

ICE60N600D

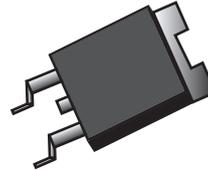
N-Channel Enhancement Mode MOSFET

Features:

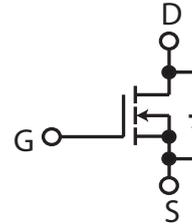
- Low $r_{DS(on)}$
- Ultra Low Gate Charge
- High dv/dt Capability
- High Unclamped Inductive Switching (UIS) Capability
- High Peak Current Capability
- Increased Transconductance Performance
- Optimized Design For High Performance Power Systems

Product Summary			
I_D	$T_A = 25^\circ\text{C}$	7A	Max
$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$	600V	Min
$r_{DS(ON)}$	$V_{GS} = 10\text{V}$	0.52Ω	Typ
Q_g	$V_{DS} = 480\text{V}$	21nC	Typ

Pin Description:



TO-252



Maximum Ratings @ $T_j = 25^\circ\text{C}$, Unless Otherwise Specified

Symbol	Parameter	Value	Unit	Conditions
I_D	Continuous Drain Current	7	A	$T_C = 25^\circ\text{C}$
$I_{D, \text{pulse}}$	Pulsed Drain Current	21	A	$T_C = 25^\circ\text{C}$
E_{AS}	Avalanche Energy, Single Pulse	170	mJ	$I_D = 3.5\text{A}$
I_{AR}	Avalanche Current, Repetitive	3.5	A	Limited by $T_{j,max}$
dv/dt	MOSFET dv/dt Ruggedness	50	V/ns	$V_{DS} = 480\text{V}, I_D = 7\text{A}, T_j = 125^\circ\text{C}$
V_{GS}	Gate Source Voltage	±20	V	Static
		±30		AC (f>Hz)
P_{tot}	Power Dissipation	65	W	$T_C = 25^\circ\text{C}$
T_j, T_{stg}	Operating and Storage Temperature	-55 to +150	°C	
	Mounting Torque	60	Ncm	M 3 & 3.5 screws

Symbol	Parameter	Values			Unit	Conditions
		Min	Typ	Max		

Thermal Characteristics						
R_{thJC}	Thermal Resistance, Junction to Case	-	-	1.9	°C/W	Leaded
R_{thJA}	Thermal Resistance, Junction to Ambient	-	-	68		
T_{sold}	Soldering Temperature, Wave Soldering Only Allowed At Leads	-	-	260	°C	1.6mm (0.063in.) from Case for 10s

Electrical Characteristics @ $T_j = 25^\circ\text{C}$, Unless Otherwise Specified

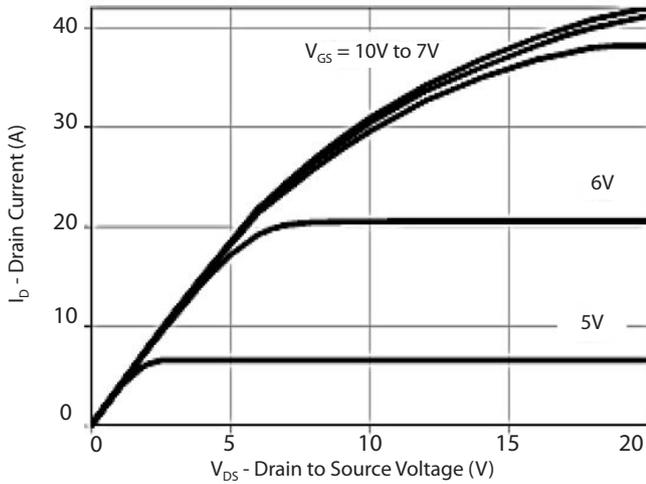
Static Characteristics						
$V_{(BR)DSS}$	Drain to Source Breakdown Voltage	600	-	-	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	2.1	3	3.9		$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
I_{DSS}	Zero Gate Voltage Drain Current	-	0.1	1	μA	$V_{DS} = 600\text{V}, V_{GS} = 0\text{V}, T_j = 25^\circ\text{C}$
		-	-	100		$V_{DS} = 600\text{V}, V_{GS} = 0\text{V}, T_j = 150^\circ\text{C}$
I_{GSS}	Gate Source Leakage Current	-	-	100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
$R_{DS(on)}$	Drain to Source On-State Resistance	-	0.52	0.60	Ω	$V_{GS} = 10\text{V}, I_D = 3.5\text{A}, T_j = 25^\circ\text{C}$
		-	1.3	-		$V_{GS} = 10\text{V}, I_D = 3.5\text{A}, T_j = 150^\circ\text{C}$
R_{GS}	Gate Resistance	-	6	-	Ω	f = 1 MHz, open drain

