N Channel Enchancement Mode MOSFET   ST6006S / ST6006

60V/60A

DESCRIPTION

The ST6006 is the N-Channel logic enhancement mode power field effect transistor are produced using high cell density, DMOS trench technology.

This ST6006 is densigned to withstand high energy in the avalanche and commutation modes. Designed for low voltage, high speed switching applications in power supplies, converters and power motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional safetv margin against unexpected voltage transients.

PIN CONFIGURATION

TO-220-3L
ST6006

TO-263-2L
ST6006S
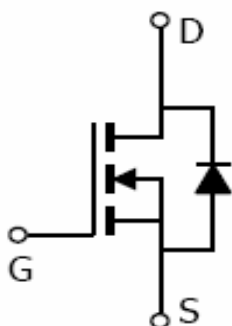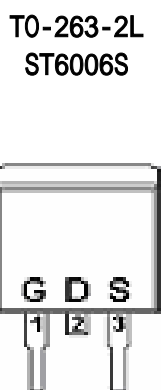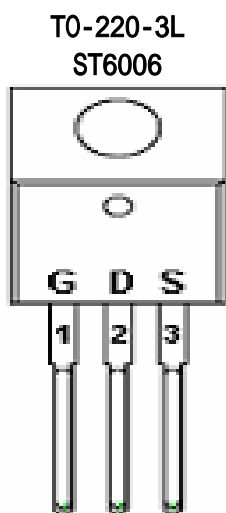
APPLICATIONS

- Power Supplies
- Converters
- Power Motor controls
- Bridge Circuit

FEATURE

- 20V/2.8A, $R_{DS(ON)} = 85$m-ohm
  @VGS = 4.5V
- 20V/2.4A, $R_{DS(ON)} = 115$m-ohm
  @VGS = 2.5V
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum
  DC current capability
- SOT-23-3L package design

STANSON TECHNOLOGY
120 Bentley Square, Mountain View, Ca 94040 USA
TEL: (650) 9389294   FAX: (650) 9389295

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60V/60A

ORDERING INFORMATION

Part Number	Package	Part Marking
ST6006T220TG	TO-220-3L	ST6006D
ST6006T220RG	TO-263-2L	ST6006

ABSOULTE MAXIMUM RATINGS (Ta = 25   Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	+/-20	V
Continuous Drain Current (TJ=150)	TA=25	I_D	60	A
	TA=70		39	
Pulsed Drain Current		I_{DM}	120	A
Continuous Source Current (Diode Conduction)		I_S	60	A
Power Dissipation	TA=25	P_D	120	W
	TA=70		3.7	
Operation Junction Temperature		T_J	150	
Storgae Temperature Range		T_{STG}	-55/150	
Thermal Resistance-Junction to Ambient		R JA	40	/W
			62.5	

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ELECTRICAL CHARACTERISTICS (Ta = 25   Unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=10uA$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=50uA$	1.0		3.0	V
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=20V$			100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$			1	uA
		$V_{DS}=20V, V_{GS}=0V$ $T_J=125$			50	
		$V_{DS}=60V, V_{GS}=0V$ $T_J=175$				
On-State Drain Current	$I_{D(on)}$	$V_{DS}=5V, V_{GS}=10V$	60			A
Drain-source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$		12	16	m
		$V_{GS}=10V, I_D=30A$ $T_J=125$		24	30	
		$V_{GS}=10V, I_D=30A$ $T_J=175$		31	37	
		$V_{GS}=5V, I_D=30A$		14	19	
Forward Transconductance	g_{fs}	$V_{DS}=15V, I_D=30A$		49		S
Diode Forward Voltage	V_{SD}	$I_F=60A, V_{GS}=0V$			1.6	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=30V, V_{GS}=10V$ I_D 60A		39	60	nC
Gate-Source Charge	Q_{gs}			12		
Gate-Drain Charge	Q_{gd}			10		
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V$ $F=1MHz$		2000		pF
Output Capacitance	C_{oss}			400		
Reverse Transfer Capacitance	C_{rss}			115		
Turn-On Time	$t_{d(on)}$	$V_{DD}=10V, R_L=5.5$ $I_D=3.6A, V_{GEN}=4.5V$ $R_G=6$		12	25	nS
	t_r			36	60	
Turn-Off Time	$t_{d(off)}$			34	60	
	t_f			10	25	

