ICE60N130

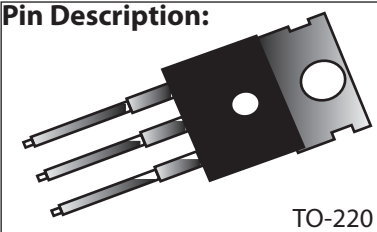
N-Channel Enhancement Mode MOSFET

Product Summary			
I_D	T_A = 25°C	23A	Max
$V_{(BR)DSS}$	I_D = 250uA	650V	Min
$r_{DS(ON)}$	V_{GS} = 10V	0.13Ω	Typ
Q_g	V_{DS} = 480V	82nC	Typ

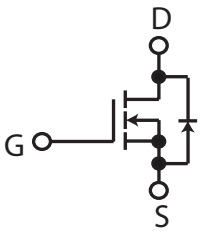
Features:

- 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

Pin Description:



TO-220



Maximum Ratings @ Tj = 25°C, Unless Otherwise Specified

Symbol	Parameter	Value	Unit	Conditions
I_D	Continous Drain Current	23	A	T_C = 25°C
I_D, pulse	Pulsed Drain Current	82	A	T_C = 25°C
E_{AS}	Avalanche Energy, Single Pulse	690	mJ	I_D = 11.5A
I_{AR}	Avalanche Current, Repetitive	11.5	A	Limited by $T_j$max
dv/dt	MOSFET dv/dt Ruggedness	50	V/ns	V_{DS} = 480V, I_D = 23A, T_j = 125°C
V_{GS}	Gate Source Voltage	±20	V	Static
		±30		AC (f>Hz)
P_{tot}	Power Dissipation	208	W	T_C = 25°C
T_j, T_{stg}	Operating and Storage Temperature	-55 to +150	°C	
	Mounting Torque	60	Ncm	M 2.5 screws

Symbol	Parameter	Values			Unit	Conditions
		Min	Typ	Max		
Thermal Characteristics						
R_{thJC}	Thermal Resistance, Junction to Case	-	-	0.6	°C/W	
R_{thJA}	Thermal Resistance, Junction to Ambient	-	-	62		Leaded
T_{sold}	Soldering Temperature, Wave Soldering Only Allowed At Leads	-	-	260	°C	1.6mm (0.063in.) from Case for 10s

Electrical Characteristics @ Tj = 25°C, Unless Otherwise Specified

Static Characteristics						
$V_{(BR)DSS}$	Drain to Source Breakdown Voltage	600	650	-	V	V_{GS} = 0V, I_D = 250µA
$V_{GS(th)}$	Gate Threshold Voltage	2.1	3	3.9		V_{DS} = V_{GS}, I_D = 250µA
I_{DSS}	Zero Gate Voltage Drain Current	-	0.1	1	µA	V_{DS} = 600V, V_{GS} = 0V, T_j = 25°C
		-	-	100		V_{DS} = 600V, V_{GS} = 0V, T_j = 150°C
I_{GSS}	Gate Source Leakage Current	-	-	100	nA	V_{GS} = ±20v, V_{DS} = 0V
$R_{DS(on)}$	Drain to Source On-State Resistance	-	0.13	0.15	Ω	V_{GS} = 10V, I_D = 11.5A, T_j = 25°C
		-	0.4	-		V_{GS} = 10V, I_D = 11.5A, T_j = 150°C
R_{GS}	Gate Resistance	-	4	-	Ω	f = 1 MHz, open drain