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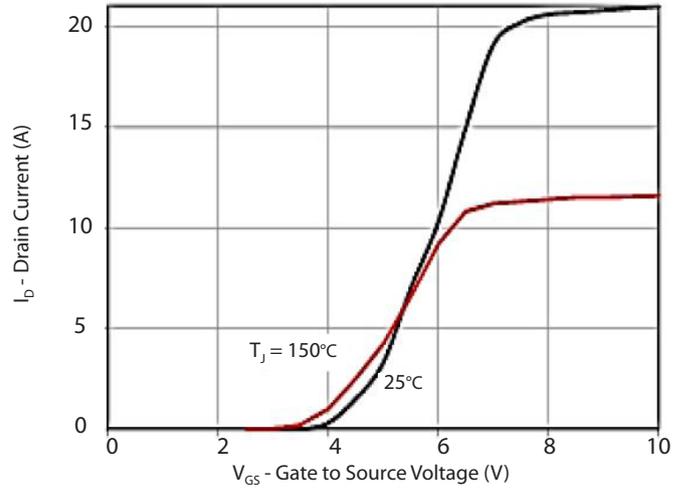
Symbol	Parameter	Values			Unit	Conditions
		Min	Typ	Max		
Dynamic Characteristics						
C_{iss}	Input Capacitance	-	635	-	pF	$V_{GS} = 0V, V_{DS} = 25V, f = 1\text{ MHz}$
C_{oss}	Output Capacitance	-	365	-		
C_{rss}	Reverse Transfer Capacitance	-	6	-		
g_{fs}	Transconductance	-	7	-	S	$V_{DS} > 2 \cdot I_D \cdot R_{DS}, I_D = 3.5A$
$t_{d(on)}$	Turn-on Delay Time	-	6	-	nS	$V_{DS} = 380V, V_{GS} = 10V, I_D = 7A, R_G = 4\Omega$ (External)
T_r	Rise Time	-	3.5	-		
$t_{d(off)}$	Turn-off Delay Time	-	54	-		
t_f	Fall Time	-	7	-		
Gate Charge Characteristics						
Q_{gs}	Gate to Source Charge	-	4.6	-	nC	$V_{DS} = 480V, I_D = 7A, V_{GS} = 0\text{ to }10V$
Q_{gd}	Gate to Drain Charge	-	6.4	-		
Q_g	Gate Charge Total	-	21	-		
$V_{plateau}$	Gate Plateau Voltage	-	5.5	-	V	
Reverse Diode						
V_{SD}	Diode Forward Voltage	-	0.9	1.2	V	$V_{GS} = 0V, I_S = I_F$
t_{rr}	Reverse Recovery Time	-	277	-	ns	$V_{RR} = 480V, I_S = I_F, d_{IF}/d_t = 100\text{ A}/\mu\text{S}$
Q_{rr}	Reverse Recovery Charge	-	2.6	-	μC	
I_{rm}	Peak Reverse Recovery Current	-	20	-	A	