TO-220-3L PACKAGE OUTLINE
ST6006
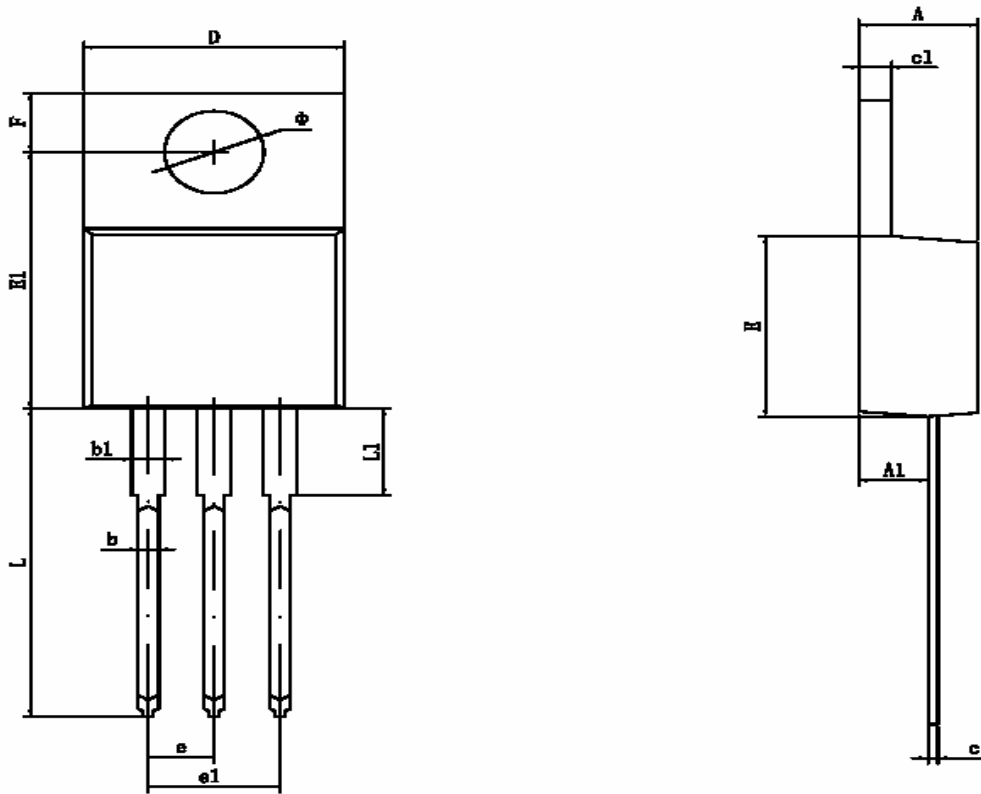
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540TYP		0.100TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.790	3.890	0.149	0.153

