

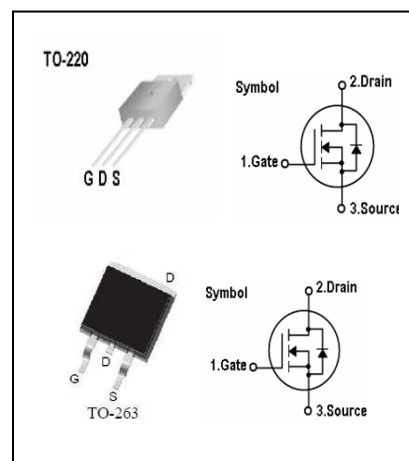
N-Channel MOSFET

Features

- 60V, 120A, $R_{ds(on)}$ (typ)=6.5m Ω @ V_{gs} =10V
- High Ruggedness
- Fast Switching
- 100% Avalanche Tested
- Improved dv/dt Capability

General Description

This Power MOSFET is produced using Si-Tech's advanced Trench MOS Technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. These devices are well suited for low voltage application such as automotive, DC/DC converters, and high efficiency switch for power management in portable and battery products.



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	60	V
I_D	Continuous Drain Current (TC=25 °C)	120	A
	Continuous Drain Current (TC=100 °C)	95	A
I_{DM}	Pulsed Drain Current (Note 1)	380	A
V_{GS}	Gate-Source Voltage	± 25	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	650	mJ
P_D	Maximum Power Dissipation (TC=25 °C)	180	W
	Derating Factor above 25°C	1	W/°C
T_J	Operating Junction Temperature Range	-55 to +175	°C
T_{STG}	Storage Temperature Range	-55 to +175	°C

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j-c}$	Thermal Resistance, Junction to case	0.75	°C/W
$R_{th\ c-s}$	Thermal Resistance, Case to Sink	0.5	°C/W
$R_{th\ j-a}$	Thermal Resistance, Junction to Ambient	63	°C/W

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=55V, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate Leakage Current, Forward	$V_{GS}=25V, V_{DS}=0V$	-	-	100	nA
	Gate Leakage Current, Reverse	$V_{GS}=-25V, V_{DS}=0V$	-	-	-100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	-	4	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=40A$	-	6.5		m Ω
Q_g	Total Gate Charge	$V_{DD}=60V$	-	110	-	nC
Q_{gs}	Gate-Source Charge	$V_{GS}=10V$	-	29	-	nC
Q_{gd}	Gate-Drain Charge	$I_D=80A$ (Note 3)	-	52	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=37.5V, V_{GS}=10V$	-	26	-	ns
t_r	Turn-on Rise Time	$I_D=45A, R_G=4.7\Omega$	-	143	-	ns
$t_{d(off)}$	Turn-off Delay Time	$T_C=25^{\circ}\text{C}$	-	40	-	ns
t_f	Turn-off Fall Time	(Note 3)	-	26	-	ns
C_{iss}	Input Capacitance -	$V_{DS}=25V$	-	3500		pF
C_{oss}	Output Capacitance	$V_{GS}=0V$	-	400	-	pF
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$	-	240	-	pF

Source-Drain Diode Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

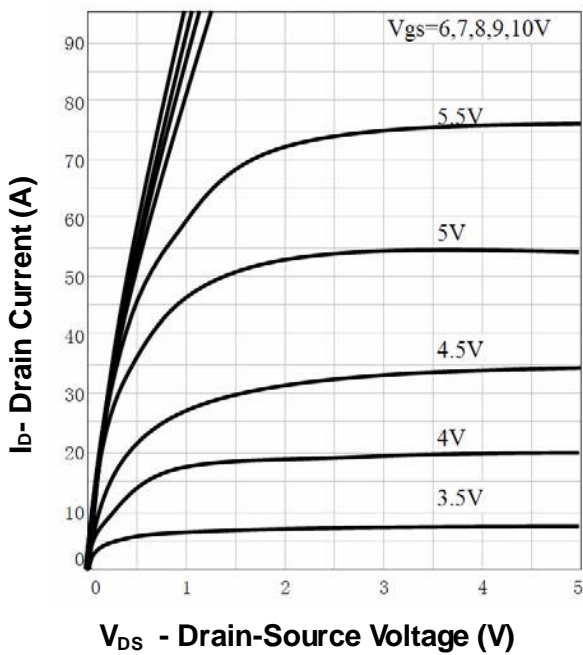
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Diode Forward Current		-	-	120	A
I_{SM}	Pulsed Source Diode Forward Current (Note 1)		-	-	380	A
V_{SD}	Forward On Voltage	$V_{GS}=0V, I_S=45A$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_S=45A$	-	100	150	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt = 100A/\mu s$	-	410	650	nC