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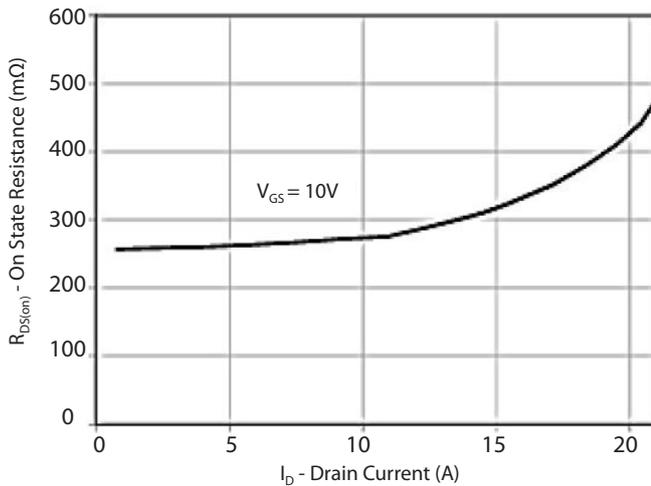
Output Characteristics



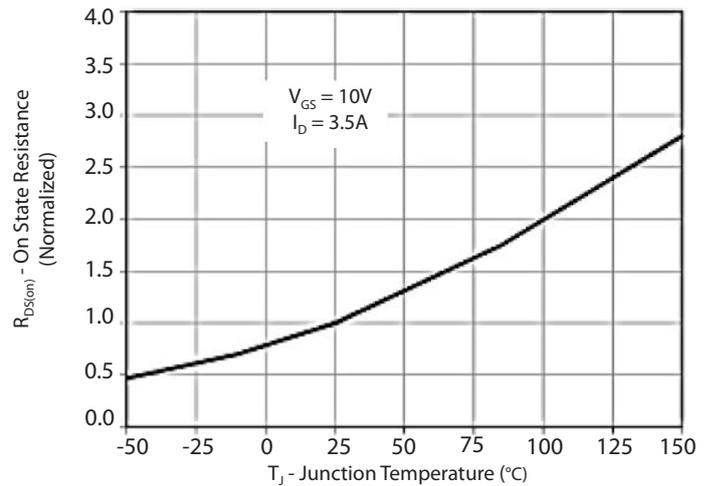
Transfer Characteristics



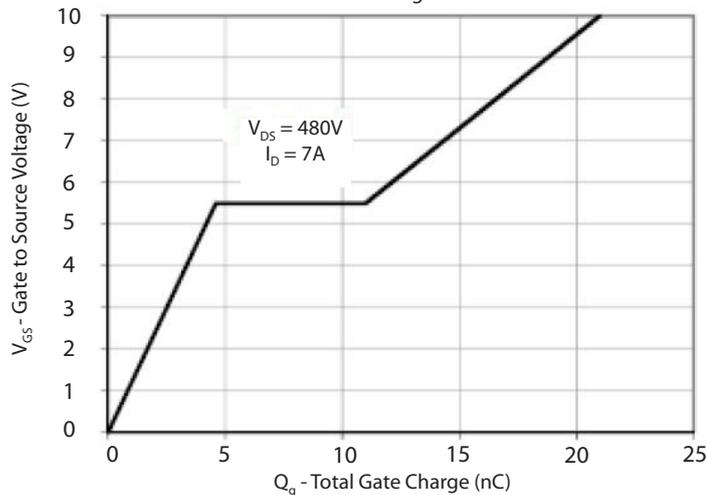
On State Resistance vs Drain Current



On Resistance vs Junction Temperature

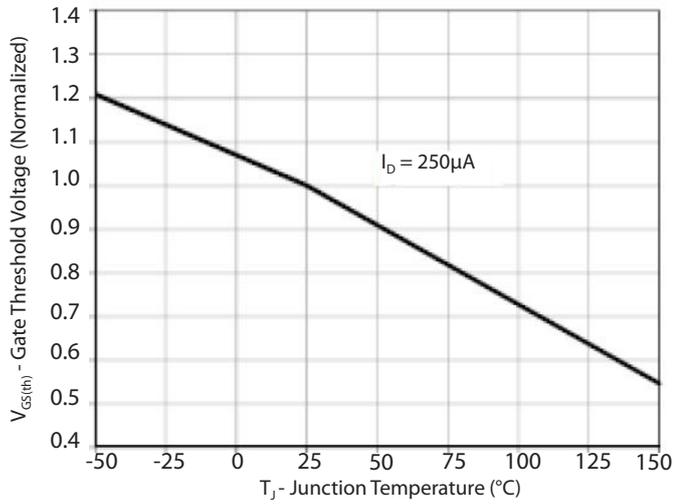


Gate Charge