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TO-263-2L PACKAGE OUTLINE
ST6006S
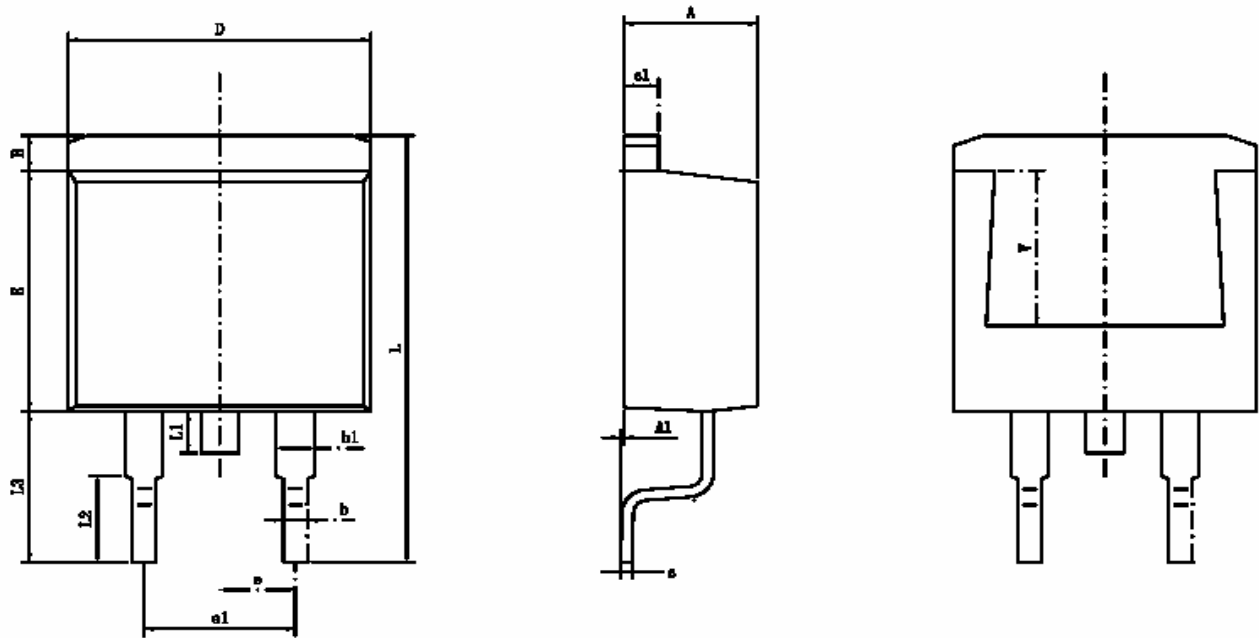
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540TYP		0.100TYP	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	1.300	1.700	0.051	0.067
L2	2.340	2.740	0.092	0.108
L3	5.080	5.480	0.200	0.216
V	5.600REF		0.220REF	