Notes:

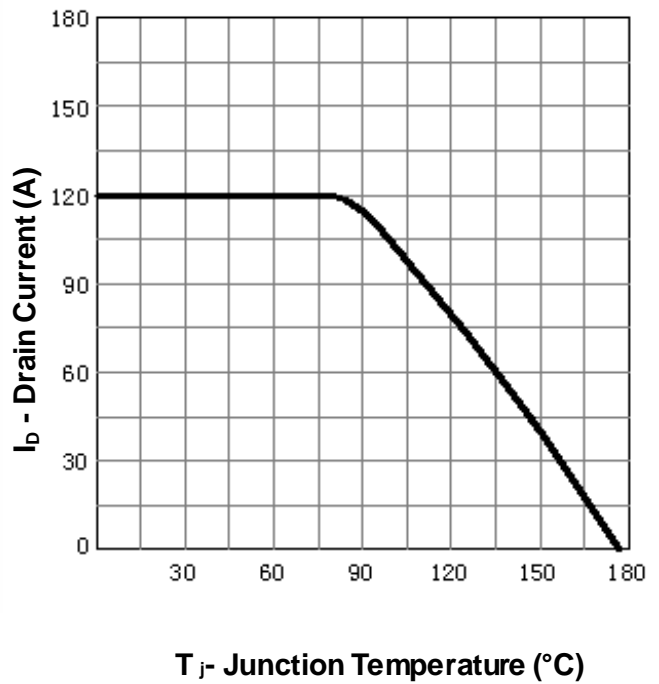
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L=0.5\text{mH}, I_{AS}=55A, V_{DD}=50V, R_G=25, \text{Starting } T_J=25^{\circ}\text{C}$
3. Pulse Width $\leq 300\mu s$; Duty Cycle $\leq 2\%$