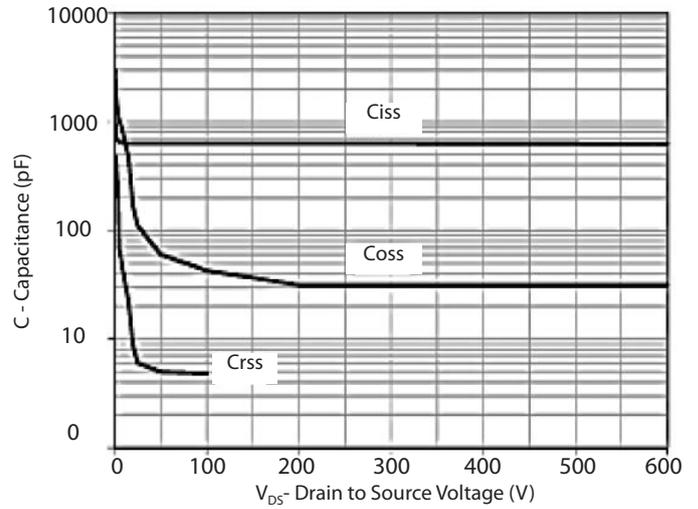


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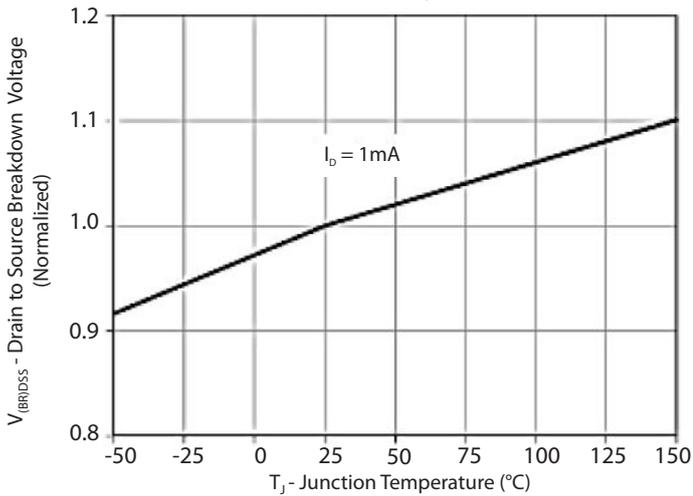
Gate Threshold Voltage vs. Junction Temperature



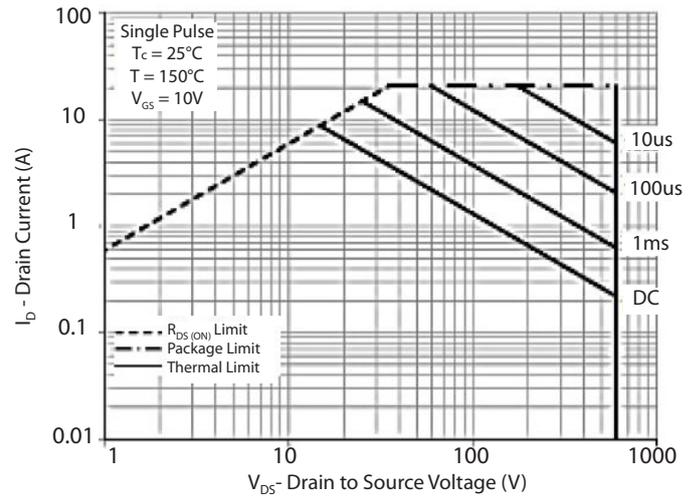
Capacitance



Drain to Source Breakdown Voltage vs. Junction Temperature



Maximum Rate Forward Biased Safe Operating Area



Transient Thermal Response - Junction to Case