TYPICAL CHARACTERISTICS

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case
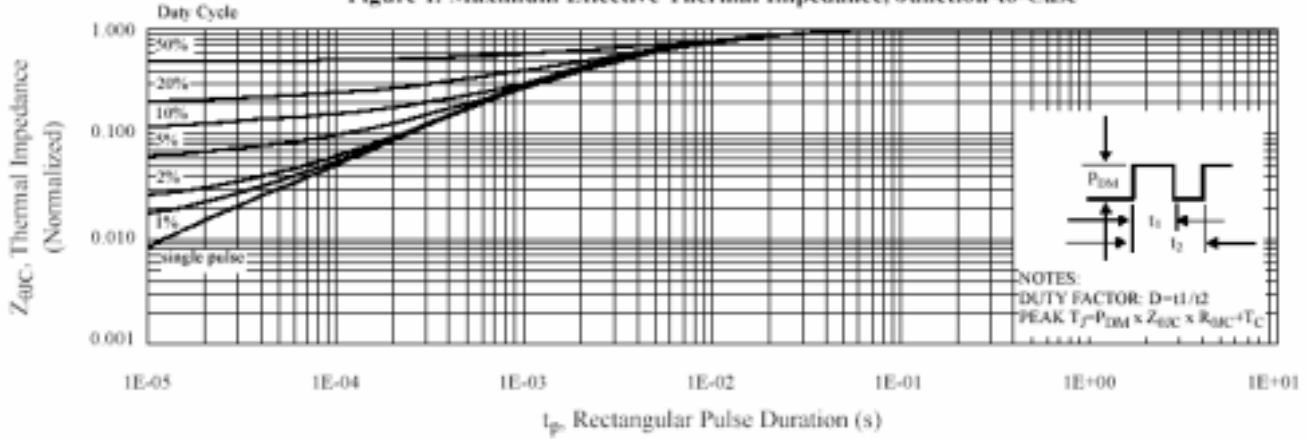
Figure 2. Maximum Power Dissipation vs Case Temperature
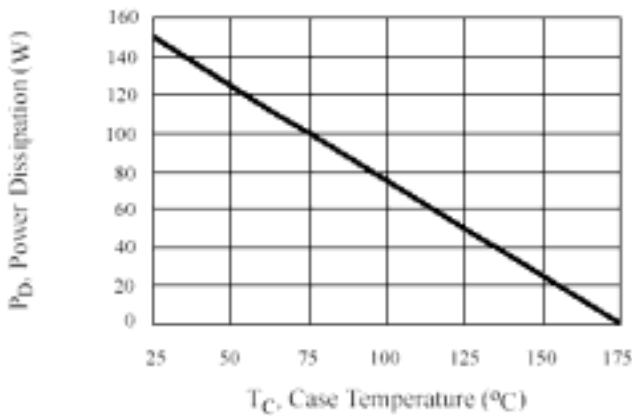
Figure 3. Maximum Continuous Drain Current vs Case Temperature