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Symbol	Parameter	Values			Unit	Conditions
		Min	Typ	Max		
Dynamic Characteristics						
C_{iss}	Input Capacitance	-	2650	-	pF	V_{GS} = 0V, V_{DS} = 25V, f = 1 MHz
C_{oss}	Output Capacitance	-	943	-		
C_{rss}	Reverse Transfer Capacitance	-	8	-		
C_{oss}	Output Capacitance	-	80	-		V_{GS} = 0V, V_{DS} = 100V, f = 1 MHz
g_{fs}	Transconductance	-	23	-	S	V_{DS} = >2*I_D* R_{DS}, I_D = 11.5A
$t_{d(on)}$	Turn-on Delay Time	-	10	-	nS	V_{DS} = 380V, V_{GS} = 10V, I_D = 23A, R_G = 4Ω (External)
T_r	Rise Time	-	5	-		
$t_{d(off)}$	Turn-off Delay Time	-	67	-		
t_f	Fall Time	-	4.5	-		
Gate Charge Characteristics						
Q_{gs}	Gate to Source Charge	-	16	-	nC	V_{DS} = 480V, I_D = 23A, V_{GS} = 0 to 10V
Q_{gd}	Gate to Drain Charge	-	30	-		
Q_g	Gate Charge Total	-	82	-		
$V_{plateau}$	Gate Plateau Voltage	-	5.5	-	V	
Reverse Diode						
V_{SD}	Diode Forward Voltage	-	1.0	1.2	V	V_{GS} = 0V, I_S = I_F
t_{rr}	Reverse Recovery Time	-	423	-	ns	V_{RR} = 480V, I_S = I_F, d_{iF}/d_t = 100 A/µS
Q_{rr}	Reverse Recovery Charge	-	8	-	µC	
I_{rm}	Peak Reverse Recovery Current	-	34	-	A	

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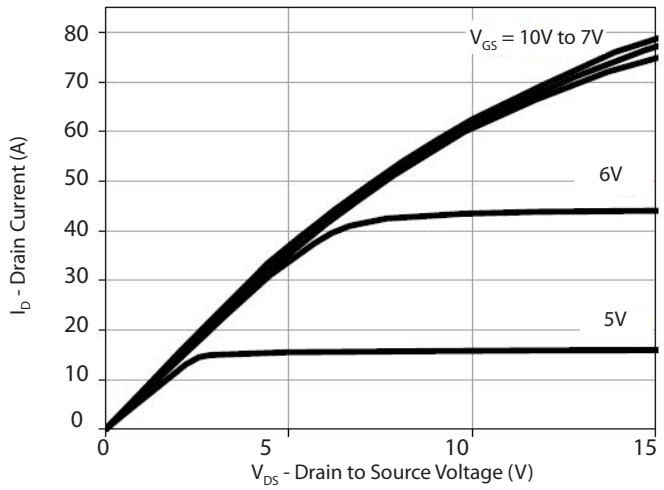
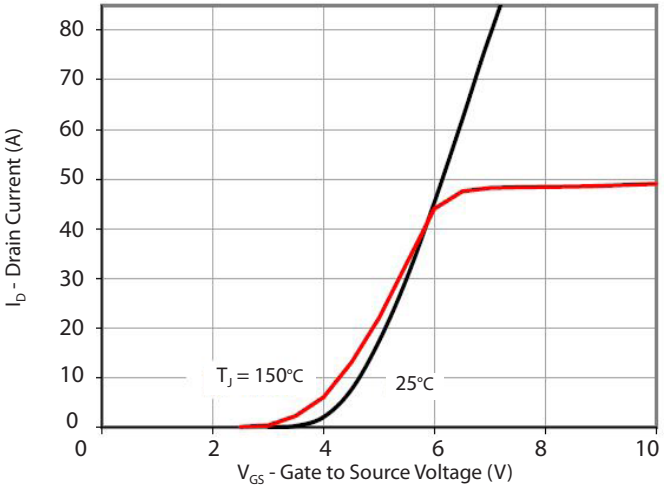
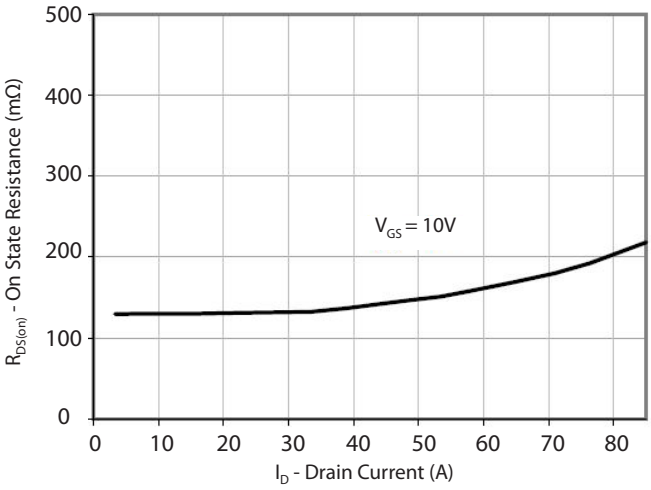
Output Characteristics



