

P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ Advanced trench cell design

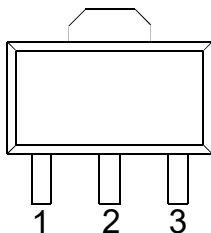
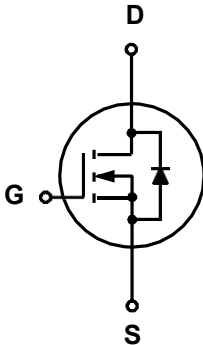
1.2 Applications

- ☒ LCD TV appliances
- ☒ High power inverter system
- ☒ LCDM appliances

1.3 Quick reference

- ☒ $BV \geq -60\text{ V}$
- ☒ $R_{DS(ON)} \leq 90\text{ m}\Omega @ V_{GS} = -10\text{ V}$
- ☒ $P_{tot} \leq 35\text{ W}$
- ☒ $R_{DS(ON)} \leq 110\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$
- ☒ $I_D \leq -5\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 <p>Top View SOT89</p>	
2	Drain(D)		
3	Source(S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-60	-	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D	Drain Current (DC)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	-5	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	-3	A
$I_{DM}^{*,***}$	Drain Current (Pulsed)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	-30	A
P_{tot}	Drain power dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	35	W
T_{stg}	Storage Temperature		-55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		-	150	$^{\circ}\text{C}$
I_S	Continuous-Source Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	-5	A
$R_{\theta JA}^{**}$	Thermal Resistance- Junction to Ambient		-	50	$^{\circ}\text{C/W}$
$R_{\theta JC}^{**}$	Thermal Resistance- Junction to Case		-	3.5	

Notes:

* Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

** Mounted on Large Heat Sink

*** limited by bonding wire

4. Marking Information

Product Name	Marking
SN06P05Q	<div>SN06N05Q</div> <div>YWWXXX</div> <div>YWW: Date Code</div>

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
SN06P05Q	SOT89			1000	

Note: NHCX defines “ Green ” as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

6. Electrical Characteristics ($T_A=25^\circ$ Unless Otherwise Noted)

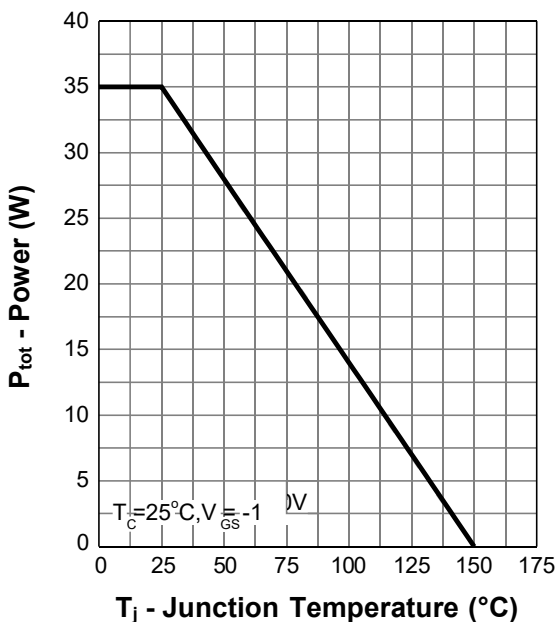
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = 250 μA	-60	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	-1.5	-	-2.5	V
I _{DSS}	Drain Leakage Current	V _{DS} = -48 V, V _{GS} = 0 V	-	-	-1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = 0 V, V _{GS} = ± 20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = -10 V, I _{DS} = - 3 A	-	80	90	mΩ
		V _{GS} = -4.5 V, I _{DS} = -2 A	-	100	110	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = -3 A, V _{GS} = 0 V	-	-	-1.3	V
t _{rr}	Reverse Recovery Time	I _{DS} = -3 A, V _{GS} = 0 V dI _{SD} /dt = 100 A/μs	-	2.5	-	nS
Q _{rr}	Reverse Recovery Charge		-	0.6	-	μC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = -25 V Frequency = 1 MHz	-	918	-	pF
C _{oss}	Output Capacitance		-	66	-	
C _{rss}	Reverse Transfer Capacitance		-	51	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = -30 V, V _{GEN} = -10 V, R _G = 3.3 Ω, R _L = 10 Ω, I _{DS} = -3 A	-	2.8	-	nS
t _r	Turn-on Rise Time		-	13	-	
t _{d(off)}	Turn-off Delay Time		-	12	-	
t _f	Turn-off Fall Time		-	5	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = -30 V, V _{GS} = -10 V, I _{DS} = -3 A	-	5.7	-	nC
Q _{gs}	Gate-Source Charge		-	2.3	-	
Q _{gd}	Gate-Drain Charge		-	1.7	-	