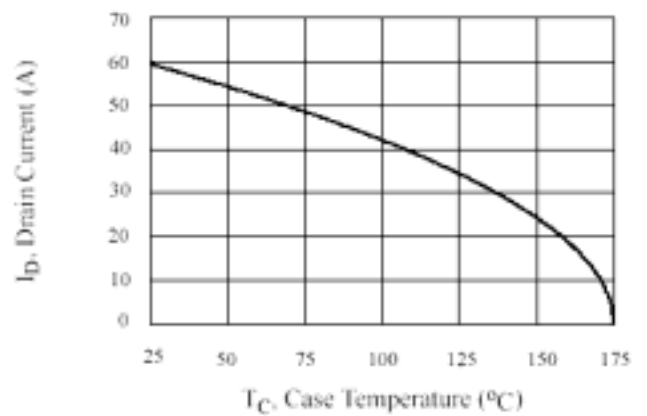
Figure 4. Typical Output Characteristics
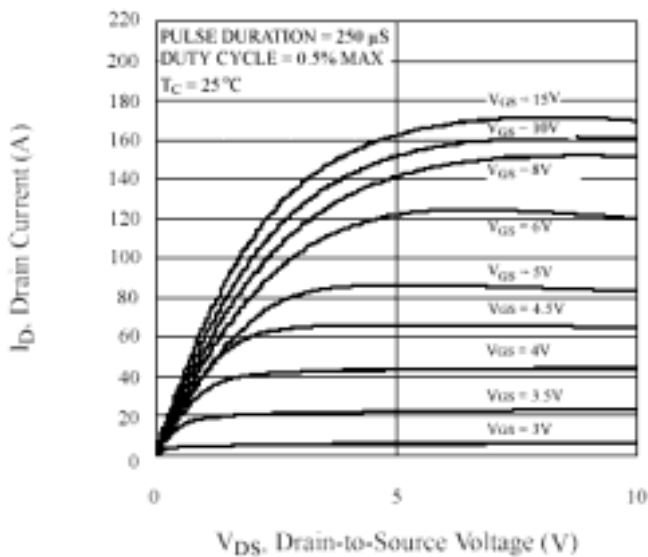
Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current
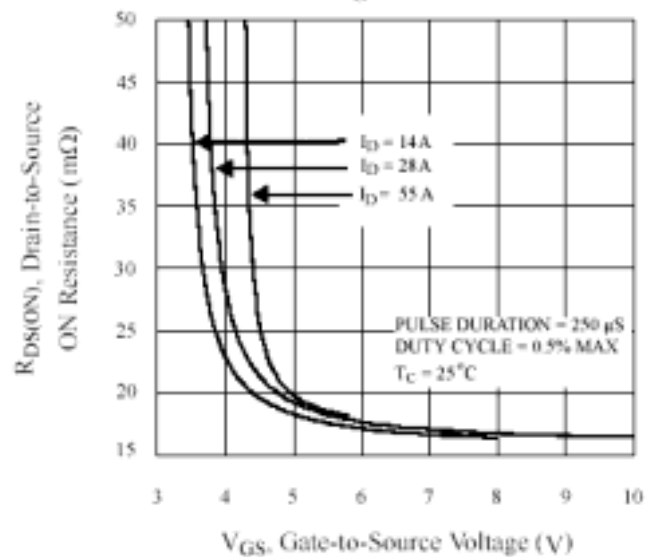
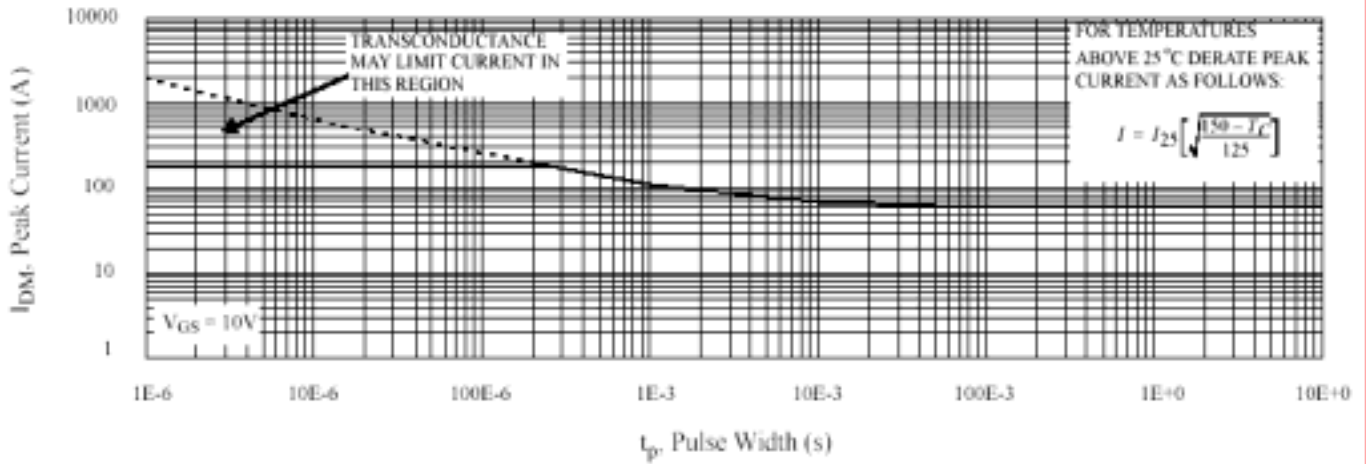# TYPICAL CHARACTERISTICS

