure 18. Capacitance Characteristics.

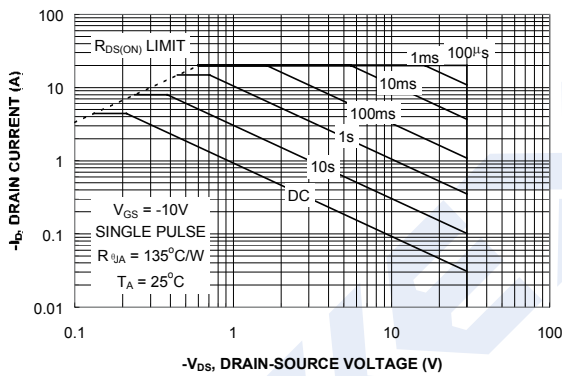


Figure 19. Maximum Safe Operating Area.

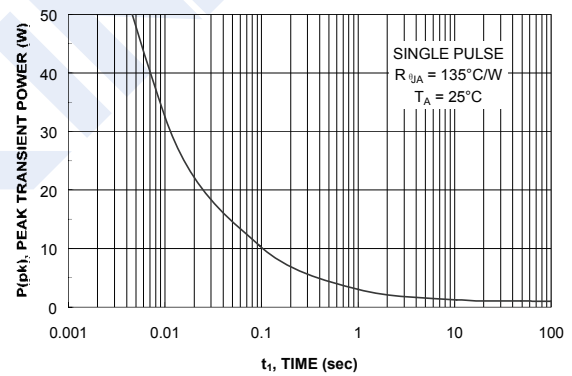


Figure 20. Single Pulse Maximum Power Dissipation.

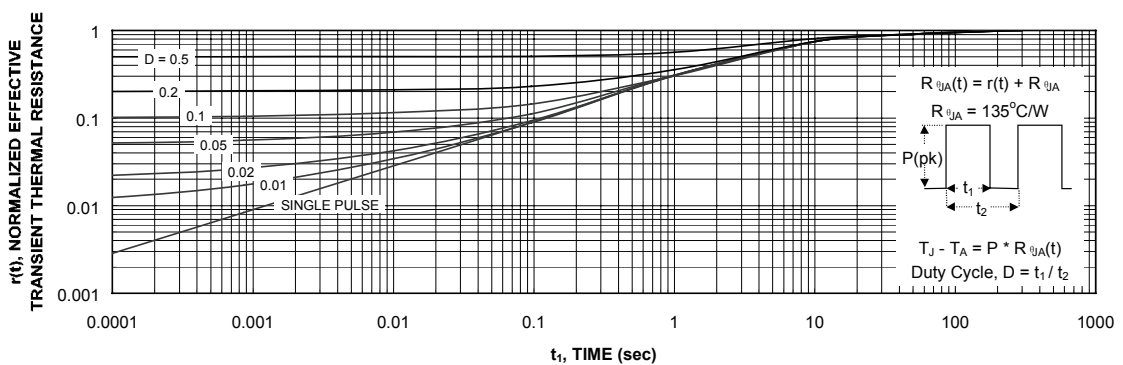


Figure 21. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1c.
Transient thermal response will change depending on the circuit board design.