NEC

MOS FIELD EFFECT TRANSISTOR
2SK3456

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

The 2SK3456 is N-channel DMOS FET device that features a low gate charge and excellent switching characteristics, designed for high voltage applications such as switching power supply, AC adapter.

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3456	TO-220AB
2SK3456-S	TO-262
2SK3456-ZJ	TO-263

FEATURES

- Low gate charge
  Q_G = 30 nC TYP. (V_{DD} = 400 V, V_{GS} = 10 V, I_D = 12 A)
- Gate voltage rating ±30 V
- Low on-state resistance
  $R_{DS(on)}$ = 0.58 Ω MAX. (V_{GS} = 10 V, I_D = 6.0 A)
- Avalanche capability ratings
- Surface mount package available

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	500	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±30	V
Drain Current (DC) (T_C = 25°C)	$I_{D(DC)}$	±12	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	±36	A
Total Power Dissipation (T_A = 25°C)	P_{T1}	1.5	W
Total Power Dissipation (T_C = 25°C)	P_{T2}	100	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C
Single Avalanche Current Note2	I_{AS}	12	A
Single Avalanche Energy Note2	E_{AS}	51	mJ

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1 %

2. Starting T_{ch} = 25 °C, V_{DD} = 150 V, R_G = 25 Ω, V_{GS} = 20 V → 0 V

The information contained in this document is being issued in advance of the production cycle for the device. The parameters for the device may change before final production or NEC Corporation, at its own discretion, may withdraw the device prior to its production.
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

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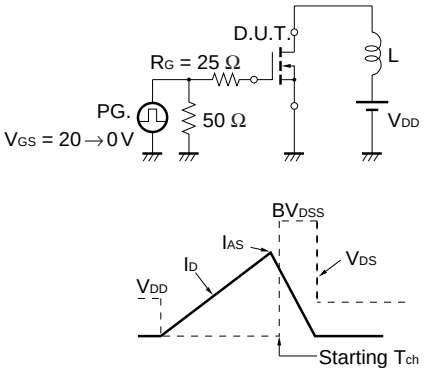
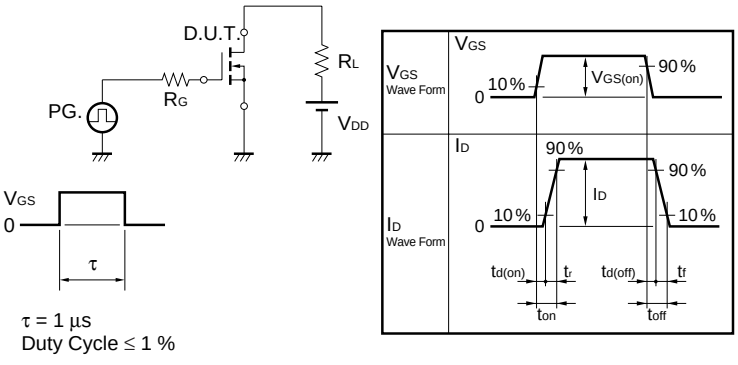
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Leakage Current	I_{DSS}	V_{DS} = 500 V, V_{GS} = 0 V			100	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V			±100	nA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	2.5		3.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 6.0 A	2.0			S
Drain to Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 6.0 A		0.46	0.58	Ω
Input Capacitance	C_{iss}	V_{DS} = 10 V		1500		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		250		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		22		pF
Turn-on Delay Time	$t_{d(on)}$	I_D = 6.0 A		24		ns
Rise Time	t_r	$V_{GS(on)}$ = 10 V		13		ns
Turn-off Delay Time	$t_{d(off)}$	V_{DD} = 150 V		59		ns
Fall Time	t_f	R_G = 10 Ω		21		ns
Total Gate Charge	Q_G	I_D = 12 A		30		nC
Gate to Source Charge	Q_{GS}	V_{DD} = 400 V		7.3		nC
Gate to Drain Charge	Q_{GD}	V_{GS} = 10 V		11		nC
Diode Forward Voltage	$V_{F(S-D)}$	I_F = 12 A, V_{GS} = 0 V		1.0		V
Reverse Recovery Time	t_{rr}	I_F = 12 A, V_{GS} = 0 V		1.4		μs
Reverse Recovery Charge	Q_{rr}	di/dt = 50 A/μs		7.6		μC