Figure 6. Maximum Peak Current Capability
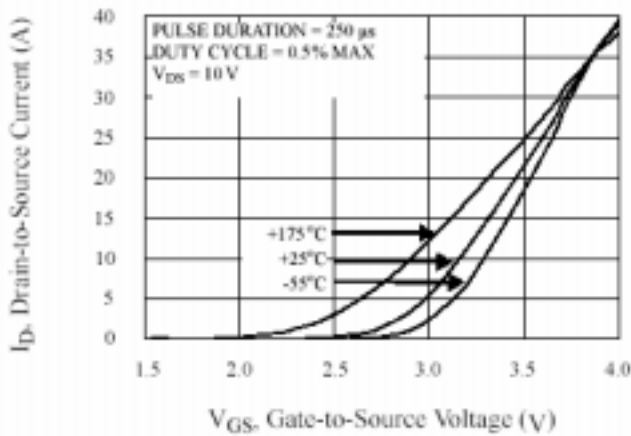

Figure 7. Typical Transfer Characteristics

Figure 8. Unclamped Inductive Switching Capability
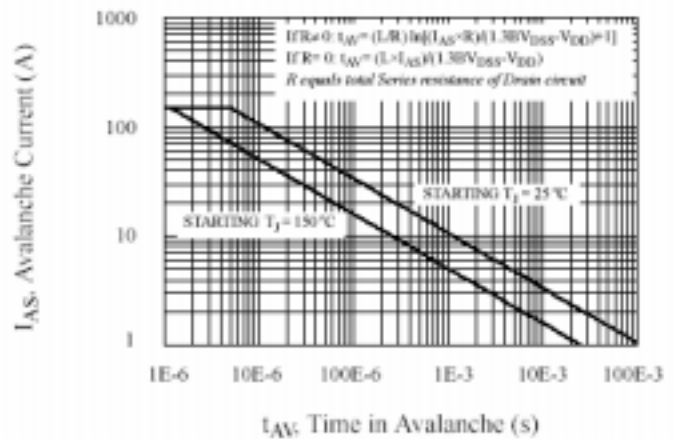
Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current
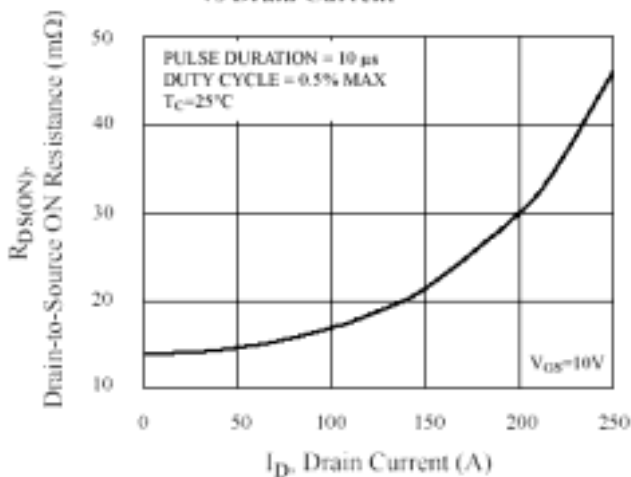
Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature
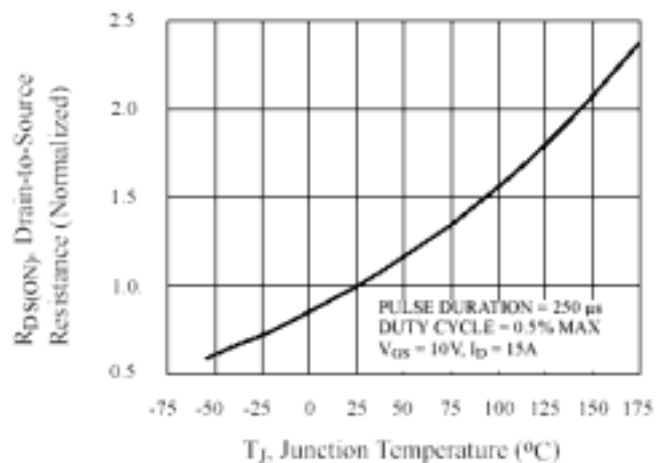
TYPICAL CHARACTERISTICS

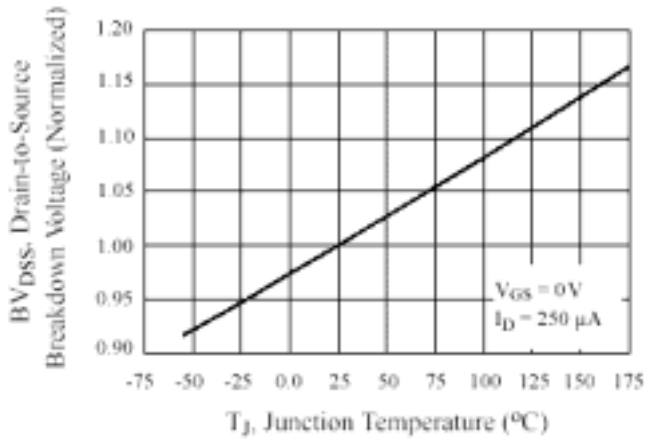Figure 11. Typical Breakdown Voltage vs Junction Temperature

