

### Features

5A, 650V,  $R_{DS(ON)MAX} = 2.2 \Omega @ V_{GS} = 10V / 2.5A$

Low gate charge

Low  $C_{iss}$

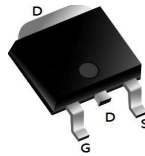
Fast switching

100% avalanche tested

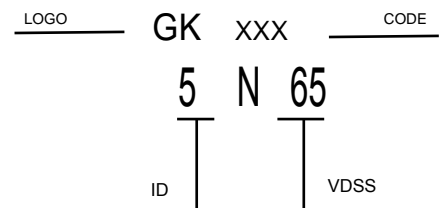
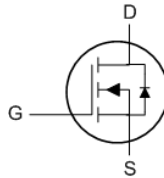
Improved dv/dt capability

$V_{DSS}$  650V  
 $I_D$  5 A  
 $R_{DS(ON)}$  1.8  $\Omega$

TO-252



Equivalent Circuit



## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

**Absolute Maximum Ratings** (@  $T_C = 25^\circ\text{C}$  unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	650	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	5	A
	Pulsed (Note 2)	$I_{DM}$	10	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	112	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.2	V/ns
Power Dissipation		$P_D$	36	W
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3.  $L = 10\text{mH}$ ,  $I_{AS} = 4.73\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25 \Omega$  Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 7.0\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