Notes:

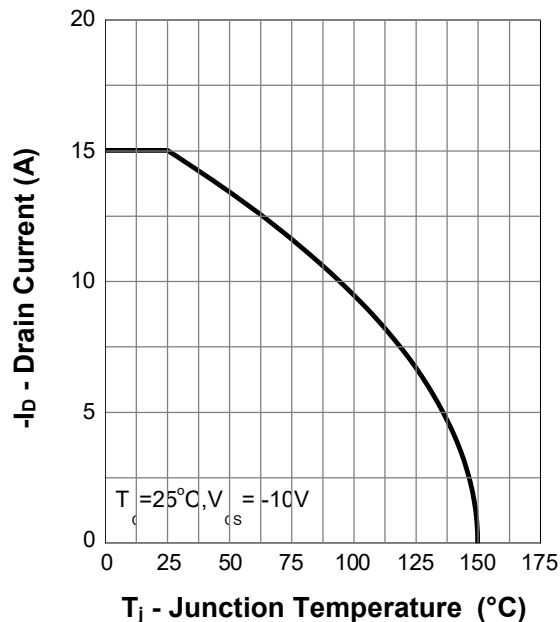
- a : Pulse test ; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

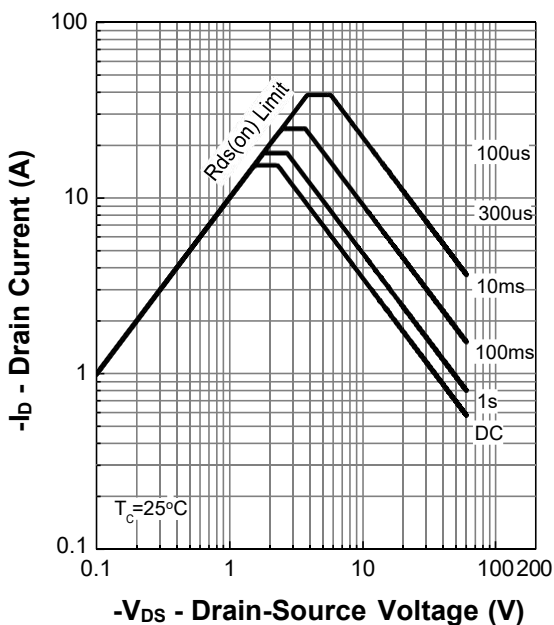
Power Capability



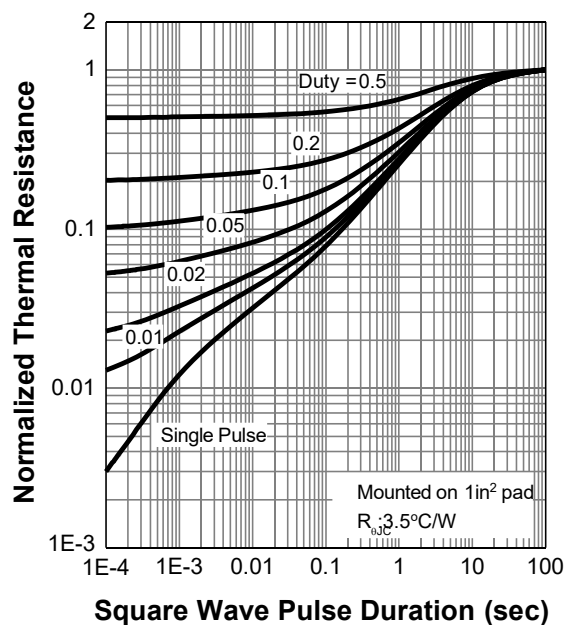
Current Capability