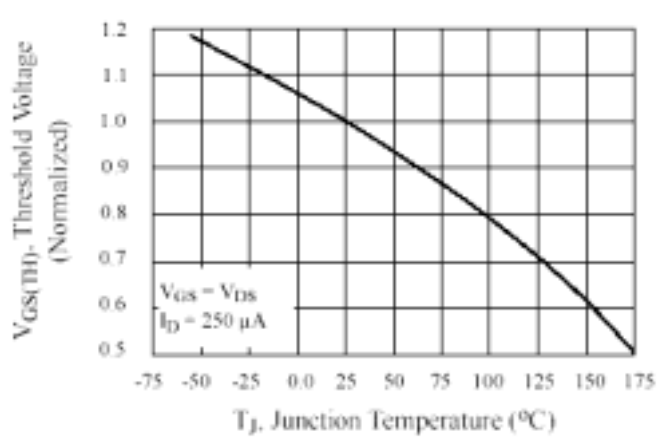Figure 12. Typical Threshold Voltage vs Junction Temperature

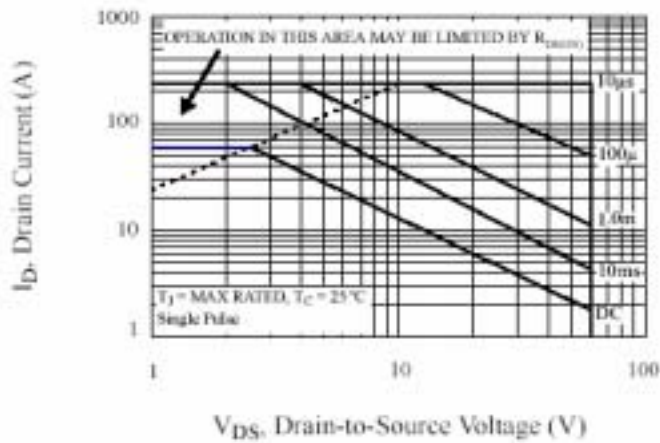Figure 13. Maximum Forward Bias Safe Operating Area

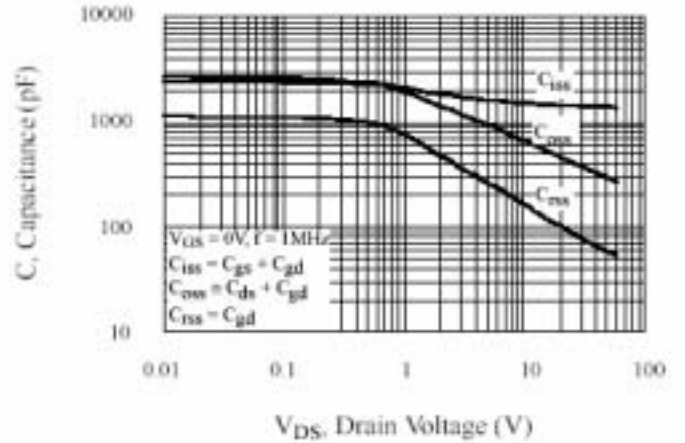Figure 14. Typical Capacitance vs Drain-to-Source Voltage
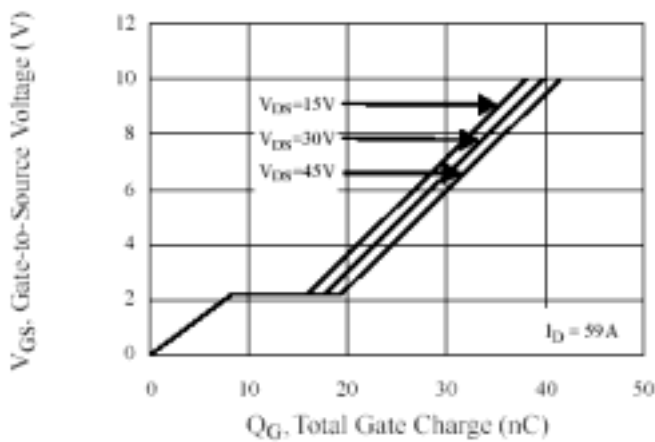
Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

Figure 16. Typical Body Diode Transfer Characteristics