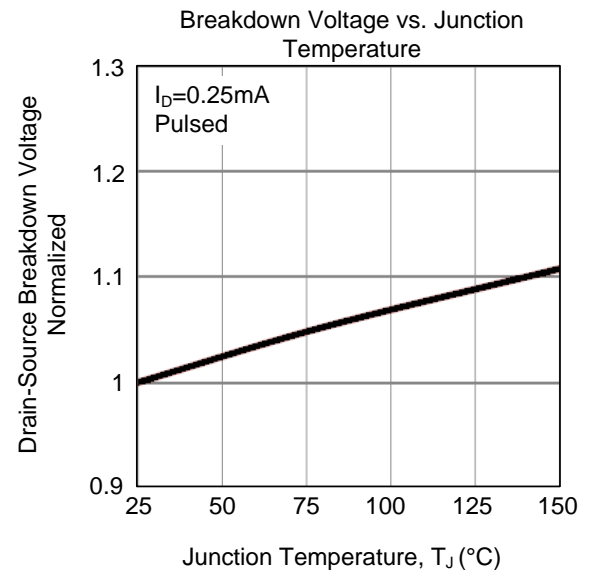
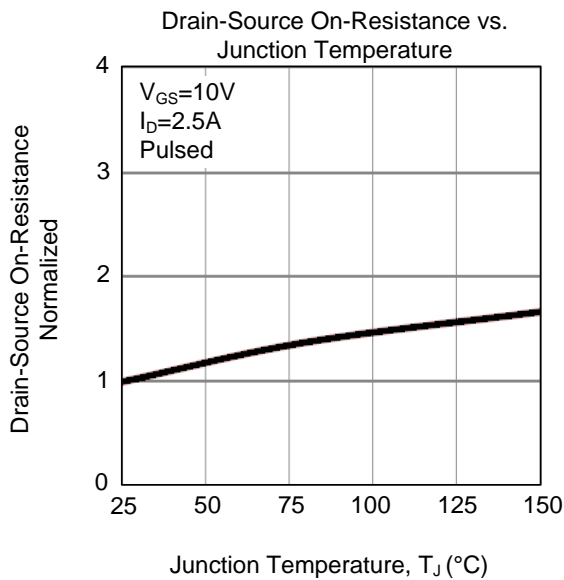
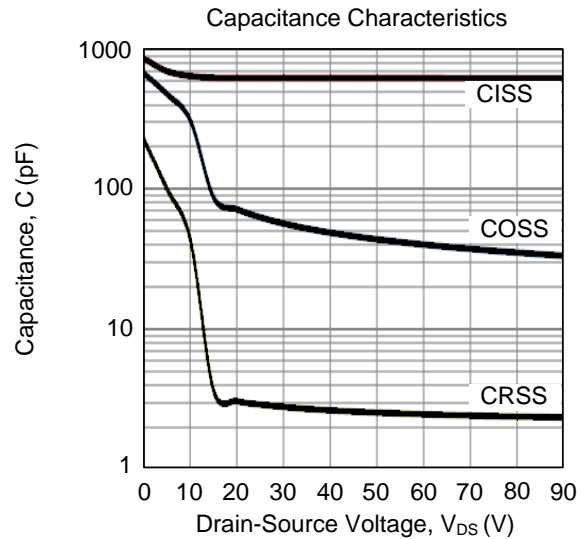
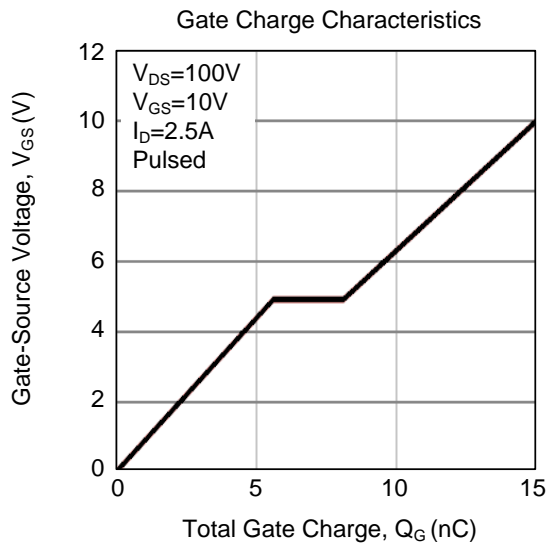
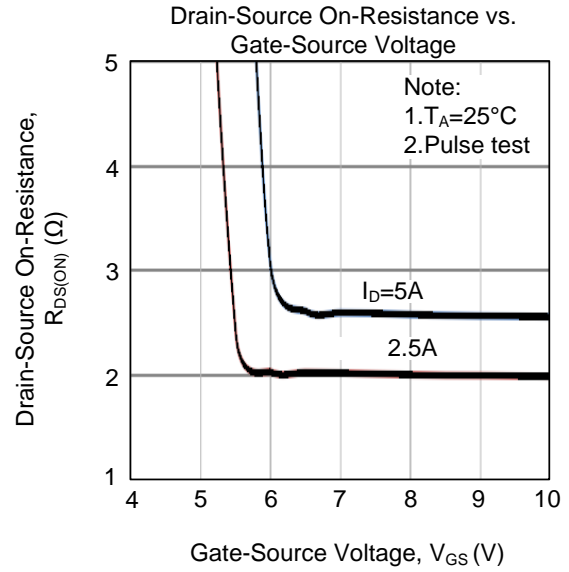
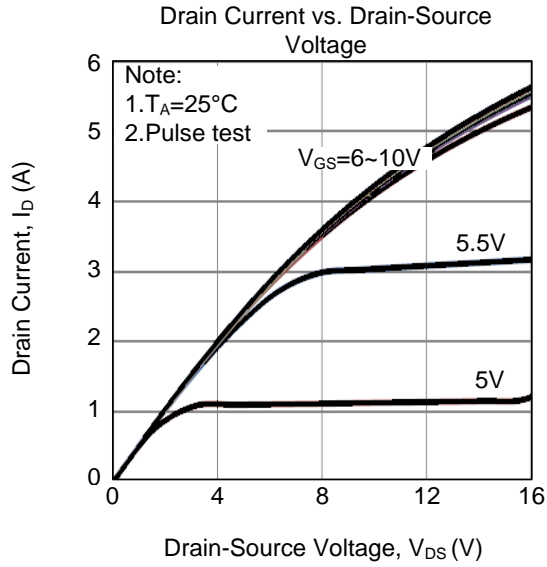
### Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$			10	$\mu A$
Gate-Source Leakage Current	Forward	$V_{GS}=30V, V_{DS}=0V$			100	nA
	Reverse		$V_{GS}=-30V, V_{DS}=0V$			-100
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.5A$		1.8	2.2	$\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=25V, f=1.0\text{ MHz}$		623		pF
Output Capacitance	$C_{OSS}$			62		pF
Reverse Transfer Capacitance	$C_{RSS}$			2.9		pF
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=100V, V_{GS}=10V, I_D=2.0A$ $I_G=1\text{ mA}$ (Note 1, 2)		15		nC
Gate-source Charge	$Q_{GS}$			5.6		nC
Gate-drain Charge	$Q_{GD}$			2.5		nC
Turn-on Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=30V, V_{GS}=10V, I_D=0.5A,$ $R_G=25\Omega$ (Note 1, 2)		4.4		ns
Rise Time	$t_R$			24		ns
Turn-off Delay Time	$t_{D(OFF)}$			122		ns
Fall-Time	$t_F$			25		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				5	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				10	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$V_{GS}=0V, I_S=5.0A$			1.4	V
Reverse Recovery Time (Note 1)	$t_{rr}$	$V_{GS}=0V, I_S=5.0A,$		328		ns
Reverse Recovery Charge	$Q_{rr}$	$di_F/dt=100A/\mu s$ (Note1)		2.65		$\mu C$