Safe Operation Area

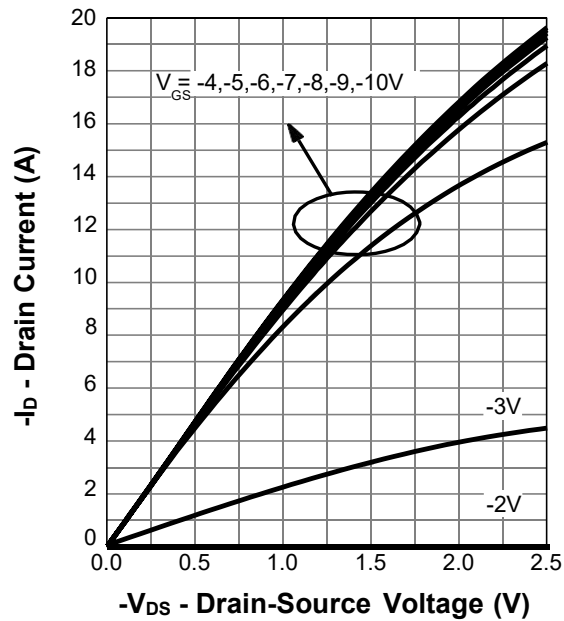


Transient Thermal Impedance

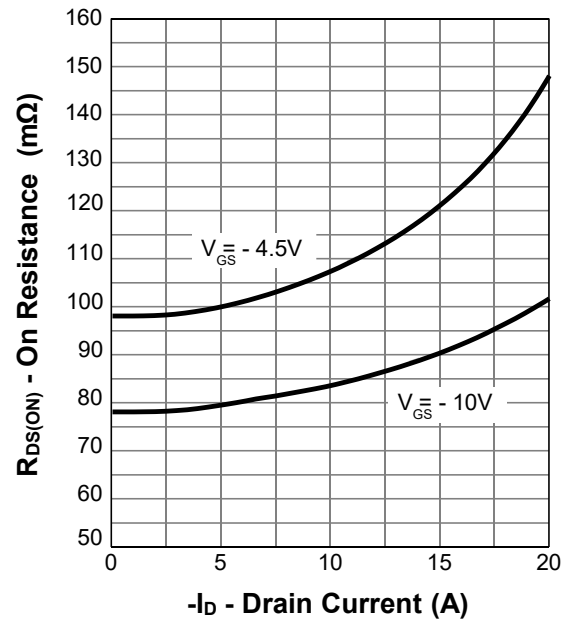


8. Typical Characteristics (Cont.)

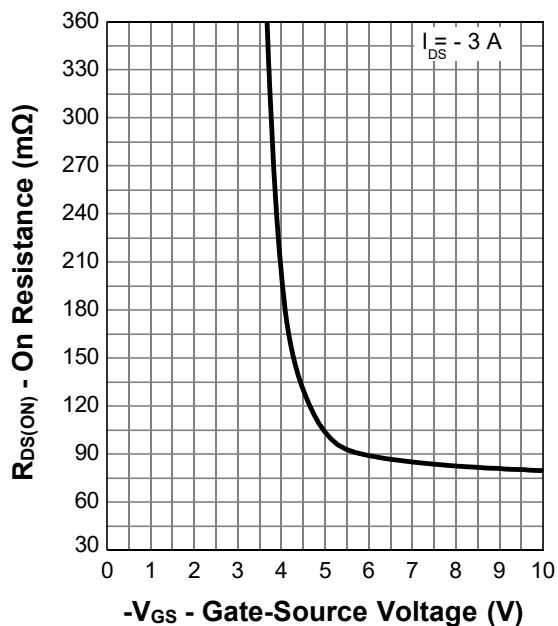
Output Characteristics



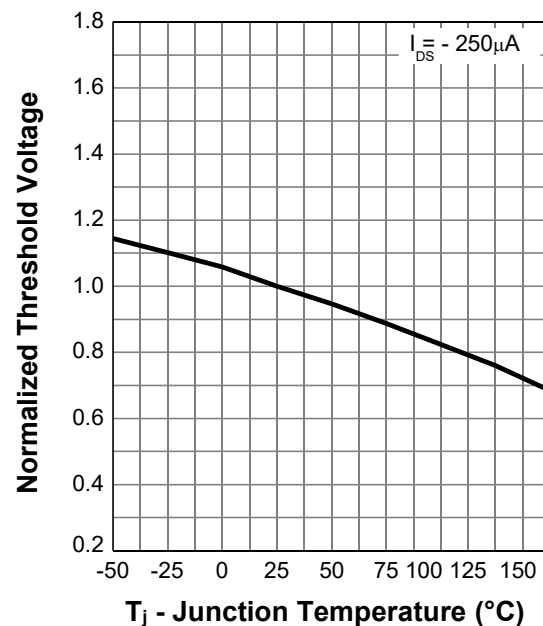