Typical Characteristics

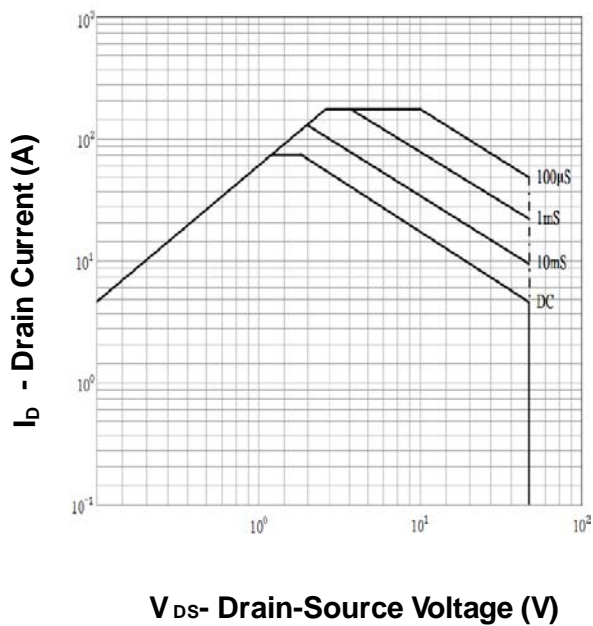
Output Characteristics



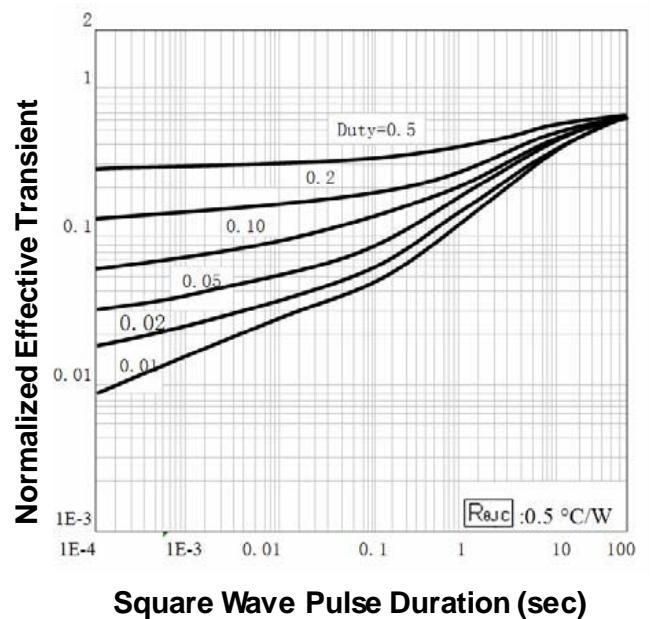
Drain Current



Safe Operation Area

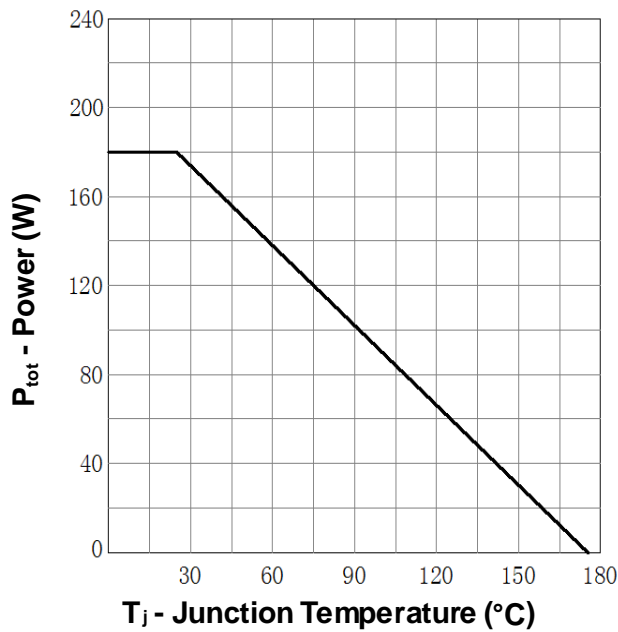


Thermal Transient Impedance

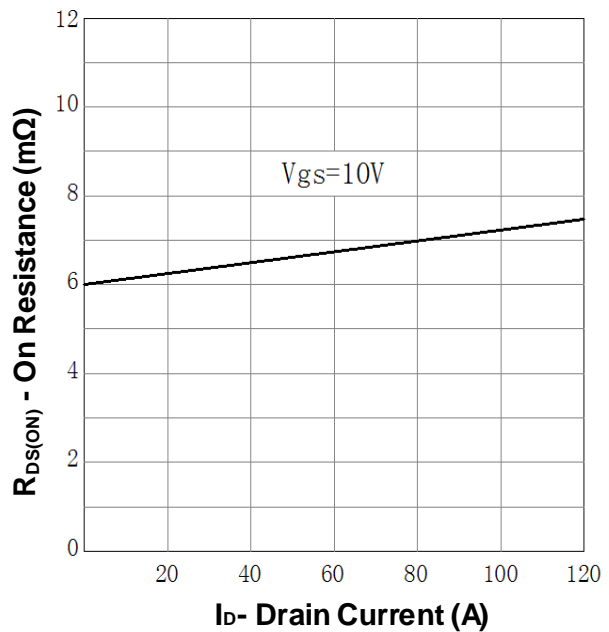