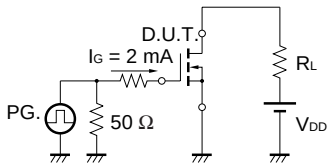
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

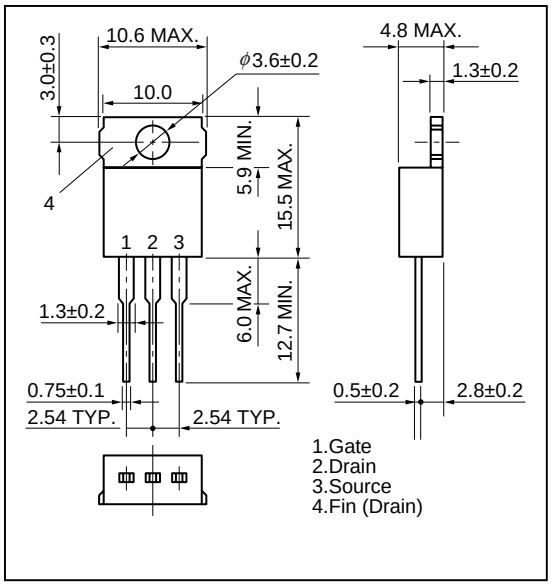


TEST CIRCUIT 3 GATE CHARGE

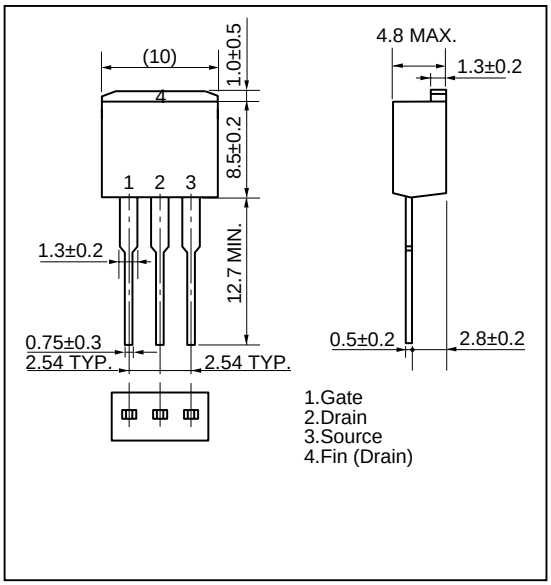


PACKAGE DRAWINGS (Unit : mm)

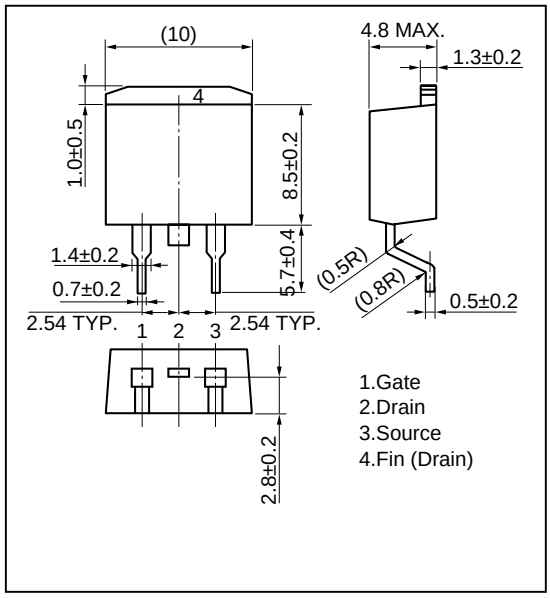
1)TO-220AB (MP-25)



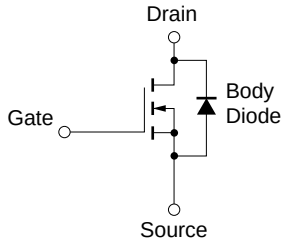
2)TO-262 (MP-25 Fin Cut)



3)TO-263 (MP-25ZJ)



EQUIVALENT CIRCUIT



Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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  Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

  Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

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