Drain-Source On Resistance



Transfer Characteristics

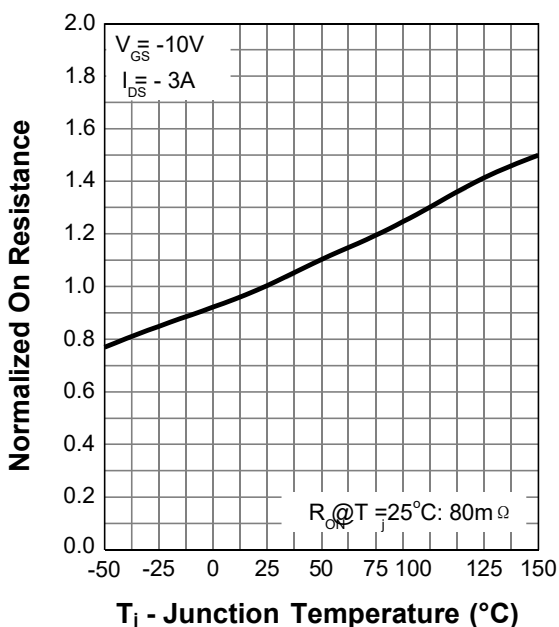


Normalized Threshold Voltage

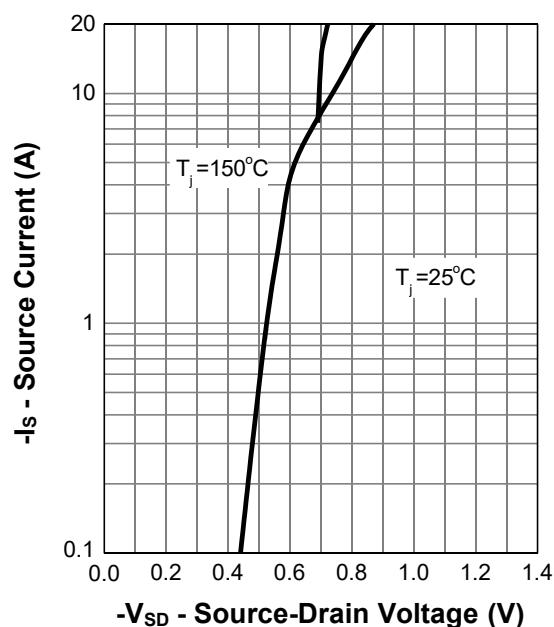


7. Typical Characteristics (cont.)

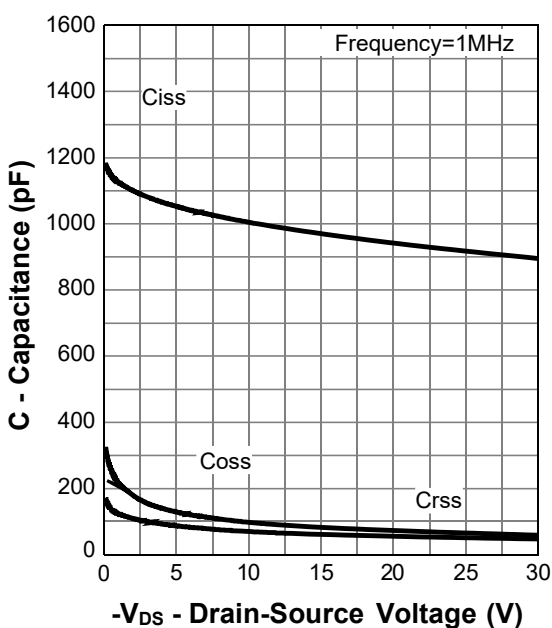