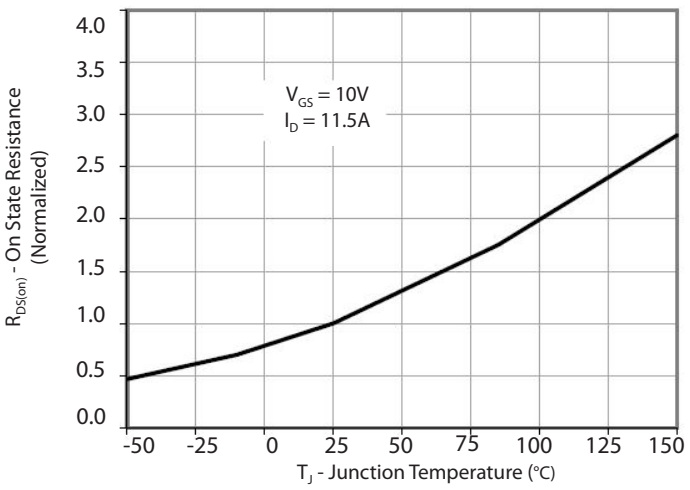
Transfer Characterstics



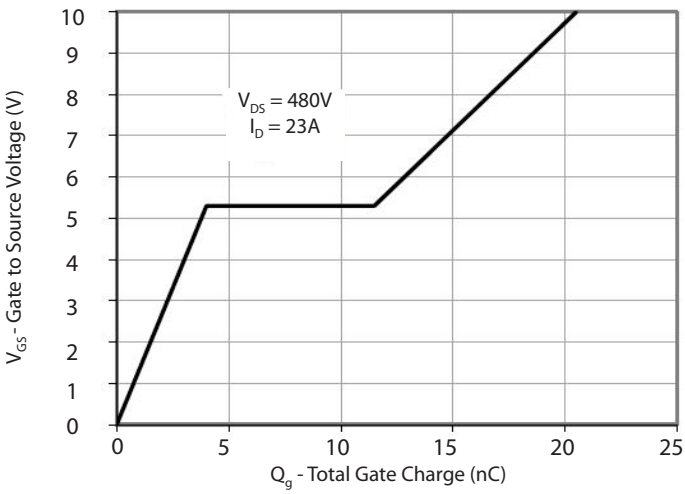
On State Resistance vs Drain Current



On Resistance vs Junction Temperature



Gate Charge



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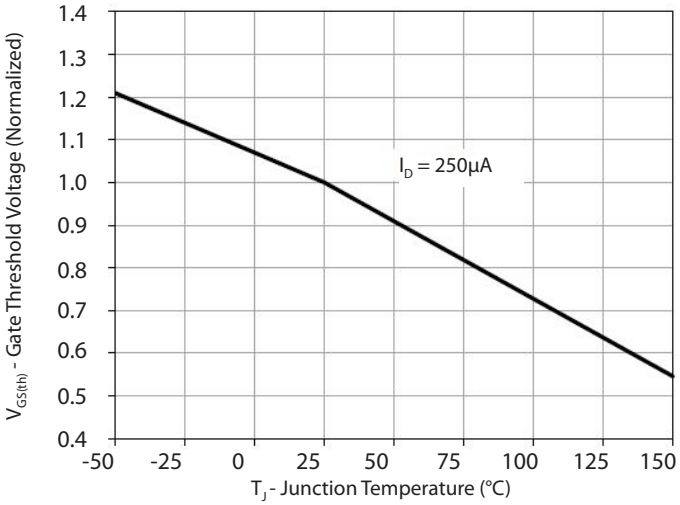
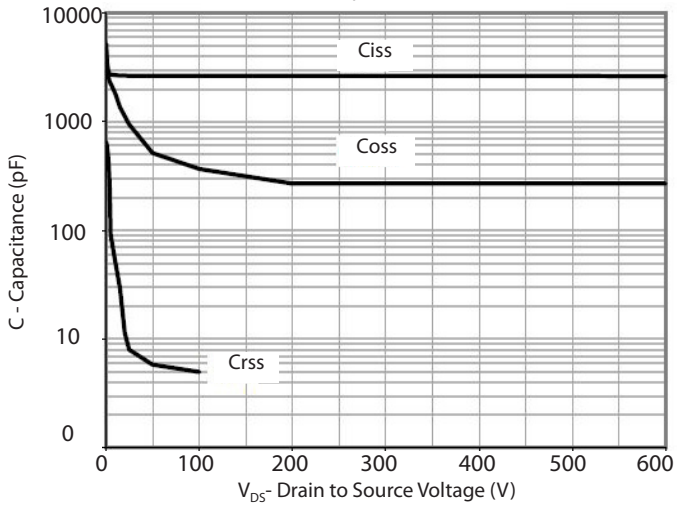
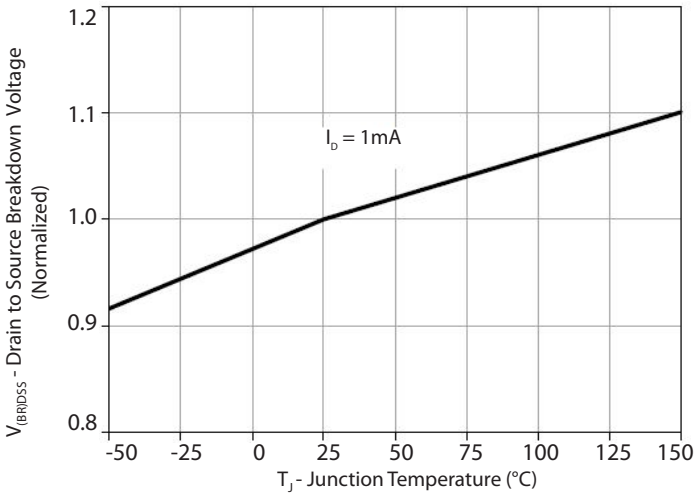
Gate Threshold Voltage vs. Junction Temperature