Typical Characteristics

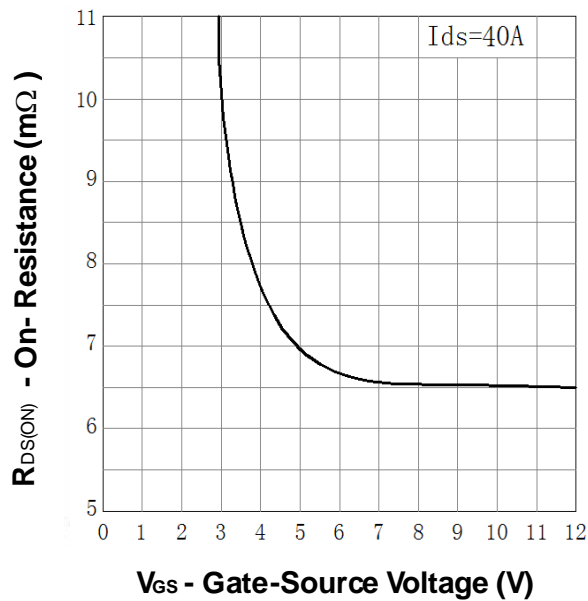
Power Dissipation



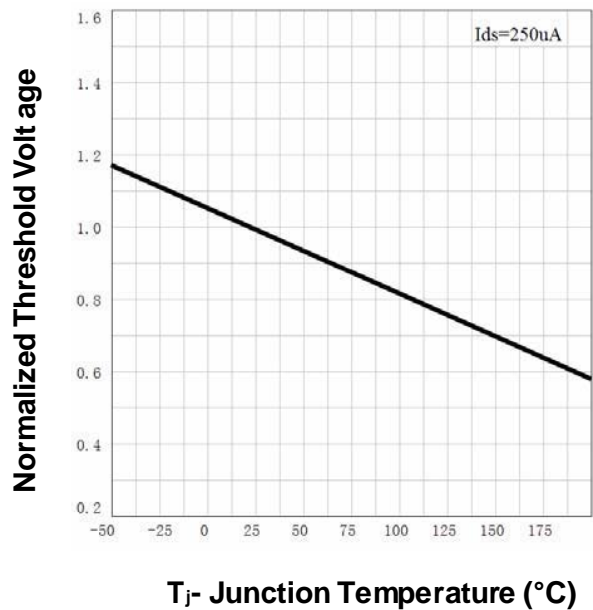
Drain-Source On Resistance



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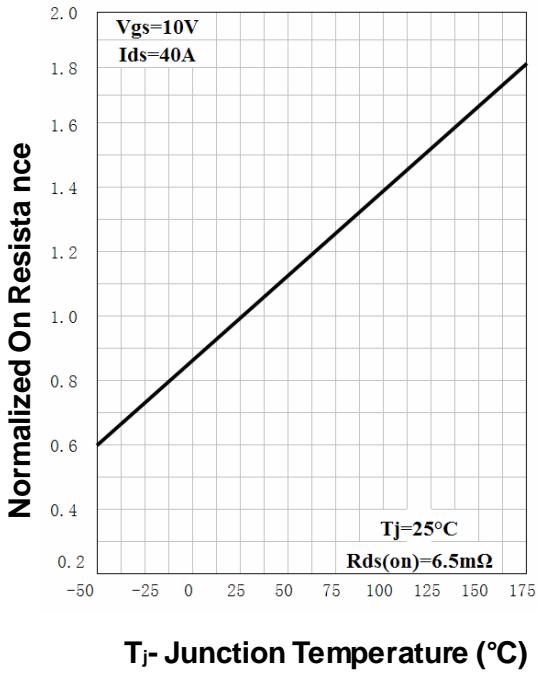