Normalized On Resistance



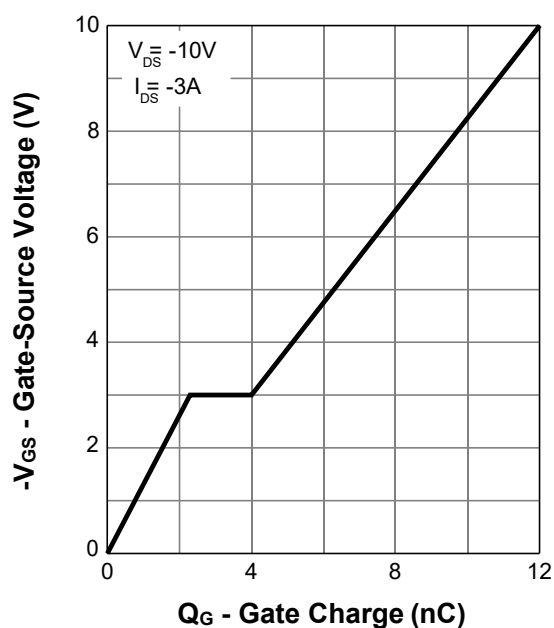
Diode Forward Current



Capacitance

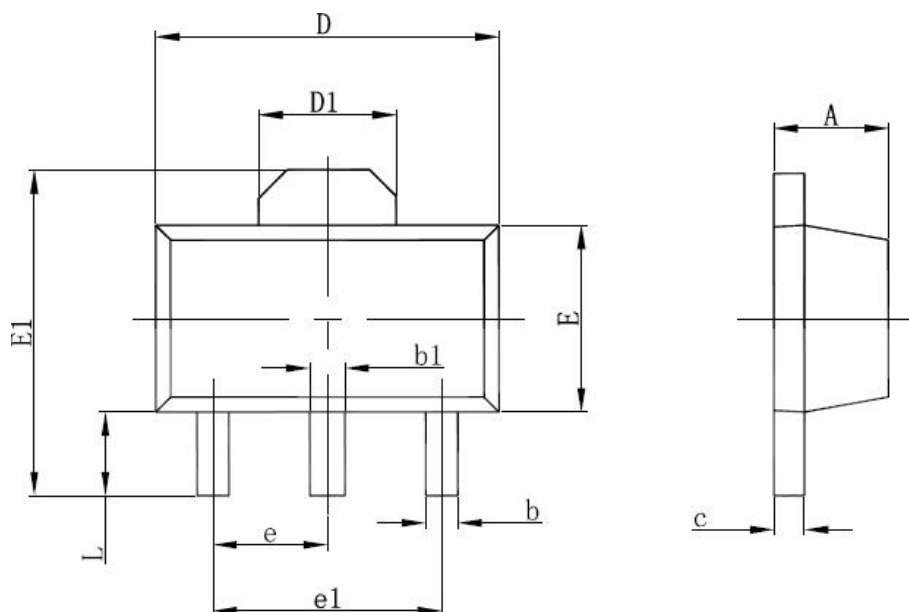


Gate Charge



8.Package Dimensions

SOT89-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047