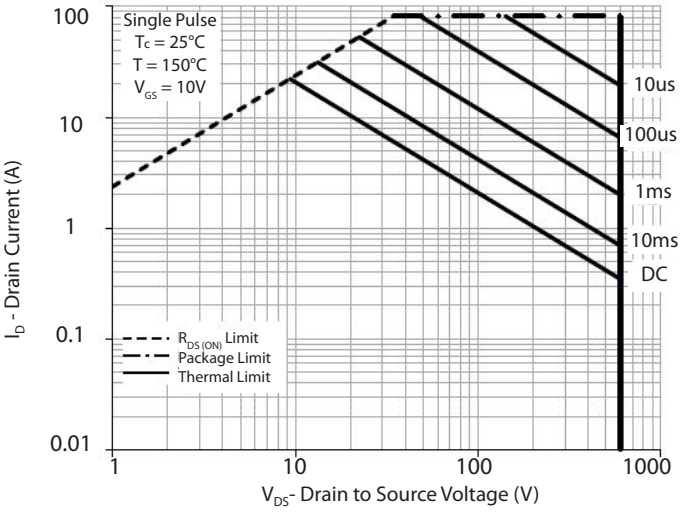
Capacitance



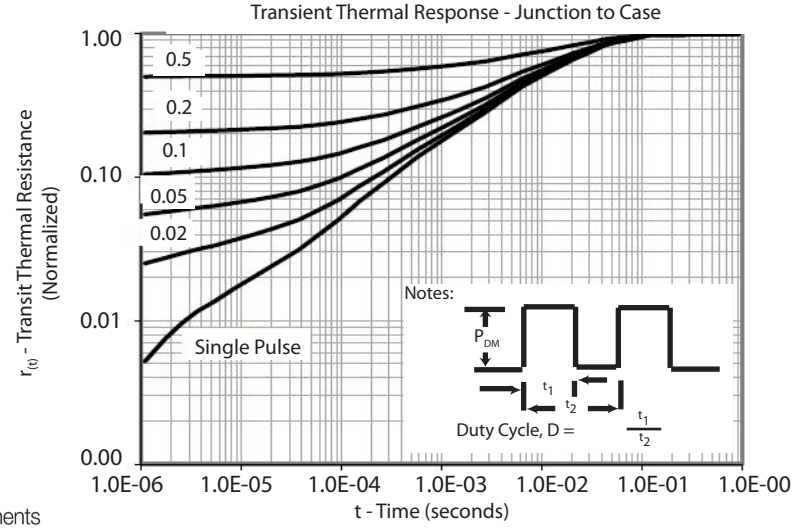
Drain to Source Breakdown Voltage vs. Junction Temperature



Maximum Rate Forward Biased Safe Operating Area



Transient Thermal Response - Junction to Case



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