Gate Threshold Voltage

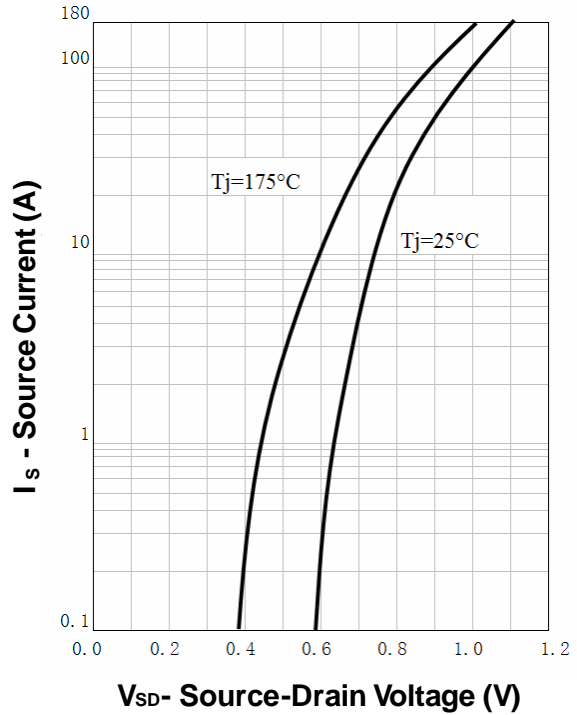


Typical Characteristics

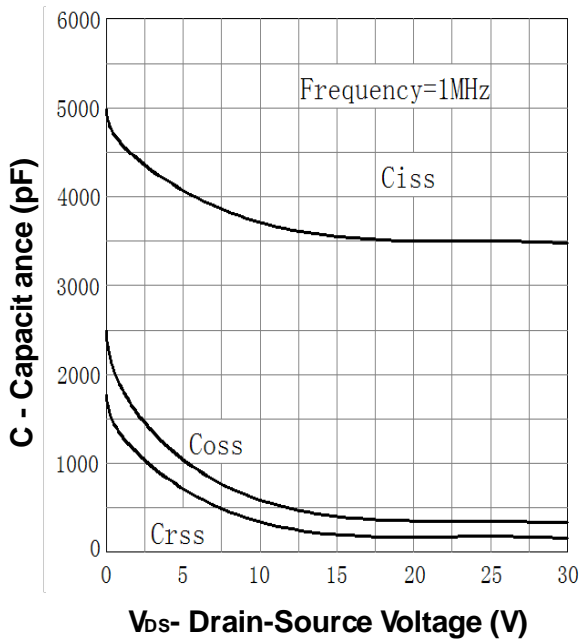
Drain-Source On Resistance



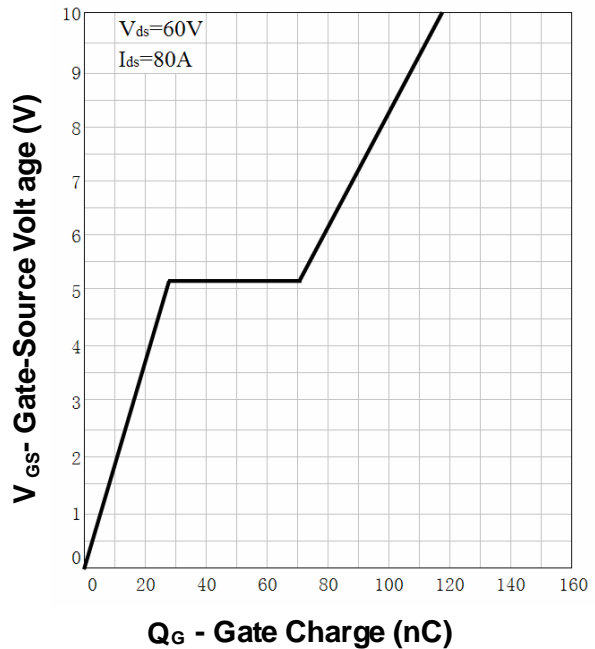
Source-Drain Diode Forward



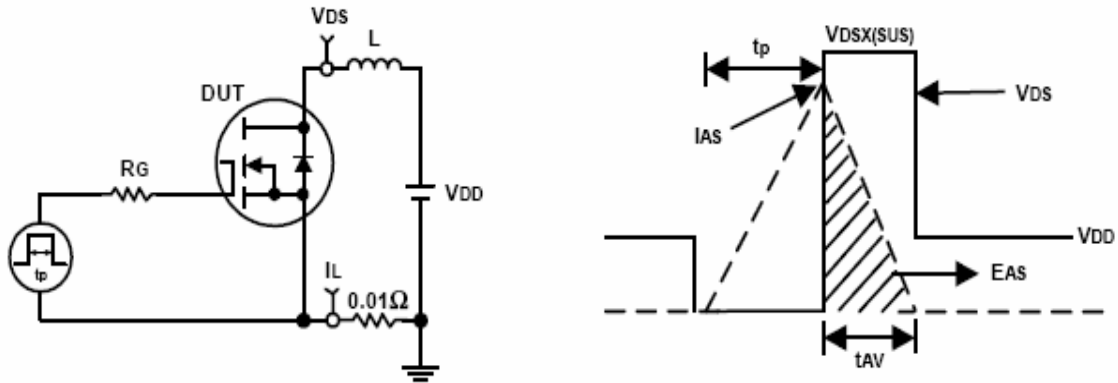
Capacitance



Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