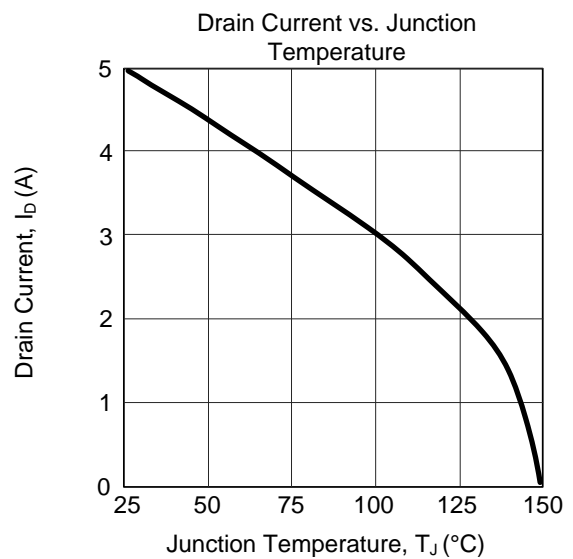
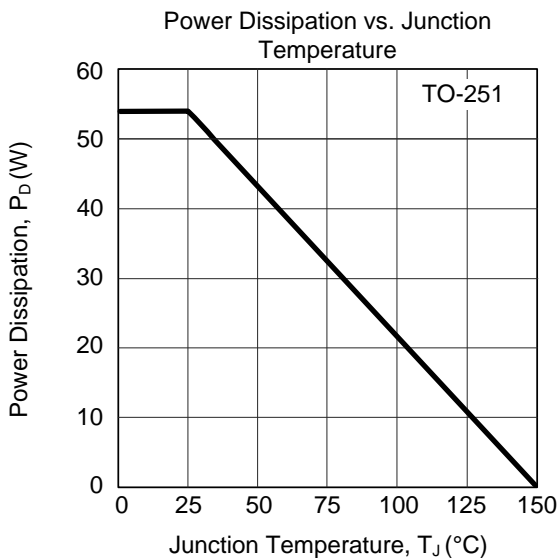
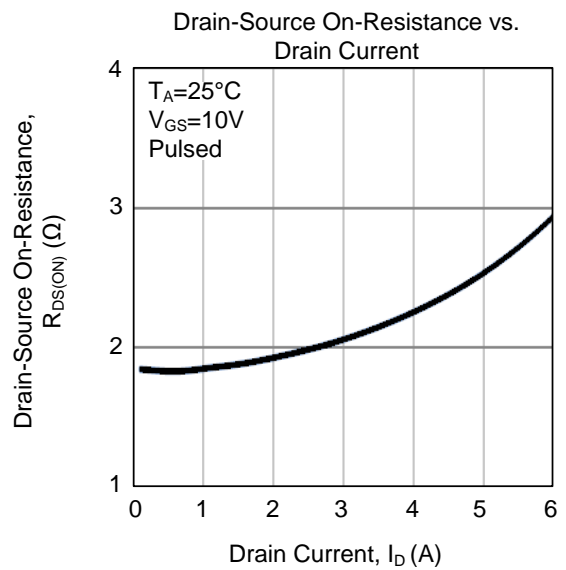
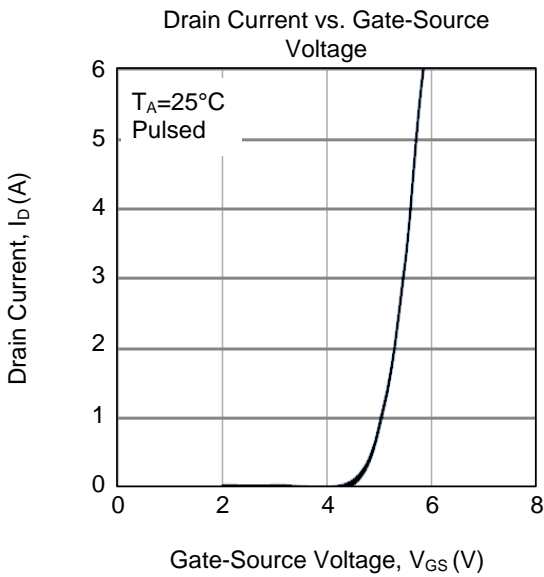
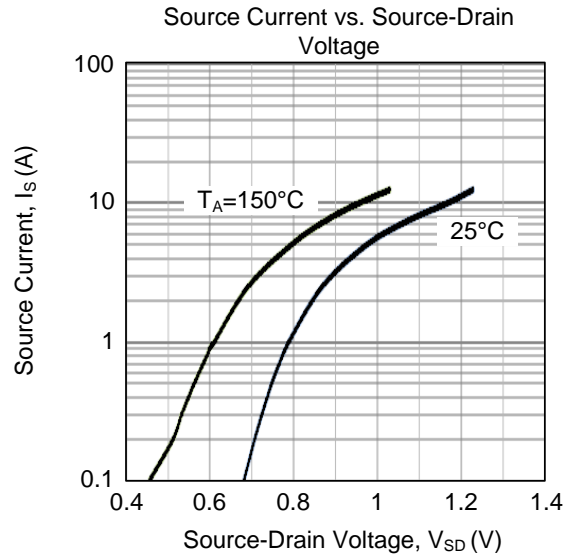
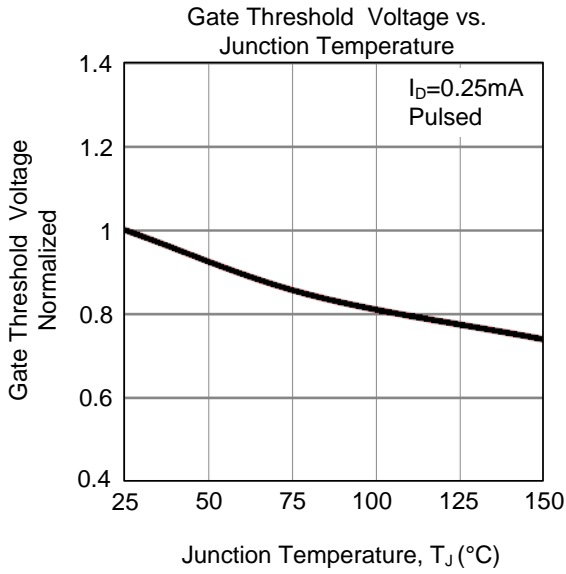
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES



RATING AND CHARACTERISTIC CURVES



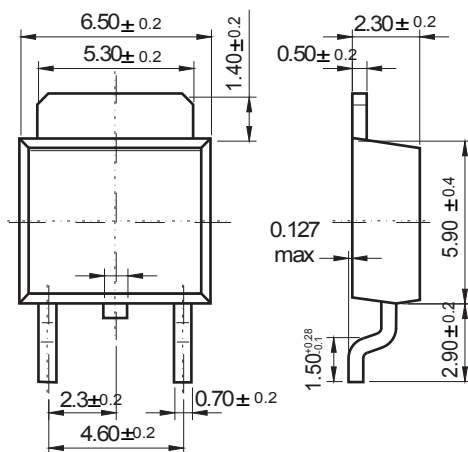
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150 °C
	-Temperature Max ( $T_{s(max)}$ )	+200 °C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak)		3 °C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3 °C/sec. Max
Reflow	-Temperature ( $T_L$ ) (Liquid us)	+217 °C
	-Temperature ( $t_L$ )	60-150 secs.
Peak Temp ( $T_P$ )		+260(+0/-5) °C
Time within 5 °C of actual Peak Temp ( $t_p$ )		30 secs. Max
Ramp-down Rate		6 °C/sec. Max
Time 25 °C to Peak Temp ( $T_P$ )		8 min. Max
Do not exceed		+260 °C

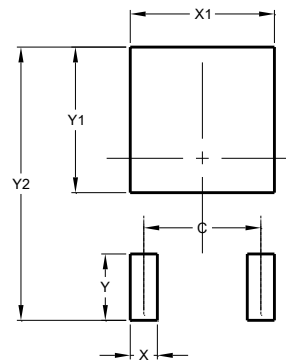


Package Dimensions & Suggested Pad Layout

TO-252



Dimensions in inches and (millimeters)



Dimensions	Value (in mm)
C	4.55
X	1.50
X1	5.80
Y	2.70
Y1	6.00
Y2	10.90

Tape & reel specification

Tape		Symbol	Dimension (mm)
		P0	4.00±0.20
		P1	8.00±0.20
		P2	2.00±0.20
		D0	1.55±0.15
		D1	1.55±0.20
		E	1.75±0.20
		F	7.50±0.20
		W	16.00±0.20
		A0	7.10±0.20
		B0	10.50±0.20
		K0	2.70±0.20
		T	0.30±0.10
		D2	330.0±5.0
		D3	100.0±4.0
		W1	20.0±5.0
W2	25.0±5.0		
I	13.0±2.0		
Quantity: 2500PCS			

